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Pacific Marine Review

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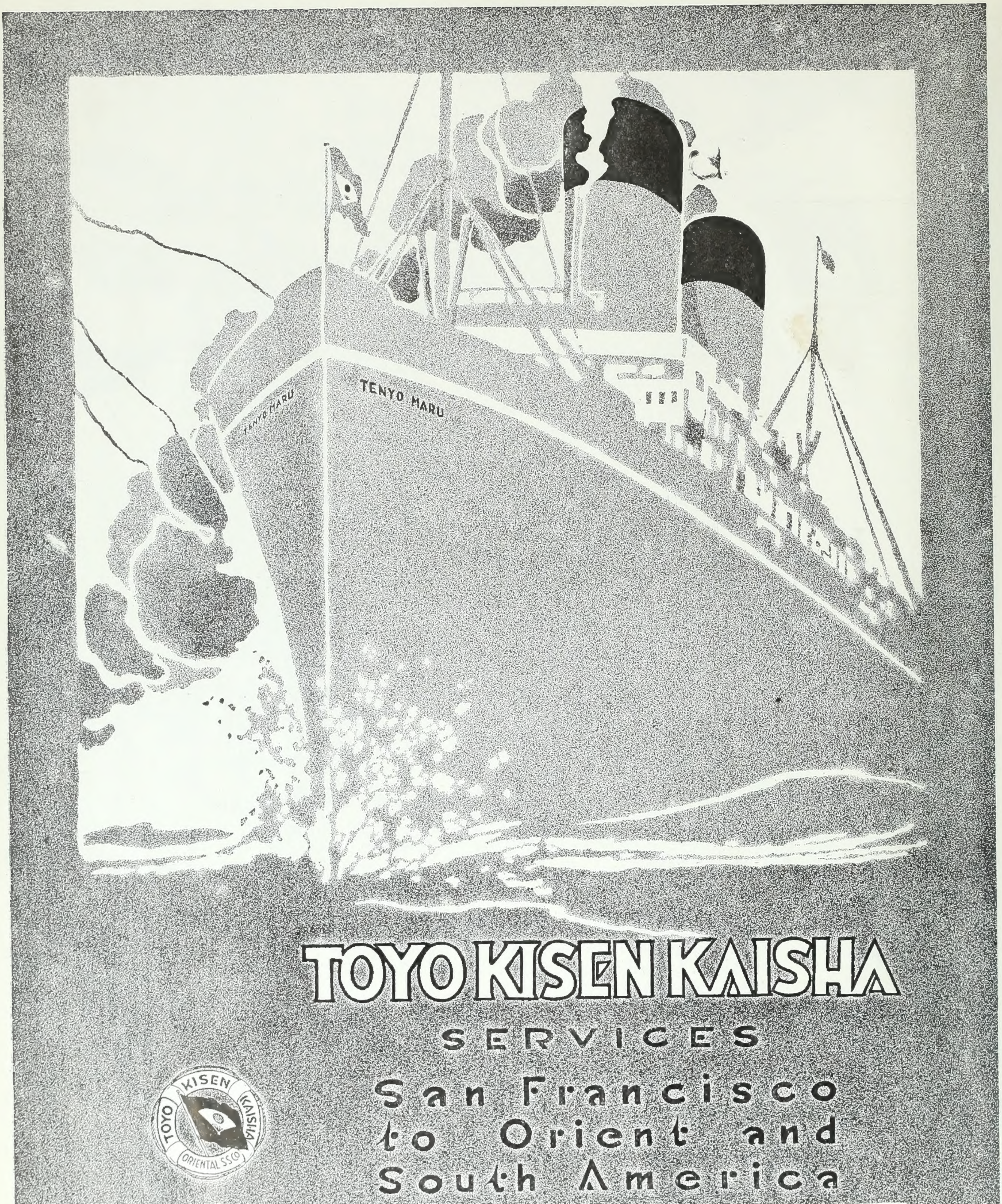
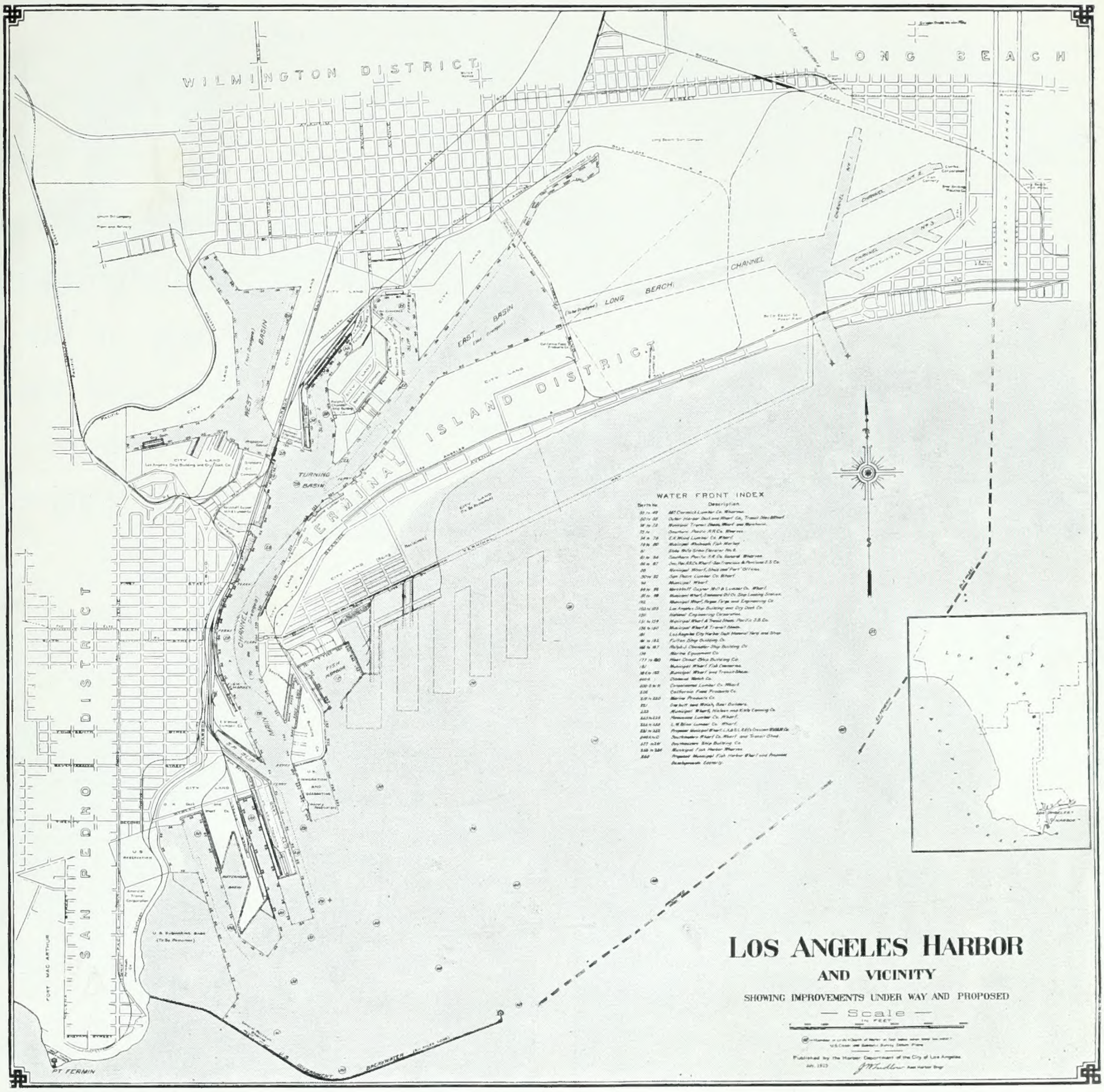


Sailings from San Francisco to Japan, China and Philippines

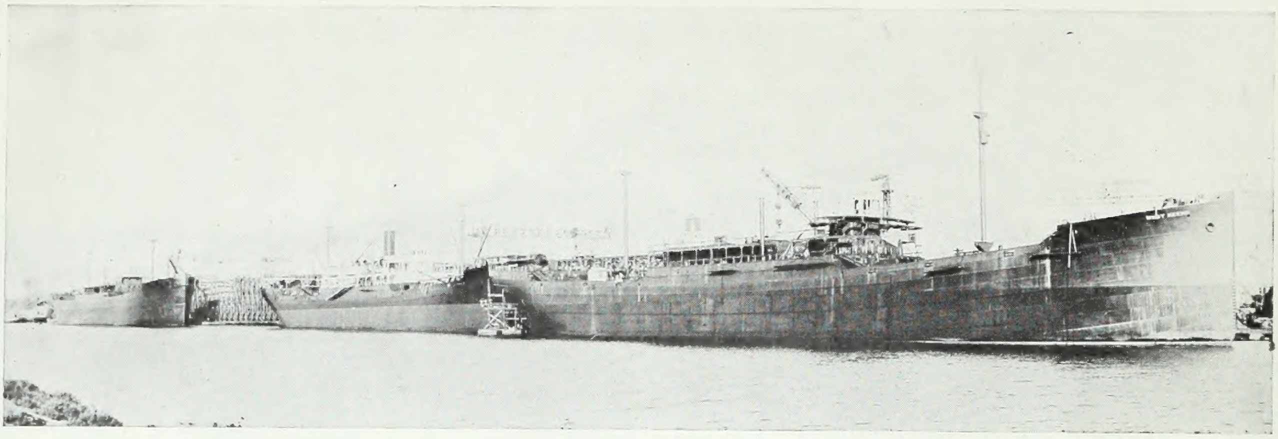
S. S. Korea Maru, January 7th
S. S. Tenyo Maru, January 23rd
S. S. Siberia Maru, 20,000 tons, Dec. 22nd

South American Line—S. S. Kiyo Maru sails for Valparaiso and West Coast Ports Feb. 21st.

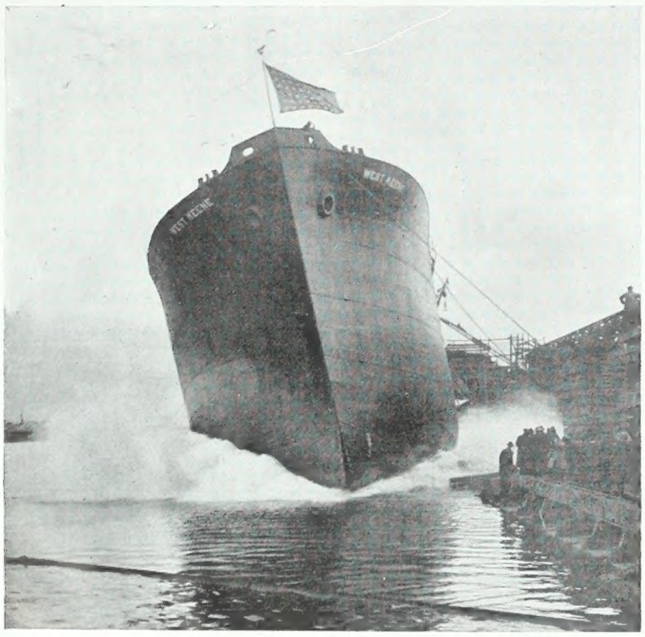
San Francisco Passenger and Freight Office, 625 Market St.

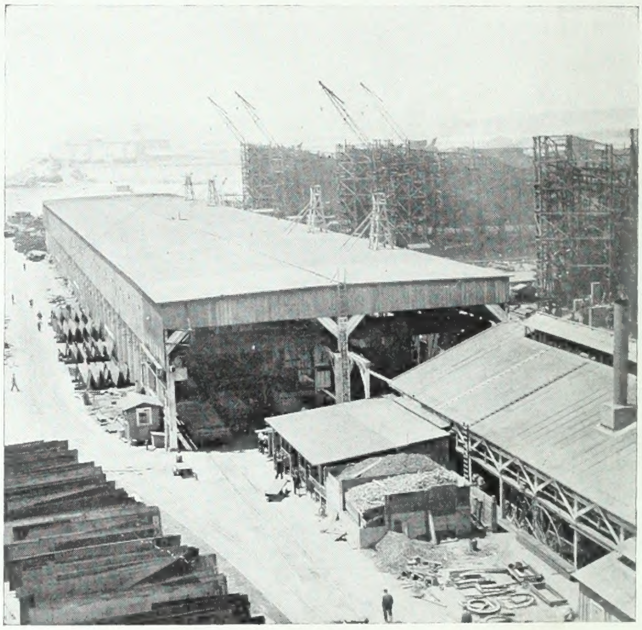


Latest Map of Los Angeles Harbor Showing Proposed Developments



Some interesting
views in the
Shipyards and
Harbor
at Los Angeles





Pacific Marine Review

The National Magazine of Shipping

January, 1920

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Its Port Development, Industries and Foreign Trade Outlook

SAN PEDRO, which is now the port of Los Angeles, was discovered in 1542 by Juan Rodriguez Cabrillo. Two hundred and thirty-nine years later the doughty Spanish soldier, Don Caspar de Portola, camped one evening in a broad valley about midway between San Diego and Santa Barbara. The spot looked good to the general and he determined to establish there a permanent puebla with a parish church and a fort and a garrison.

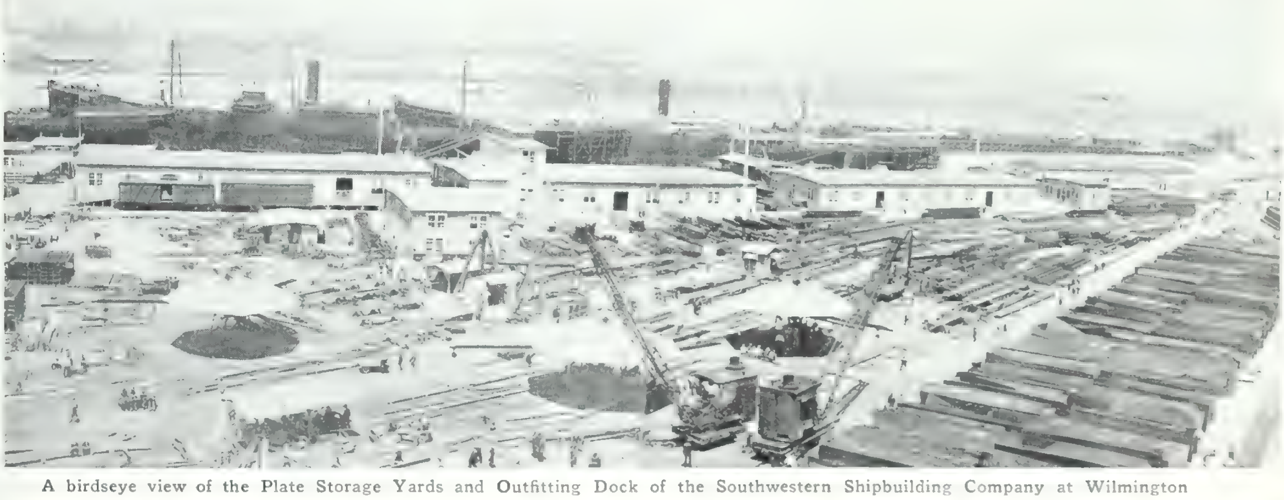
A name for the new town was the first consideration, and with true Spanish piety Portola consulted his church calendar, where he found that the date was the name day of "Nuestra Senora la Reina de Los Angeles." The town was established, a church and a fort were built, and in 1781, with due solemnity, Governor Felipe De Nieve proclaimed the post to be La Puebla de la Reina de Los Angeles. For many years it remained the typical sleepy village of Mexican California, which, in fact, it continued to be until captured by the Americans in 1847.

Today, Los Angeles covers an area of nearly 362 square miles, with a population of over 600,000. Both her area and population are increasing with wonderful rapidity, and she can well maintain her boast that she is the largest city on the Pacific Coast.

In this article we shall endeavor to sketch in brief outline those features of the development of Los Angeles which are of especial interest to our readers.

Los Angeles at the beginning of the present century began negotiations toward the making of a deep water port for the city. Much survey work was done at San Pedro by the United States government and the present harbor lines were established by the War Department in 1908. Consolidation with Los Angeles of the harbor cities of San Pedro and Wilmington was effected in 1909.

The harbor consists of two portions, an outer and an inner harbor, the former protected by a government breakwater over two miles long which cost about $6,000,000. The entrances from this outer harbor lead to the interior basins, where all port facilities of loading, unloading, coaling, bunkering, etc., can be expeditiously effected. There are twenty-five docks and wharves, fourteen of which are owned by the municipality and eleven by private interests. This total length of waterfront dockage is over 33,000 feet, or more than six



A birdseye view of the Plate Storage Yards and Outfitting Dock of the Southwestern Shipbuilding Company at Wilmington

Part of Los Angeles bulk oil storage capacity

miles of operating dockage. Depth of water alongside the present wharves is 35 feet, thus accommodating any vessel now constructed for trans-oceanic freight service. Between these slips lies perhaps the finest pier in America, measuring more than one-half mile long and 650 feet in width. In the center stands a reinforced concrete warehouse 480 by 152 feet, comprising six stories besides the basement. The building contains about ten acres of floor space, with a capacity for 80,000 tons of freight. It is conceded to be the finest waterfront warehouse on the Pacific Coast, and is the first of a number of units to be placed on the same gigantic pier. The warehouse is served by both electric and steam railways running on double tracks through the center of the building, with a total carloading capacity of 860 cars. The tributary tracks allow for a car-storage track capacity of nearly 8000 additional cars, to say nothing of the private yard capacity of the Santa Fe, Salt Lake, Southern Pacific and Pacific Electric systems of 25,000 cars more.

Oil Loading Facilities

The General Pipe Line Company has an eight-inch and a twelve-inch oil pipe line to its loading stations on the breakwater and can supply two vessels simultaneously. This company has an oil line direct from the Midway field, and has a storage capacity at the harbor of 962,500 barrels.

The Standard Oil Company, located near the main turning basin, has direct pipe line connection with the oil fields, and has in the harbor storage capacity of 460,000 barrels. This company can load into two tankers simultaneously at the rate of 12,000 barrels an hour.

The Union Oil Company is now constructing a large refinery on a 260-acre tract at the head of the West Basin. This company's plans include the necessary pipe lines and facilities for loading ships.

Railroads

All waterfront improvements are served on the same terms by the Santa Fe, Southern Pacific, Salt Lake and Pacific Electric Railway Companies. This has been accomplished by the Municipal Terminal Railway, operated at present by the Pacific Electric Railway Company as agent of the city. The municipal terminal system now has approximately fourteen miles of trackage.

The principal business transacted at the port of Los Angeles has been the import of lumber and the export of crude oil and its distillates, and of cement. The oil fields tributary to Los Angeles and its ports are among the most extensive in the world, and they are, as indicated above, admirably equipped for the export of this commodity by the connection of practically all the producing fields to tide water by pipe lines.

Los Angeles claims to handle a larger importation of lumber than any other port in the world. In 1917 this business had reached the grand total of 602,397,568 feet B. M. In 1918 this had dropped to 517,000,000 feet, but the value had increased considerably, making a total value of $17,104,097.

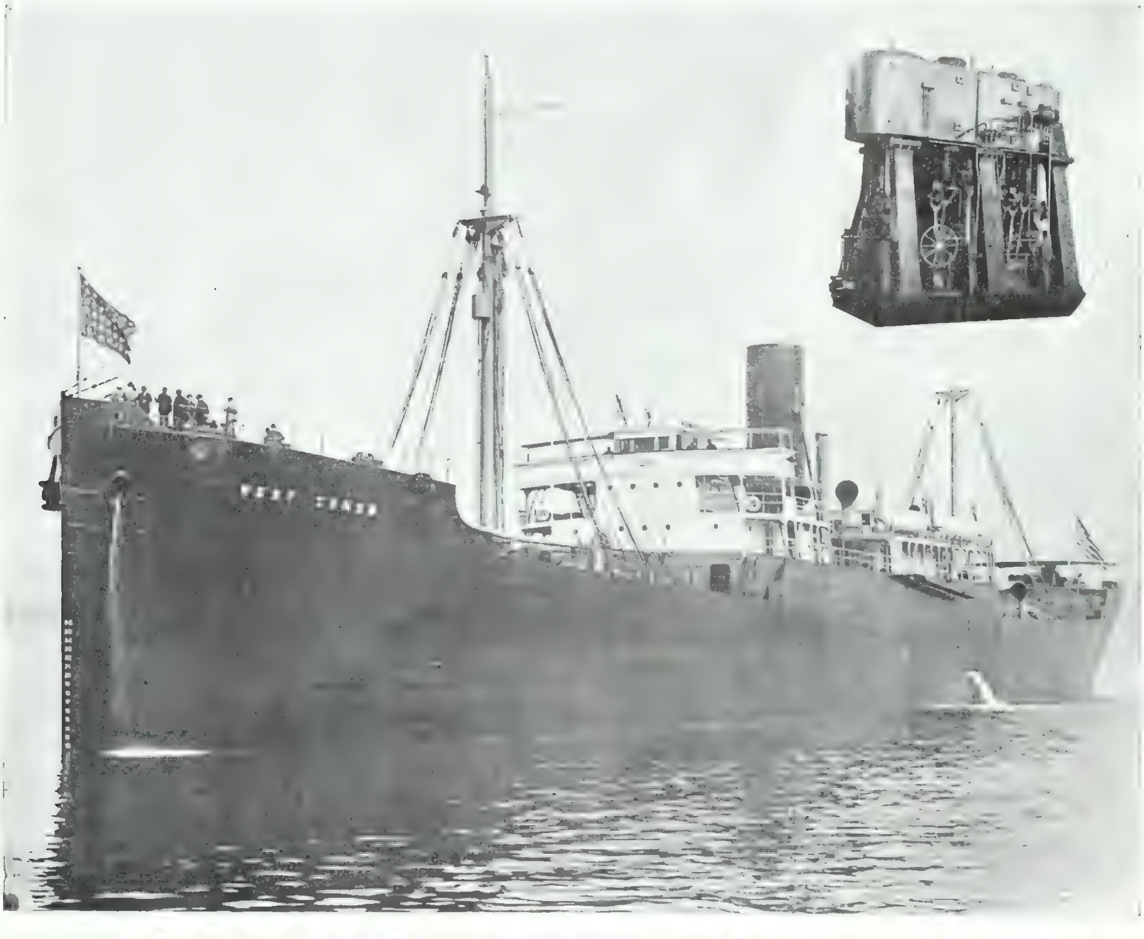
The harbor is well equipped for repair work. The Los Angeles Shipbuilding & Drydock Company has now under construction a 10,000-ton floating drydock which will take care of the largest ships entering the harbor, and both this company and the Southwestern Shipbuilding Company are equipped with shops and machinery capable of taking care of the largest repairs. These two shipbuilding yards have been working on government contracts

Steamer unloading at Municipal transit shed

Two 8800-ton steamers at outfitting wharf, Los Angeles Shipbuilding & Dry Dock Company

calling for a total of sixty-three ships, valued at approximately $125,000,000. Both of them have received several contracts for private account during the last month, and it may be stated that the steel shipbuilding business of Southern California, including that of the Long Beach Shipbuilding Company at Long Beach, is on a fairly stable basis. The various shipyards were employing 15,000 men just prior to the recent labor troubles. There are also two wooden shipbuilding yards located at Los Angeles harbor and these will find much work in the building of boats in connection with the fishing industry.

The fishing industry is becoming very important at the port. Three hundred and twenty-five boats are now engaged in supplying the canneries and wholesale markets. Los Angeles has furnished a modern building for the use of the wholesale fish dealers. The building has been constructed with a view to the comfort of the fishermen, and individual lockers are provided for those who wish to use them. A special basin has been fitted out for the accommodation of the fishing craft.



An 8800-ton freighter ready for delivery. This vessel and her triple expansion engines shown in the insert are products of the yards and shops of The Los Angeles Shipbuilding & Dry Dock Company

There are fifteen canneries engaged in packing tuna, sardines and other fish. Approximately 1,000,000 cases, valued at $5,000,000, were packed during the season of 1918. The supply of fish in the waters adjacent to the port is practically unlimited, and this business bids fair to grow into a large export trade. Already a substantial beginning has been made in exporting packed fish to Central and South American ports.

The organization and government of the port of Los Angeles is in the hands of the Board of Harbor Commissioners, who claim that the port charges there are as favorable as in any port in America.

Pilotage is not compulsory. Any master of a vessel licensed to navigate that vessel in the port of Los Angeles is not required to have a pilot, and when a pilot is required, he is furnished by the city of Los Angeles at the reasonable rate of $1 a foot draft and one cent a net registered ton, with half rate for vessels that are coming in for fuel, supplies or orders.

The dockage charge is on a graduated scale up to vessels of 2100 net tons, where the scale reaches $15 a day. For larger vessels a charge is made of one-half cent a net ton above that figure. No rent whatever is charged to the steamship companies for assignment of wharves. Wharfage rates are based on commodities and vary from 2½ cents to 10 cents a ton, but on outgoing cargoes thirty days' free time is allowed on foreign shipments and ten days' free time on domestic cargoes. On incoming cargoes free time is forty-eight hours after the final discharge of the vessel.

Handling of cargo by stevedores is subject to private contract with the stevedoring companies. Municipal water is furnished at a cost of 17 cents a thousand gallons f. o. b. ship. The facilities for furnishing fuel oil have already been described.

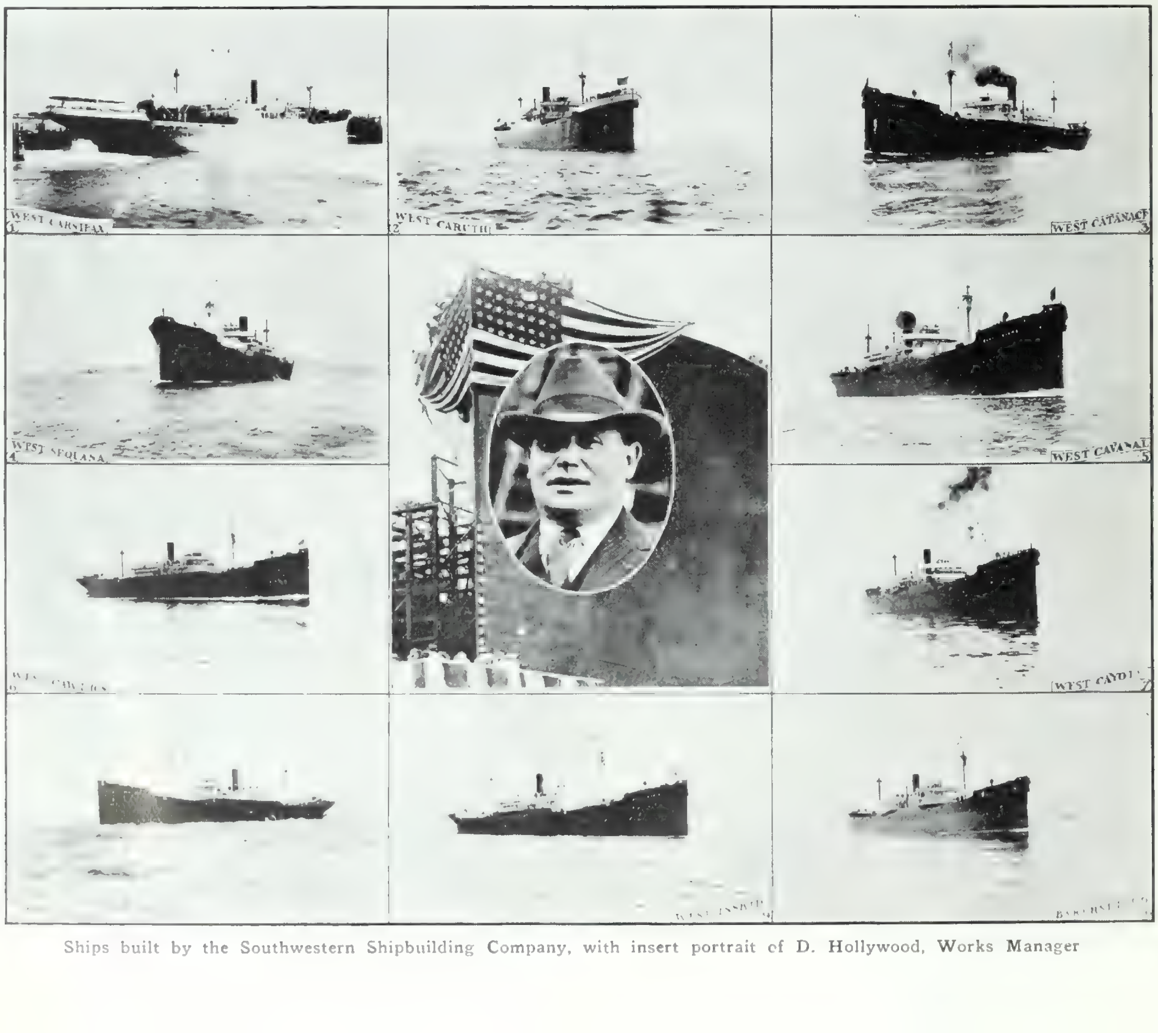
The city of Los Angeles has made arrangements with large coal companies of Utah to supply coal for bunkering, and they will furnish this coal for $12.50 a ton f. o. b. ship, provided the order is placed ten days in advance of the bunkering.

The map published on our frontispiece page shows in dotted outline the proposed extensions to the present port. An extension of the breakwater to include part of the waterfront at Long Beach is contemplated and two entrances will be provided. This would very largely increase the capacity of the outer harbor and would make an anchorage basin sufficiently large to accommodate any increase in the traffic for years to come. This basin would be absolutely protected from all sides.

The dredging of the Long Beach channel is also proposed, which would connect the inner harbor with the industrial region to the north of the city of Long Beach.

Enough has been said to show that Los Angeles harbor is a going concern, adequately equipped and sufficiently commodious to take care of the export and import needs of a very large community. Let us now look a little into the possibilities for the future expansion of the trade of this harbor.

As has been stated above, Los Angeles draws on an oil-producing territory of very great capacity. Practically every by-product of crude petroleum can be profitably manufactured in the refineries now situated at or near to the port of Los Angeles. In 1918 the miscellaneous oil products turned out by these various refineries aggregated over one



Ships built by the Southwestern Shipbuilding Company, with insert portrait of D. Hollywood, Works Manager

Birdseye view of the Inner Harbor at Wilmington, showing the dock built by the City of Los Angeles, for the Pacific Steamship Company

billion gallons. In the future, as the demand of the west coast of South America grows, this total production will be vastly increased and much of it will travel by water from Los Angeles harbor.

Another commodity is beginning to show large on the export books of the city. In various parts of Southern California, there are vast deposits of calcareous rock from which a very fine grade of cement is being manufactured. It is expected that the total export in this commodity alone will come very close to 50,000 tons for the year 1919. This cement is largely exported to Chile. Allied with the cement industry, there have been large developments in various kinds of clay products, such as conduit, fire brick, glazed and enamel brick, ordinary brick and tile. One of the most recent developments in this line—an invention of a Los Angeleno—is larsite, an expanded clay material which is used as an aggregate in the manufacture of concrete where light weight is a consideration.

Deposits of silica in large quantities have also been discovered, which are said to be unrivalled on the Pacific Coast for the production of clear glass, and the glassworks deriving material from these deposits are producing a great variety of high-grade glass products. This silica deposit is practically unlimited as to quantity.

Los Angeles is making a strong effort in carrying out many extensive and expensive experiments looking toward the local production of steel and iron from local ores. There are now in operation two excellent rolling mills for stock and structural steel and iron which are running mainly on scrap, but if the present plans are carried out, hydro-electric energy from the mountain streams of the Sierras will soon be reducing local ore and producing a fine quality of steel. The ore beds in question are of sufficient capacity to much more than take care of the local demand and the possibilities in this line are almost without limit.

The Imperial Valley is beginning to export a very high grade of long staple cotton through Los Angeles to Oriental points. This cotton is in very great demand for blending with the shorter staples from China and India, and already quite a trade has been developed with Japanese cotton mills.

As facilities for refrigerating develop, undoubtedly many of the immense shipments of citrus fruits which now travel east from Southern California by rail will be water-borne and certainly the vast bulk of the preserved by-product of the citrus industry, such as jams, marmalades, flavoring extracts, etc., which are already in use almost the world over, will soon be carried by sea.

There is a very large export tonnage in walnuts from Southern California and canned fish has been exported to China, Australia and Latin America. It will thus be seen that this Southern harbor made to order, as it were, and manufactured out of whole cloth, while only ten years old, has already achieved for itself some considerable share of the export and import trade of the Pacific. Backed by the well-known Los Angeles spirit and the resources of Southern California, there is no doubt that it will continue to grow.

Wooden steamship Bellota built by the Ralph J. Chandler Company at Los Angeles. The Bellota made a splendid record carrying sugar from Hawaii and is now on the Atlantic

A WORLD'S LAUNCHING RECORD

On December 20, 1919, at the shipyard of the Moore Shipbuilding Company, Oakland, California, there was staged what is up to the present time a world's record of launching ships. Three tankers, of 10,000 deadweight tons each, and three freighters, of 9400 deadweight tons each, were launched in fifty-two minutes. The vessels were arranged in pairs, two on adjacent ways at the west end of the yard, two at the center, and two at the east end. The names of the vessels and sponsors, and the order of launching, are as follows:

Name	Hull No.	Ways	Time	Sponsor
S. S. Salina	1029	10	10:00 a.m.	Miss Gertrude Hull
S. S. Janelew	2235	2	10:10 a.m.	Mrs. R. S. Moore
S. S. Sapulpa	1030	6	10:20 a.m.	Mrs. J. W. Hoover
S. S. City of Reno	1028	9	10:35 a.m.	Miss Nathalie Byington
S. S. Mosella	2234	3	10:45 a.m.	Mrs. J. A. Moore
S. S. Jalapa	2233	5	10:55 a.m.	Mrs. G. A. Armes

After the launching, a delightful luncheon was served by the company at the Hotel Oakland. Our illustration at the top of this page shows the guests of the Moore Company at the luncheon; at the left is shown the launch of the steamship City of Reno, and below are the six sponsors.

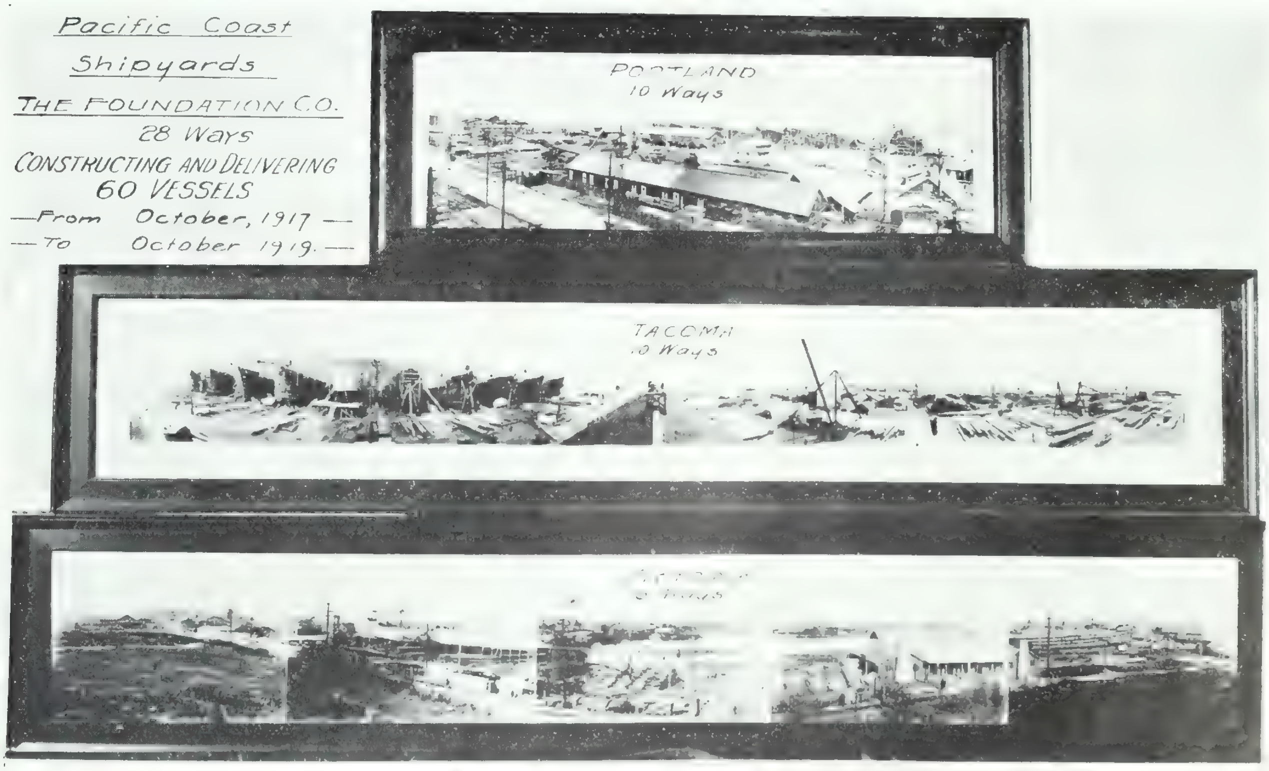
Half a mile of freighters at the outfitting docks at Newark Bay

A Birdseye View of American Shipbuilding

AS we look forward on the threshold of another year and approach the end of the emergency war construction program in American shipyards, we are brought face to face with conditions which from certain angles are very encouraging. Notwithstanding the enormous merchant marine built up during the past three years under Shipping Board control, we note in practically every shipbuilding section of the country a very healthy and gratifying growth in contracts for private account. In fact, there are now under construction on the ways and under contract nearly 750,000 gross tons of merchant shipping in the United States, exclusive of Shipping Board and naval work, which alone is over five times the amount of all classes of ships building in the United States in June, 1914. One American shipbuilding corporation is constructing for private account 20,000 tons more than all the shipyards of the country were building in 1914. Practically the entire amount of this construction is thoroughly American, the percentage building for foreign account being almost negligible, although practically all the yards are now in a position to bid for foreign account.

The great bulk of this private shipbuilding program is being constructed on the Atlantic Coast, a fact which is probably due as much as anything else to the old-established shipyards in that section being released from navy and army control. Analyzing this program of building, we find that about 50 per cent of the vessels under construction are steam freighters, about 30 per cent tankers, and the balance vessels fitted for handling special varieties of freight. The naval architects at the same time are very busy getting out plans and specifications for passenger liners, and there is great hope on all sides that our merchant marine fleet will soon be rounded out by the acquisition of many fine vessels of this class.

Among the freighters, we note with pleasure that W. R. Grace & Company are having constructed by William Cramp & Sons two motor freighters of 6300 gross tons each, and also that several of the oil companies are becoming interested in the internal combustion engine propulsion for their tankers. The following table, issued by the Atlantic Coast Shipbuilders' Association, gives the figures in detail for this private shipbuilding program:



The Pacific Coast Shipyards of the Foundation Company

STEEL TONNAGE BUILDING FOR PRIVATE ACCOUNT IN U. S. SHIPYARDS

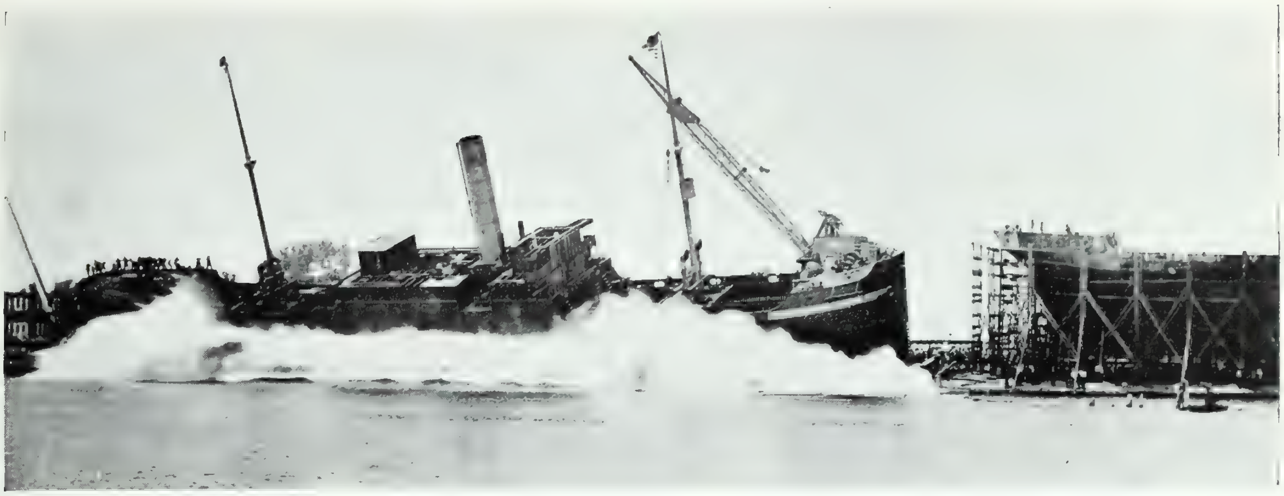
BUILDERS	OWNERS	Type	Tonnage	No.	Total Tonnage
American Shipbuilding Company	Builders	Freighter	2338	10	23,380
Bath Iron Works	Crowell & Thurloe	Freighter	5600	1	5,600
Bayles Shipbuilding Company	Nyack Shipbuilding Company	Tanker	1200	1	1,200
Bethlehem Shipbuilding Corp.—					
Fore River	Standard Transport Company	Tanker	7150	4	28,600
Fore River	Ore Steamship Company	Ore-Carrier	7150	1	7,150
Sparrows Point	Ore Steamship Company	Ore-Carrier	6,993	1	6,993
Sparrows Point	Standard Transport Company	Tanker	7150	2	14,300
Sparrows Point	Vacuum Oil Company	Tanker	7150	1	7,150
Sparrows Point	Atlantic, Gulf & West Ind. S. S. Co.	Tanker	7500	3	22,500
Sparrows Point	Standard Transport Company	Tanker	7500	1	7,500
Brunswick Marine Corporation	R. L. Smith	Harbor-Scow	2000	2	4,000
Cramp & Sons	W. R. Grace & Company	Motor-Freighter	6300	2	12,600
Downey Shipbuilding Corporation	Coastwise Transportation Company	Freighter	5383	1	5,383
Federal Shipbuilding Company	Standard Oil Company	Tanker	10,000	5	50,000
Federal Shipbuilding Company	United States Steel Corporation	Freighter	7765	14	108,710
Federal Shipbuilding Company	Freeport Sulphur Company	Freighter	4690	2	9,380
Globe Shipbuilding Company	East Coast Fisheries Company	Trawler	301	1	301
Greenport Shipbuilding Company	Builders	Trawler	355	2	710
International Shipbuilding Company	J. A. Bandi	Freighter	4200	8	25,600
Kyle & Purdy	East Coast Fisheries Company	Trawler	355	2	710
Long Beach Shipbuilding Company	Builders	Motor-Vessel	950	1	950
Manitowac Shipbuilding Company	Atlantic Fruit Company	Fruit-Steamer	2000	2	4,000
McDougall-Duluth Company	Barnes Steamship Company	Freighter	2338	1	2,338
McDougall-Duluth Company	Builders	Freighter	2338	4	9,352
Merchant Shipbuilding Corporation	Shawmut Steamship Company	Freighter	7300	2	14,600
National Shipbuilding Company	Pan-American Petr. & Trans. Co.	Oil-Tanker	1371	2	2,742
Newburgh Shipbuilding Company	Union Sulphur Company	Freighter	4700	2	9,400
Newburgh Shipbuilding Company	United Fruit Company	Fruit-Steamer	3000	2	6,000
New Jersey Dry Dock Company	East Coast Fisheries Company	Trawler	355	2	710
New York Shipbuilding Company	W. R. Grace & Company	Oil-Tanker	7753	1	7,753
Rice Brothers	Chris Hennevig	Trawler	500	4	2,000
Skinner & Eddy	Builders	Freighter	7350	4	29,400
Spedden Shipbuilding Company	Standard Oil Company	Oil Barge	995	1	995
Sun Shipbuilding Company	Sun Company	Tanker	6689	1	6,689
Sun Shipbuilding Company	Sun Company	Tanker	6728	1	6,728
Sun Shipbuilding Company	Gulf Refining Company	Tanker	6728	1	6,728
Sun Shipbuilding Company	Gulf Refining Company	Tanker	6700	1	6,700
Sun Shipbuilding Company	Rotterdamsche Lloyd	Freighter	7700	1	7,700
Sun Shipbuilding Company	Atlantic, Gulf & West Ind. S. S. Co.	Tanker	6700	2	13,400
Sun Shipbuilding Company	Pan-American Petr. & Trans. Co.	Tanker	6700	2	13,400
Tank Shipbuilding Corporation	Vacuum Oil Company	Motor-Tanker	1100	2	2,200
Texas Company	Builders	Tanker	3500	1	3,500
Todd Shipyards Corporation	Sinclair Navigation Company	Oil Barge	1800	1	1,800
Todd Shipyards Corporation	Donald Steamship Company	Fruit Steamer	1400	2	2,800
Union Construction Company	Standard Oil Company	Tanker	1650	1	1,650
Union Shipbuilding Company	Builders	Freighter	3150	2	6,300
Union Shipbuilding Company	Aluminum Company of America	Barge	2112	1	2,112
Union Shipbuilding Company	Aluminum Company of America	Freighter	3100	2	6,200
Union Shipbuilding Company	Gulf Refining Company	Tanker	6100	2	12,200
Virginia Shipbuilding Company	United States Steamship Company	Freighter	6200	3	18,600

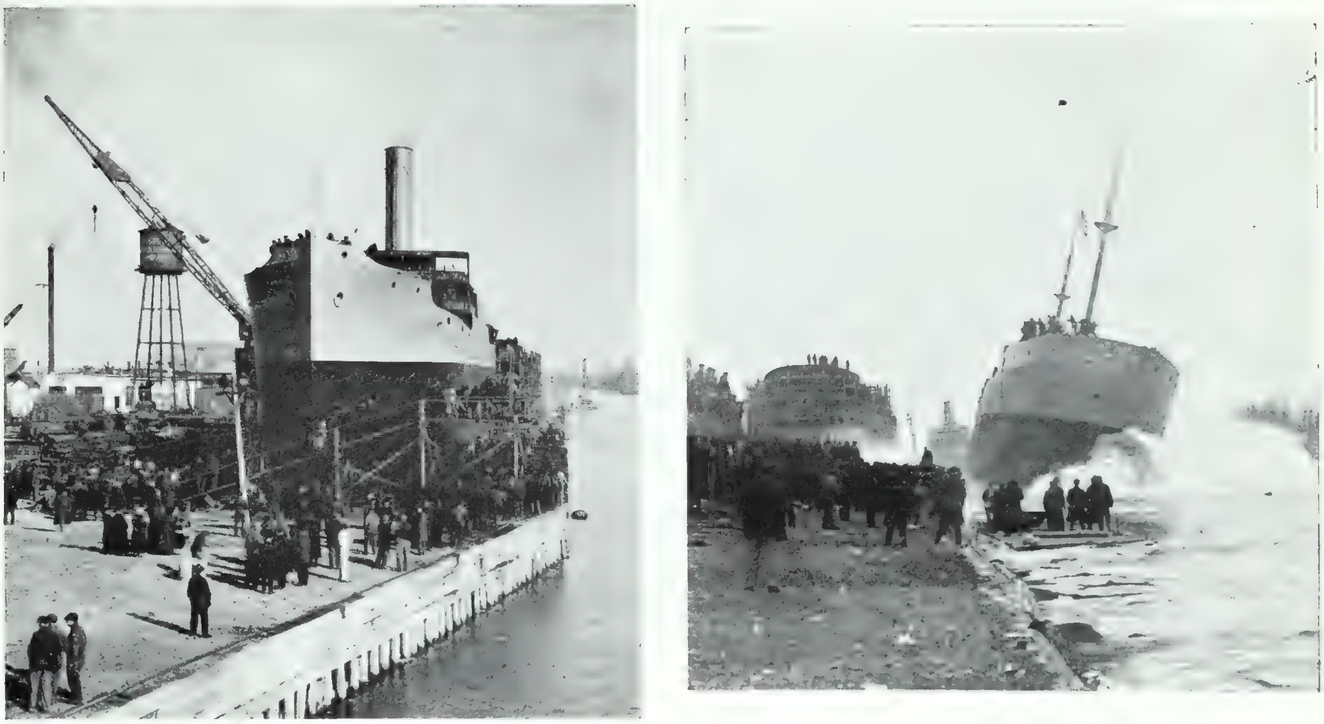
Total building, 118 ships aggregating 550,714 gross tons.

Since this table was compiled, a large number of contracts have been let to yards on both the Atlantic and Pacific coasts. Rumor credits San Francisco Bay district with contracts on tankers for private account aggregating about 175,000 tons, but all such contracts are contingent on certainty of deliveries and the attitude of labor will enter very largely into the final allocation of actual construction.

It may be authoritatively stated that there is well in excess of 1,000,000 deadweight tons of merchant shipping wanted for private account at the present time, and that contracts for that amount would now be in force if labor conditions would warrant the shipbuilders in making a guarantee of delivery. When we add to this new construction program the new building program of the United States Shipping Board and the immense amount of reconditioning, reconstruction and repair work which is waiting, we can easily see that the American shipbuilder has a busy time ahead, and that 1920 will be, so far as the shipbuilding and allied industries are concerned, even more prosperous than the year we have just been through.

The south plant, Baltimore Dry Docks and Shipbuilding Company, showing the 8800-tonner Naiwa tied up at the outfitting pier just after launching

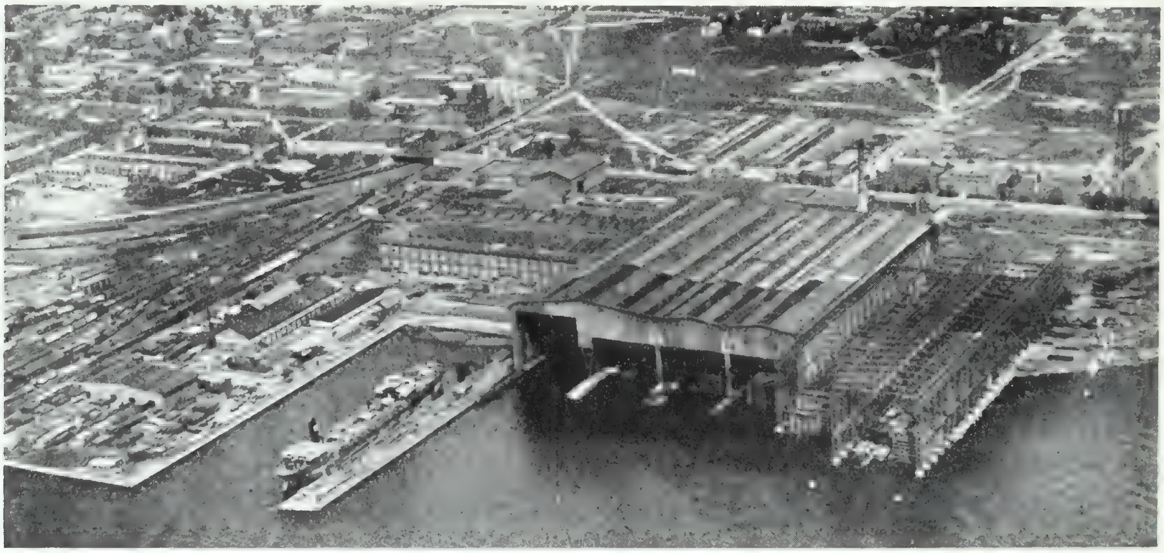




SHIPBUILDING ON THE GREAT LAKES

The views on this page show the launching ways, outfitting docks, and two views of side launchings at the Saginaw Shipbuilding Company, Saginaw, Michigan. A great volume of tonnage was turned out by the yards in the Great Lakes district during the last two years. Practically all this tonnage was in steel ships of 3000 to 3500 tons deadweight capacity, the size being limited by the capacity of the ship canals connecting the Lakes with the Atlantic seaboard.

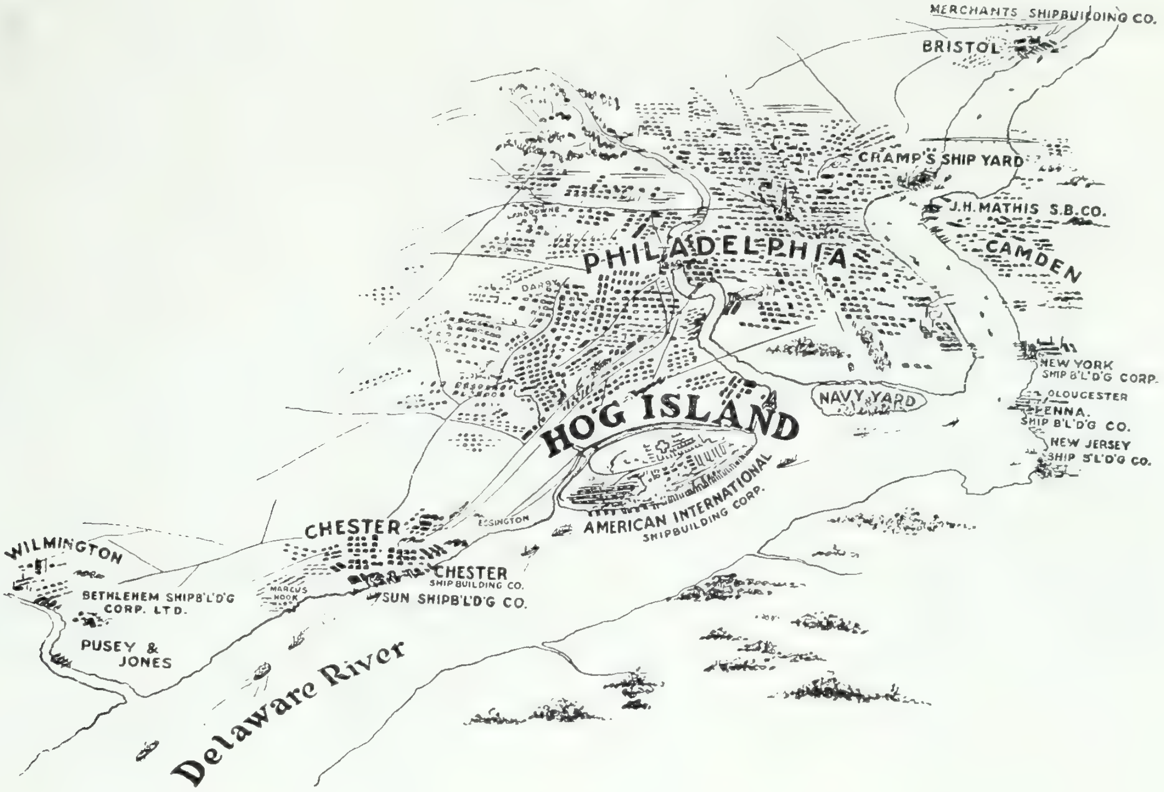
The yard of the Moore Shipbuilding Company, Oakland, California, taken from an aeroplane



The yard of the New York Shipbuilding Company, Camden, New Jersey

View from the air of Yorkship village, the housing project of the New York Shipbuilding Company, Camden, New Jersey

Shipbuilding on the Delaware



Above is shown a birdseye sketch map of the Delaware River adjacent to the City of Philadelphia, showing the many shipyards on this river, which can rightfully claim to be the Clyde of America. The plants included in this map represent well over 150 shipbuilding ways.

Below is shown an aeroplane view of the Emergency Fleet Corporation's great shipyard at Hog Island, Philadelphia. This is undoubtedly the largest single shipyard in the world. Note in the rear of the picture the long rows of shipbuilding ways with their cranes. These fifty-one slips have during the past year been turning out freighters with almost clock-like regularity and are now launching one a week or more.

Notes From the Eastern Front

By "Americus"

As indicated in my article in the December number, I intend to relate the current news and gossip on the Eastern coast anent our struggle to keep our merchant marine on the seas. The next six months will be the most momentous period in history for the American merchant marine. In that time governmental policies and private readjustments from a period of high freight rates to conditions more nearly normal will be uppermost in the mind of every one who has any interest in shipping and foreign commerce.

All eyes are on Washington, as that is where will be fought out what attitude the government is to take. The Greene bill, which has for its object the practically immediate abandonment of government ownership as well as operation, has already passed the House by an overwhelming majority. It has gone over to the Senate and been referred to the Committee on Commerce, of which Senator Jones of Washington is the chairman. There it will be confronted by a bill introduced by the chairman himself. It will also be confronted by a sentiment among the members of the Senate by no means so sympathetic as that in the House, for there are almost as many ideas in the Senate regarding the future of the merchant marine as there are senators. Hence the Greene bill will have hard sledding among the solons of the upper house.

If I may be permitted to indulge in a little prophecy, I will prognosticate an entirely different measure, as the final outcome, from either the Greene or the Jones bills. Theoretically most of us will agree that the Greene bill is absolutely right in principle, as the government should get out of the shipping business just as quickly as possible. Government operation of railroads has proved to the American people the futility of public operations of our great transportation facilities. The difference is that a railroad only has to be turned back to its owners, disrupted as it may be, and it is hoped with a monetary recompense for its hard usage. With shipping, owners must be found to take it off the government's hands. Not such an easy task, when it is considered that even at a price greatly reduced from actual cost, there would be required nearly two billions of dollars from the public to make the purchase.

Of course, that is a small sum in these days of reckless expenditures and government appropriations, but there is no such money available in this country for investment in ships. Far from it! Bankers tell me that if the Greene bill was passed and an attempt was made to sell all the ships, it is doubtful if more than 500 out of a total of over 2000 would be absorbed by the public. You can bet that the 500 purchased would be the cream of the fleet at that. What then would become of the 1500 culled-over remainder? According to some, they would be operated by those established firms which had bought the 500 ships, acting as operating agents of the government.

Many people contend that if we can only find a sale market for one-fourth the ships, why sell them? Here then comes the advantage of the Jones bill, which contemplates a holding company operating as a private concern all ships owned by the government. As operators learn the business and make some savings from their efforts, gradually, say over a period of ten years, sell these ships to them.

In other words, the main difference between the two bills is that in one the government proposes to get out of the shipping business with a jolt, and let nature take its course. With the other it is proposed that the government back out gradually, and as it is doing so, it proposes to nurse along and develop a new crop of shipping men and set private ownership and operation going gradually without any rude jolting. Of the two, I believe the latter will better fit existing conditions, but, as before predicted, it looks to me as if the ultimate result of legislation will be a safe and sane compromise. Don't think for a moment that Congress is antagonisitc to shipping, for such is far removed from the fact. There exists among nearly all members of the House and Senate a strong interest and desire to help maintain and develop the merchant marine, and it is surprising to find how many members show a real knowledge of things maritime. The occurrences during the late war which brought shipping so prominently to the forefront have inculcated in the minds of our legislators a knowledge and interest which bid well for the future governmental policy, whatever it may be. Heretofore, the depth of ignorance of the average congressman on shipping matters was impenetrable; this, added to the machinations and propaganda of the agents of foreign steamship lines, made it almost impossible ever to obtain any legislation to help American shipping. Every one connected with a shipyard or shipping concern was looked upon either as a crook or a malefactor of great wealth, and was given but scant courtesy at Washington. No wonder such an atmosphere made it possible for the incubation of the ill-considered Seamen's Act. And speaking of that, have you hardy mariners on the west coast noticed the vote by which the Rowe bill passed the House? This bill, as all of you may not know, represents the first concerted effort to rescind some of the bad portions of the Seamen's law. It simply provides that Americans who have had an intensive training at the Shipping Board's school may be rated as able seamen after nine months' service at sea. This is a perfectly good proposition and one to encourage young Americans to follow the sea. If anyone claims that by intensive training you cannot condense, in a short period under competent officers, as much knowledge as young men would receive in three years' service as an ordinary seaman, he has but to read what those valiant young Americans, similarly trained, did to the machine-made Huns at Chateau Thierry and Belleau Woods.

In spite of the opposition of the Seamen's Union, this Rowe bill received the unanimous approval of the House Committee on Merchant Marine and was passed by the House itself without opposition. It is to be taken up in the Senate Committee shortly after the holidays, and the Seamen's Union will undoubtedly exhaust every resource to block it there. Again, if I may be allowed to predict, the opposition of foreign seamen will be futile. California people and others on the Pacific Coast know that these young men are well trained at the new school of the Shipping Board on Hampton Roads, as Captain I. N. Hibberd, formerly of San Francisco, is in charge of the school, and every one knows that what he starts to do he does well. Give him a hand, all you shipping men, to get this most worthy measure through the Senate.

The feeling is growing in intensity on this coast that we must have all our ships manned by simonpure American crews, and to make their lives at sea just as attractive as possible. The Neptune Association here in New York, composed of American masters, mates and pilots, has even gone so far as to propose that the men be drafted to man our ships, and it is striking a very responsive cord in the minds of the public. While personally I would not go so far as that, I would advocate measures almost as strenuous to attract boys to sea. This Rowe bill will be a great help along these lines.

With our merchant ships manned by crews over half of whom are aliens, we are making our merchant marine problems much harder to solve. When I think of our navy having crews numbering over 125,000 and all Americans, it makes me weep to think we cannot take about one-fourth of them and put them on our merchant vessels. Keep them in the status of naval reserves if you like, and they will then be instantly available for naval duty. In my humble judgment, and in that of a great many other good Americans, they would be more efficiently trained for naval duties on merchant vessels in times of peace than they are on naval vessels. Why? you will ask. Because on merchant vessels they are kept going to sea all the time, and not giving so much attention to land parades and flower carnivals. According to Shipping Board statistics recently published, it only takes 60,000 men to man all our merchant vessels. With what Americans are already on the merchant ships, these few borrowed from the navy would give us all-American crews for all-American ships. Wouldn't that be fine?

Another item of good news for the American merchant marine is the appointment of Judge Alexander of Missouri as Secretary of Commerce. Everybody knows that this department, with its lighthouse service, steamboat inspection service, coast survey and bureau of navigation, has a great deal to do with the merchant marine. Judge Alexander has been for many years on the Merchant Marine Committee of the House, and for the past eight years its chairman. Being from Missouri, he had to be shown, and he has amassed a wonderful lot of knowledge about shipping. He was one of the American delegates to the International Conference on Safety of Life at Sea, and as such did very good work. He undoubtedly brings to his new cabinet position a greater amount of maritime knowledge than any other man who has ever held the job. We all look for a very intelligent and just performance of the duties of that office, which are so closely interwoven with our merchant marine policies. In saying this, there is no intention of detracting from the qualities of his immediate predecessor, Mr. Redfield, who was a very able cabinet official.

Have you noticed that our shipbuilding activities of late have largely turned to oil tankers? Every day we learn that this or that oil company has contracted for one, two or sometimes ten large tankers. The undoubted saving in the use of oil as a fuel at sea and on shore, and the determination of American business men to get out of the clutches of foreign coal miners are contributing factors in this tanker boom. I am told by shipbuilders that within a short time there will be over 1,000,000 deadweight tons of oil tankers under construction in American yards. It will take one right good sized tanker alone to keep our ex-Hunnish greyhound, the Leviathan, going, as she is now being transformed into an oil burner, and it is rumored that she will take on fuel in New York sufficient to make the round trip. As I said before, there are lots of important news items popping these days, and I hope to send more for the next issue.

Steering Ships by Wireless

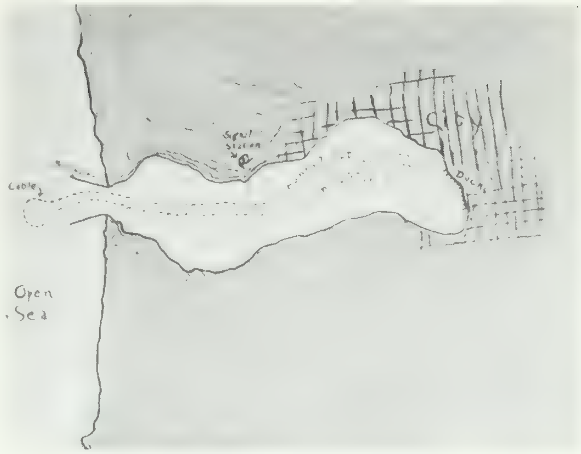


Diagram to illustrate method of guiding ships by signals from submarine cables

MR. R. H. MARRIOTT, expert radio aide to the United States Navy Department, impressed with the many losses of vessels in the narrow channels of Alaskan waters, has been for some time experimenting with electrical methods of guiding vessels by signal from submarine cables. On November 5, 1919, he read a paper on this subject before the Seattle section of the Institute of Radio Engineers. The following article is a synopsis of this paper, and the illustrations show clearly the method used in the experiments carried out by Mr. Marriott.

This method of guiding vessels involves the installation of a signal-carrying conductor along the course, and installation on the vessel of a receiving apparatus suitable for indicating the proximity and direction of the signal conductor.

Various forms and combinations of signals can be used, and duplicate cables are recommended for entering harbors and some narrow channels, one cable to control outbound vessels and the other inbound vessels. The use of this form of control is considered very valuable for submarines working along the coast, and for the control of mines in protecting coasts from enemy ships.

In order to test the method practically, an installation was made on the steamship Tourist of the Kennedy Line, Puget Sound Navy Yard route. Use was made of the United States Army submarine cable for carrying signals from Bainbridge Island to Pier 8 in the Navy Yard. This cable is an ordinary submarine cable conductor, covered with insulation and having an outside sheath of iron wires. One end of the cable conductor was grounded, and the other was connected through a key, an ammeter, a resistance and a 500-cycle generator to ground at the Naval Radio Laboratory. A similar generating and control plant was placed also on Pier 8, Navy Yard, for use at that point when more convenient. The Morse signal, "M. A.," was used as a guide signal.

In order to have a wide margin of safety, only forty volts was applied to the cable. The maximum current obtainable with this voltage was seven-tenths of an ampere.

The receiving coil on the Tourist consisted of four coils of No. 28 D. C. C. wire connected in series, and in series with a variable air condenser having a maximum capacity of .005 M. F. D. and the primary of a vacuum tube amplifier circuit. The system showed a minimum impedance for 500 cycles with a capacity of about .004 M. F. D.

There are about 2000 turns of wire in this total receiving coil and the coil is about four feet square. Three steps in amplification were used to pick up the signal from the cable. For convenience in the Tourist, this receiving coil and the amplifiers were placed in the smoking-room, under the pilot house, and connected up to a pair of receiving telephones in the pilot house. As the pilot could not see the receiving coil, it was, during navigation, left in a vertical fore and aft position, the pilot swung the ship necessary to hold the maximum signal.

In experimenting, as shown in the illustrations, the receiving coil was turned and tipped in many positions so as to give the location of a ship relative to the cable. On one or two trips this was done while the vessel was being operated and the location signalled to the pilot.

Captain Barrington of the Tourist has repeatedly guided his vessel by sound over the cable, and on more than one occasion the results indicated that it was easier to guide the vessel by this method than by sighting the channel buoys, even when these could be seen at a considerable distance. The reason for this is probably that the drift due to tidal currents is more noticeable by the channel cable electrical signal method than when trying to keep in line with buoys.

It will be evident to anyone who has had any experience in the vexatious delays due to fog-bound port entrances and incident to all navigation in fogs that this method has great possibilities.

The cable by which the successful experiments were carried out cost, when laid, about $800 a mile. A much more profitable service might result by installation of a cable that would cost $10,000 a mile, but in the matter of protection to traffic entering and leaving harbor, and the prevention of delays, a

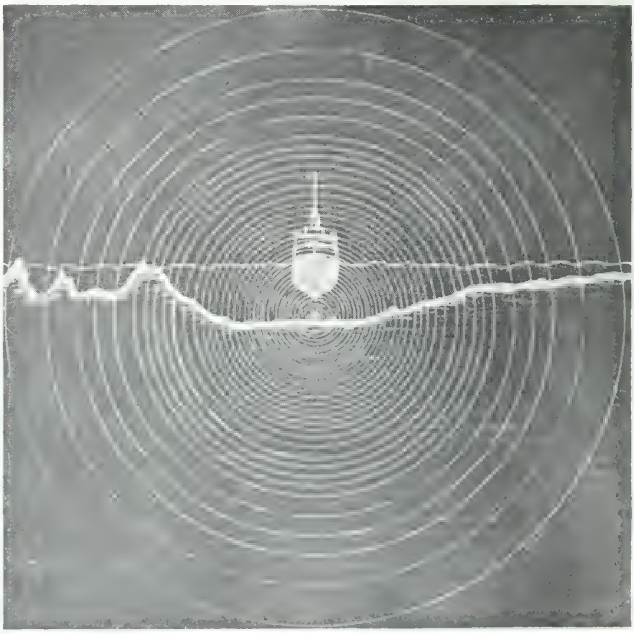


Diagram showing how magnetic lines of force radiate from submarine cables cable arrangement costing many times that sum might easily pay for itself in any foggy month.

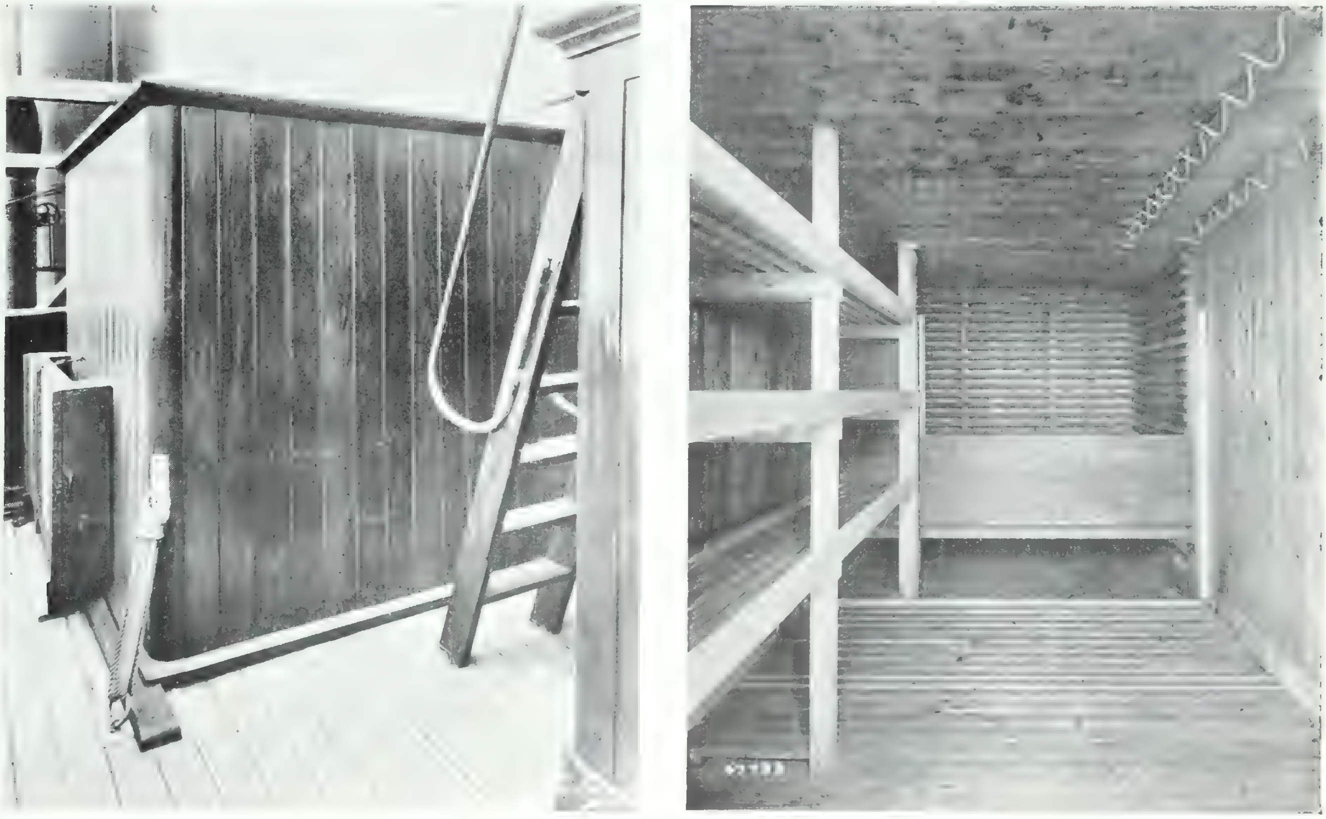
Mr. Marriott not only considers the possibility of guidance by electrical signals, but also that it would be entirely practical, by equipping with a suitable installation and using sufficient electrical energy, to control the course of a vessel from the shore automatically, and one or two schemes have already been designed for providing a suitable automatic device which will give the pilot of a vessel a visual indication of the exact position of his ship in relation to the position of the guide cable.

Means can also be provided for automatic signalling at sharp turns in channels, so that a pilot when he comes to a spot where a turn is necessary will actually receive a signal from the cable, "ninety degrees port" or "ninety degrees starboard," as the case requires.

The ancient navigator, impressed with the power and mystery of the ocean, oftentimes was considerably disturbed by weird calls from the various mythological sirens of the deep. Science seems to be reversing this process and, by applying the mysterious forces of wireless control, brings to the navigator a friendly voice which guides him promptly into a safe haven.

R. H. Marriott tilting the receiving coil on the steamer Tourist to get the bearing of the ship from submarine cable

An Efficient Ice Chest for Marine Use



The two illustrations above show the exterior and interior of a large ice chest, installed at the beginning of last summer on the Swedish steamship Narvik, by the American Balsa Company. This chest was constructed of yellow pine and had two layers of Balsa insulation fitted between the inner and outer sheathing, the outside layer being three inches thick and the inner layer one inch thick, installed in such a way as to form a continuous unbroken lining. On June 20, 1919, 3000 pounds of ice were put into this chest, and a test made, which continued until July 14th. At that time 110 pounds of ice were left in the chest. During this time, the door to the ice chest had been opened three times a day. The temperature outside varied from 75° to 85° Fahrenheit in the shade. The ice chest had no shade, being located on the bridge deck, and subjected to the full force of the sun's rays. The highest temperature recorded in the chest was 42.8° Fahrenheit, and perishable food placed in the chest at New York, on June 20, was found to be in perfect condition at Gothenburg on July 14. The owners of the Narvik were so pleased with this performance that they have ordered similar installations for their other steamers.

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G. N. SOMERVILLE . . . . . Associate Editor
J. G. BRAY . . . . Pacific Coast Adv. Mgr.

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F. E. SHORT, Manager

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A FORWARD LOOK

ON the threshold of the year 1920, American shipbuilders, shipowners, and citizens interested in maritime affairs, may well congratulate themselves upon the magnificent prospect ahead. This year, if we may be allowed to indulge in prophecy, will be one that will mark a very permanent milestone in the history of American maritime progress. The year will be unique in a great many respects.

Nineteen-twenty! Even the very figures as written have a "forward" look. For the first time, the year has gone ahead of the century. Nineteen-twenty will be the first year of untrammeled opportunity since the end of the big war. Nineteen-twenty will be the first year of open competition on all seas by the foreign traders of all nations. Nineteen-twenty will be the first year in which the results of five years of intensive scientific research, made under the spur of war, will be applied to the industries and arts of peace. Thus far the primary attributes of this year are applicable in a general way to all the people of the earth, but there are several directions in which this year will be unique among the years of American foreign relations, especially as they affect water-borne foreign commerce.

The opening of 1920 will mark for the first time since 1850, the supremacy of the American merchant marine in the carriage of American foreign trade. Late in November, 1919, and through December, the ships of America have carried over 50 per cent of the goods from foreign countries entering and leaving American home ports. Nineteen-twenty will be the first real big year of America's new merchant marine.

Nineteen-twenty in its opening appears to bring to the American shipbuilder his first year of great opportunity free from government control.

The fact that, notwithstanding the huge government program, much of which is still in process of construction,, we have now under contract for private account an amount of shipping from five to six times greater than was on the building ways of this country at the time of the beginning of the big war, is a fact which should fill the mind of every shipbuilder with confidence for the future stability of his business, and if the American people can really become ship-minded and willing to meet the ship-operator and shipbuilder half way in an effort to keep our merchant marine on a proper competitive basis, this stability in the shipbuilding business will become a permanent source of great prosperity at all our seaboard centers of population.

For the American shipbuilder there will be many prosperous years, especially for those builders who are properly equipped and well backed financially to undertake building contracts and large repair work.

We will not here take the time, or the space, to quote statistics proving these simple statements, our purpose being rather to congratulate all the American maritime interests in the prosperous situation which should develop during this coming year, and also to add a word of warning lest the great prosperity, into which we are about to enter, should blind us to the dangers that confront American maritime supremacy in the future.

Pacific Marine Review for the last sixteen years, while trying to avoid any sensational propaganda, has carried on at great expense a campaign of education to induce Congress to see the necessity for placing upon our statute books a really constructive program of marine legislation and navigation law. We have seen many of the most prominent shipping lines of America driven by adverse legislation to seek refuge under foreign flags, or to dissolve their corporate bodies in despair at not being able successfully to compete with their foreign rivals.

We have also seen, during the last five years, under very abnormal conditions, a magnificent array of merchantmen built for American use by American shipbuilders and now sailing the seven seas under the American flag. We are very happy and proud to see this great achievement, but we are fearful lest its real advantage be lost sight of in the political maelstrom which apparently surrounds the governing body under whose guidance this great fleet is working.

When we see that, notwithstanding the government ownership of such a large fleet of merchantmen, we are still operating under the same legal handicaps that were in force prior to the big war, we cannot but consider that in the voyage of this merchant marine of ours there will be many breakers ahead, and it will be necessary to have a very competent pilot in order to steer clear of the rocks that will beset the intricate course through which we will have to navigate.

We are using as our cover subject for this issue of Pacific Marine Review, a beautiful marine painting from the brush of Oswald Pennington, which was furnished to us through the courtesy of Messrs. James Brown & Sons of Glasgow. The artist shows the clipper ship with every stitch of canvas set "running free" before a stiff trade wind.

It seems to us that this picture should typify the spirit with which America should enter this year in striving for merchant marine supremacy.

The beautiful clipper ship, with her forward-pointing figurehead, embodies that spirit of untrammeled liberty of action which is absolutely necessary to the successful operation of a merchant ship in foreign trade. This untrammeled liberty is not now the possession of any American ship in comparison with the ships of other nations, and if a true picture of American freighters were to be drawn, we would find that, instead of "running free," they are running in a sort of network of governmental red tape and "burdensome, restrictive, regulatory legislation" which so entangles their sails or fouls their propellers (if you will come down to modern terms), that great as our fleet is in comparison with what we formerly owned, we find it working at an efficiency of only 40 to 50 per cent as compared with even the disadvantageous pre-war conditions.

We would, therefore, at the opening of this wonderfully promising year, congratulate all our friends in the American marine world on the boundless possibilities which lie ahead, and also warn them to treat these opportunities fairly and justly, lest, as in the former years, they elude our grasp and disappear for another half century.

THE SHIPBUILDING PROGRAM

THE United States Shipping Board Emergency Fleet Corporation has delivered during 1919 upwards of 6,000,000 deadweight tons of merchant ships. This simple statement sets forth a wonderful record for ship construction, perhaps the most remarkable record in this particular industry that has yet been achieved in the history of the human race; but so accustomed have we become to hearing of world's records that this one hardly makes an impression. Indeed to the American ship builder, who is the party most responsible for this achievement, the analysis of this record and its relation to the whole construction program of the Shipping Board simply means that unless he can get domestic or foreign contracts he has worked himself out of a job so far as the building of ships is concerned.

According to a statement recently issued by Judge John Barton Payne, chairman of the Shipping Board, there had been issued up to December 2, 1919, contracts yet uncancelled for 2314 vessels. On that date 2240 keels had been laid for ships to have a deadweight tonnage of 12,926,486. Of these ships 1910 had been launched with a deadweight tonnage of 10,494,047, and of the launched ships a total of 1674 vessels had actually been delivered to the Shipping Board with a deadweight tonnage amounting to 9,189,236.

These figures show that construction work has been started on more than 96 per cent of the entire program; that over 72 per cent of the ships have been completed and delivered; and that before the middle of 1920 the last ship of this program will have been finished and accepted.

It is only by reducing the delivery figures to a daily basis that the layman can get an adequate idea of the capacity of the American shipbuilding plant. Six million deadweight tons is an amount somewhat beyond the scope of the average imagination, but nearly everyone can visualize a ten-thousand-deadweight ton freighter, and can almost sense the work required to finish, test and deliver two such ships for each working day. That is just what the shipyards of America have averaged for the whole of 1919, on Shipping Board work alone. In addition to this, there have been finished and delivered transport vessels for the Army and the Navy; wooden vessels for private account, domestic and foreign; steel merchant vessels for private account, and naval vessels of all classes, the total tonnage of which in any pre-war year would in itself have formed a very respectable record.

THE OPEN SHOP

THE shipyards of the San Francisco Bay district have resumed work on a so-called "open shop" basis. Former employes have been invited to apply for work under the same conditions as prevailed prior to October 1, on which date the Metal Trades Council called a strike.

This strike has cost the workmen involved wages aggregating more than $10,000,000; it has cost the United States government an immense sum through delay in deliveries; it has cost the shipbuilders another immense sum on account of overhead expense with no production, and it has cost the general public of this district a "pretty penny" in the way of its legitimate profits in the business that would have resulted from these wages in circulation. If the strike has produced for anyone a single advantage that will in any way offset any of these losses, the writer so far has been unable to discover it, although he has diligently searched many issues of public prints purporting to be "friends of labor" and has studied carefully the propaganda published by the Metal Trades Council.

As the shipyard executives hope by adopting an "open shop" policy to prevent the recurrence of such strikes which are a loss to everyone concerned and a benefit to none, their success in this movement should be a matter of great interest to all.

An open shop means simply a shop where work is open to any qualified man, whether he be a member of a union or not. An open shop may at any time have a personnel of which every man is a union member. So long as the shop management is not on record as refusing to employ non-union labor, it remains an open shop.

There are two varieties of "closed shop." One of these is that now almost obsolete type where membership in the union meant discharge and blacklisting. The other variety is that where the management is pledged to make membership in the union a prerequisite to employment.

The old form of closed shop was unjust, unfair and un-American, and so it has been shelved. Union labor assisted very materially in forming the enlightened public opinion which made this possible, and for its constructive work in that direction union labor deserves much praise. Even among the ultra conservatives there are not many who would, if they could, impose upon labor the drastic conditions which prevailed, say, fifty years ago. In fact, the most reactionary capitalists, and those most interested in earning large dividends through the use of skilled labor, have realized for at least a decade that one of the safest investments they can make in their plant is that tending to the comfort and welfare of their employes, and the ten dency all along the line in American industrial management has been for some time tending toward higher wages, made possible through increased efficiency.

The second form of closed shop mentioned above is exactly as unjust, unfair and un-American as the first form, and all wise union labor leaders who desire to retain that measure of public sympathy which they have now achieved, will be very careful not to seek to impose this idea of the closed shop upon our industries. If they insist on doing so, it will inevitably act as a boomerang on their success.

There is always a point in any enterprise beyond which the effort and labor necessary to carry on the work brings returns entirely inadequate and out of proportion. This fact has been worked by scientists into a law called "the law of diminishing returns." In driving a ship through the water the attainment of twelve knots' speed may need double the horsepower required to drive the ship at nine knots. In the same way the insistence by any body of men in carrying their ideas beyond the points of equity or reason brings about a reaction which may, and has in many instances in history, utterly destroyed what promised to be a very vigorous and powerful movement.

It may be possible for union labor to carry its ideas to such a point that the shipbuilding industry on the Pacific Coast will be temporarily crippled. It may even be possible for union labor to insist upon its point to such an extent that some shipyards will be entirely driven out of business; but if this condition is brought about by union labor it will find itself in the same position as the farmer in the old fable who killed the goose that laid the golden eggs.

The United States in its inception recited in the preamble to its Constitution that the purpose of the people of the United States at that time was to form a "more perfect Union." That purpose has never been abrogated and we stand pledged before the world to secure the blessings of liberty to all who come under the protection of our government. Among the liberties of mankind there is none more essential than the liberty of work, and for the preservation of that liberty the open shop condition in industry is an absolute necessity. As we write, word comes from Washington that the second industrial conference in session there has recognized this fact and has issued a statement in which it takes the middle ground as being opposed to the aggressions of both capital and labor against this policy of freedom in industrial relationships. We congratulate the members of the conference on this attitude and trust that they will stand by their guns.

DELAY IN PASSING SHIP LAWS

Prospects for the passage of permanent shipping legislation by both branches of Congress before April are slight. The necessity for adopting a policy is understood in Congress, and is receiving full attention in the committees, but a survey of the matters, which will be taken up after the holidays, shows that considerable delay may be expected.

The chief difficulties will develop in the Senate. The committee hearings, which will be held before the Senate Committee, will not start until the twelfth of January, and it is believed that they will cover at least three weeks. It is the purpose of the committee to make the hearings comprehensive and to give all interests full opportunity to express their views.

Another two weeks as a minimum must be allowed for the framing of the committee bill. Even if the measure is passed by the Senate without extensive debate, which is a matter of conjecture, it is not probable that the bill will go through before the end of March. A conference report on the Green and Jones bills is not likely to be put before both branches before the early or middle part of April.

Aside from the time that will be required for the shipping bills themselves the Senate will be occupied after the holidays with the resuscitated treaty of peace. The moves for a compromise which are now seen between the Republican and Democratic leaders indicate that the treaty will come up again for extended consideration. Water power legislation is also expected to come to the fore.

A stiff fight may be looked for on the conference report on the railroad bill, especially with regard to the labor provisions. Considerable time may be lost within the conference on this feature, as the Esch and Cummins bills differ radically. Whatever compromise is reached will presumably result in dissatisfaction when the issue comes up for debate.

A new element which is likely to be injected into the forming of legislation on the merchant marine is the Ransdell bill, which is now being drawn. The contest which has developed within the ranks of the National Merchant Marine Association may have an important effect upon the terms of this measure. While the association has gone on record as favoring the sale of the government vessels to private owners, the Southern interests have raised objections to this policy. As Senator Ransdell represents Louisiana, he finds himself besieged by the majority of the association on one side and his constituents on the other.

Divergent Views Unreconciled

A meeting of the Executive Committee of the association was held in Washington last week to frame the bill. It is understood that J. Parker Kerlin of New York and Senator Ransdell have as yet been unable to reach a compromise on their divergent views. The attitude of the Southern member is that the Shipping Board should continue to operate the government ships, even those below 6000 deadweight tons, to develop new trade routes before they are sold to private owners.

In addition to the Greene bill in the House, and the Jones and Ransdell bills in the Senate, there are a number of correlative measures to be considered. These are the mortgage bill, the load line bill, one to permit cargo vessels to carry passengers, another to permit night work in unloading ships, one to reduce the time required for the training of able seamen, and several minor measures. While it is probable that some of these will be passed upon as individual bills, it is also likely that an effort will be made to incorporate others into the more important bills defining a permanent policy. Consideration of all these measures will entail delays.—(New York Journal of Commerce.)

AMERICAN BOYS FOR AMERICAN SHIPS

Merchant Ship Naval Reserve

By R. E. Cropley

If there is no other need for a merchant marine, at least sufficient justification for having it can be found in that it is a measure of military and naval necessity. Every power in the world except the American government has recognized this fact, and looking at its merchant fleet as all-important to its military system, has provided for the national support of shipping interests in order to be able in an emergency to rely upon merchant ships for service which cannot possibly be performed by any other agency.

My teacher and patron, the late Bernard N. Baker, organizer of the International Mercantile Marine and father of the present Shipping Board Bill, rightfully stated that the merchant marine has three almost indispensable functions in modern military systems, namely:

1. Army transports.
2. Naval auxiliaries.
3. Naval reserves.

At the beginning of the war in 1914, the United States had just fifteen merchant ships actively engaged in deep-sea commerce and but sixteen army transports of all types. For fifty years we had been practically bereft of deep-sea tonnage—the necessary support of the army and navy. The blunders of our war with Spain should have been sufficient to impress us with the folly of our merchant marine policy. For we found out what a frightful and costly mistake it was not to have fortified ourselves with a marine auxiliary to our army and navy, an auxiliary which could be instantly requisitioned to meet our auxiliary necessities. Yet because victory was easily achieved and because the strain lasted but a few months, we promptly resumed our old attitude of indifference toward this vital question.

And again, when President Roosevelt sent sixteen American battleships on a world cruise, we learned that this wonderful fleet could not fight one thousand miles away from a naval station. Why? you ask. For the simple reason that this fleet had no merchant ship support. Our colliers were barely able to supply the fleet as far as the Straits of Magellan and before it entered the waters of the Pacific we had to charter English, German and Italian ships to coal our men-of-war which were on the cruise ostentatiously as a warning to Japan.

This exhibition of absolute dependence upon the the merchant fleets of our possible enemies made the American navy a laughing stock in the eyes of other naval powers. For they saw they would not have to sink our battleships to defeat us. All they would have to do would be to withdraw the means of keeping our fleet at sea.

We must sound a call that will draw Americans back to the sea to man our ships, both merchant and naval. Instead of our country boys coming to the already overcrowded cities, careers in the merchant marine should be made attractive with the added opportunity of doing their bit for their country in the naval reserve. In times of peace the naval enlistment of over six thousand boys ends, and they are blandly allowed to throw away their training, which in itself is so necessary to a naval reserve, and which from any angle, as we proved to ourselves in the great war—as England has so successfully proved to herself for generations—is worth every dollar it may cost and a great deal more.

As things are today, the regular navy is not attractive to any young man as a life career, primarily because of pay. The number of resignations of officers in the hands of the Secretary of the Navy is astounding. It is not from dissatisfaction with the life—it is simply a question of getting bread for one's children. The average naval officer does not get the daily wage of a bricklayer. His pay is not so proportionately favorable as that of a colored longshoreman on the docks in Norfolk, Virginia, earning fifty cents an hour for eight hours, seventy-five cents an hour for overtime, and a dollar if working during meal hours. A naval seaman, second class, who gets $36 a month and has to pay for his clothes, cannot be made in less than six months of intensive training. An officer cannot be made without years of instruction, supplemented by actual experience in the science of navigation, ordnance, engineering and in the command of men. Yet, today the American people have the audacity to expect naval officers to learn how to protect our precious skins at the risk of their lives—be recompensed for their effort at a wage less than that which a bricklayer earns, and at the same time be worried as to how to get bread for his children.

There are other things besides insufficient pay which are making the American boy dissatisfied with the navy, and one is not getting his pay when it is due him. Red tape and the inefficiency of some individual at a specific psychological moment are responsible for this. Another is liberty, and the third—"chow"—naval vernacular for food.

As to liberty, the confining life of military discipline is very hard on the initiative soul of an American youth. Work—he'll work his head off if there is work to be done, but, for the whim of his officers, to have his liberty—his chance to be a free man—impaired, infringed upon—that brings desertions and boys refusing to "ship over."

To remedy such situations which breed discontent, Franklin Roosevelt, Assistant Secretary of the

Navy, has organized the Sixth Division of the Bureau of Navigation. This division is of but recent conception and organization and will of course take some time to make its efforts count. The best officers possible have been detailed for this duty.

With the welfare work for merchant sailors, which the Red Cross and War Camp Community have under way, many ex-naval and country boys are beginning to seek seafaring careers and help man the "Victory" ships which are so vital to the country's prosperity in times of peace and defense in war. To meet the merchant marine competition for sailors at $85 a month, against naval pay of $36 for the same period, the following suggestion has been made to the Navy Department:

Merchant Ship Naval Reserve

Enlistment for one year's service in regular navy—three years' service in merchant marine. Special naval uniform to be worn at all times.

First Year—Service on U. S. naval vessels and training stations at naval rate of pay.

Second Year—Service on American merchant ships at merchant ship pay. Naval retainer of $75 to $100 in addition. Naval hospital service open to the man. Discipline that of any civilian merchant ship man, but desertions punishable under naval courtmartial.

Third Year—The man to do 28 days' service in regular navy in order to re-qualify for naval rating. The $75 to $100 retainer continued. The man having had two years at sea, is entitled to take examinations for a third mate's ticket, or an assistant engineer. If acquired, he ranks as an ensign in the naval reserve, and retainer fee increased.

Fourth Year—Final year in which the man is held by naval rules under his enlistment. No naval duty. Same retainer fee as formerly, according to rating.

Fifth Year—Man is entitled to take examinations for a second mate's ticket, or a chief engineer. If successful, ranks as a naval reserve lieutenant, junior grade. Has to do 28 days in navy this year and every other year from now on as long as he elects to remain in the merchant ship naval reserve.

Sixth Year—No naval duty. Just retainer.

Seventh Year—Naval duty, 28 days. The man is able to take his master's examination. When he becomes chief officer of a merchant ship he ranks as a lieutenant, senior grade, and when he has become captain his rank is that of a lieutenant-commander. The same applies in the engineer's department, as the man works up.

From now on he has 28 days every other year in regular naval service, ashore or afloat, in order to re-qualify for his test certificate and keep in the spirit of the navy. As the man gets seniority in the merchant ship naval reserve it is optional with the Navy Department whether or not they require him to do active naval duty 28 days every other year.

At all times when doing naval duty, man to be paid according to his rating and receive the retainer as well. At all times he has the naval hospitals open to him and all other naval advantages. After the first four years he cannot be tried by naval courtmartial unless called actively into service in war.

The advantages of this to the man will mean that except for one year in the regular navy, where periodically he might be out of luck in receiving his pay, the man will be paid regularly as any other merchant ship man is and his liberty will be that of any other merchant ship man.

As passenger ships require pursers and assistant pursers, naval enlistment in the pay corps should figure on this branch of the merchant marine.

And while suggesting things to the regular navy it is well not to forget the medical department, for that department with its fellow department in the army rather fell down on the country during the past war. The following scheme might prove advantageous:

Medical Corps Naval Reserve

First and Second Years—Graduates of medical colleges, before taking their state regent examinations, to become doctors must do two years as internes in hospitals. These men enlisting in the Navy for two years would rank as Ensigns and be given the opportunity of study and experience which internes in civilian hospitals get. In other words, work done by senior Hospital Corps men in the regular Navy, should be done by these Reserve ensigns. This will not only give them their necessary experience but save many a boy from the terrible trials they have to experience at the hands of hospital corps men who never have studied medicine.

Third Year—Optional course. Rank of lieutenant (junior grade):

1. To civil life—receiving annual naval retaining fee of $200.
2. Merchant ship doctor—annual naval retaining fee of $400 for three years, serving 28 days a year in regular Navy, at the end of three years going on inactive status, with retainer fee of $100.
3. Enter regular Navy.

Assistant Secretary Roosevelt embodied, in a recent letter to me, the following extract from a letter of Captain N. J. Ziegemeier, U. S. N.:

> "With regard to the points brought up by Mr. Cropley, I am in accord with him in believing in a one-year enlistment in the Navy for training and then three years as a Naval Reserve in the merchant service, letting the man understand when he enrolls that it is a four-year enrollment, one year to learn his job in the Navy and three years in the merchant service. As long as he performs service in the merchant service at sea he should be paid a retainer fee, and the amount suggested—$75 to $100—seems to be the right sum. Furthermore, a form of retirement after years of service would be advisable and would encourage men to enter for the merchant service. I doubt very much, however, whether the men after getting into the merchant service could be induced to go into naval training twenty-eight days each year. Furthermore, I do not believe that such a long time would be necessary. If the man has had one year's training and remains constantly at sea in the merchant service, he should be well qualified for this service in every respect."

All of which means that suggestions are at last falling on interested ears, and there is a possibility of the United States no longer being the only naval power which does not rely upon its merchant marine for its naval reserve. I am convinced that we can enlist and maintain a merchant ship naval reserve of, say, 10,000 officers and men a year, at just about what we pay for the operation of a battleship for that period.

Take, for instance, the Northern Pacific, of 8000 gross tons. As she was formerly operated as a merchant ship, she carried twelve navigating and engineer officers, twenty petty officers and 172 men. Granting the navigating and engineer officers $15 a month naval retainer, petty officers $10 and crew $5 per man—a total of 204 officers and men would cost the navy $13,880 a year. With fifty vessels of this type, having an aggregate gross tonnage of 400,000 tons, the navy could maintain a little more than 10,000 reservists at a cost of not exceeding $694,000 a year. Prior to our entrance into the war, the annual cost of the personnel of one battleship, of 35,000 tons, including the pay of officers and the pay and subsistence of the crew of nearly 1000 men, was approximately $730,000.

To be efficient in times of war, our present navy needs the backing up of over four hundred auxiliary merchant ships—mainly big cargo craft and a few express liners for armed scouts; ships to do the real, hard, dirty work of war, as has been proved by the wonderful efficiency of the British merchant marine during the great war in performing deeds which, though we heard but little about them, were as essential to England's command of the sea as is a carburetor to an automobile.

We cannot any longer afford to remain blind to the international situation forced upon us and hope to survive as the world power we like to imagine ourselves to be. We must operate our merchant marine—our "Victory" fleet— on a paying basis in peace times or we shall not have them for naval and army transport purposes, and without a merchant ship reserve our fighting fleet cannot keep the high seas—cannot fight a thousand miles away from a naval base. It is simply a question of self-preservation for the American people to see to it that laws are made so that the American merchant marine will be able to maintain itself on the high seas in commercial competition with the fleets of the world.

The American Ship & Commerce Corporation

UNDER the above name, a holding company has been organized to take over the ownership of the different activities carried on by the Kerr Steamship Company and the William Cramp & Sons Ship and Engine Building Company.

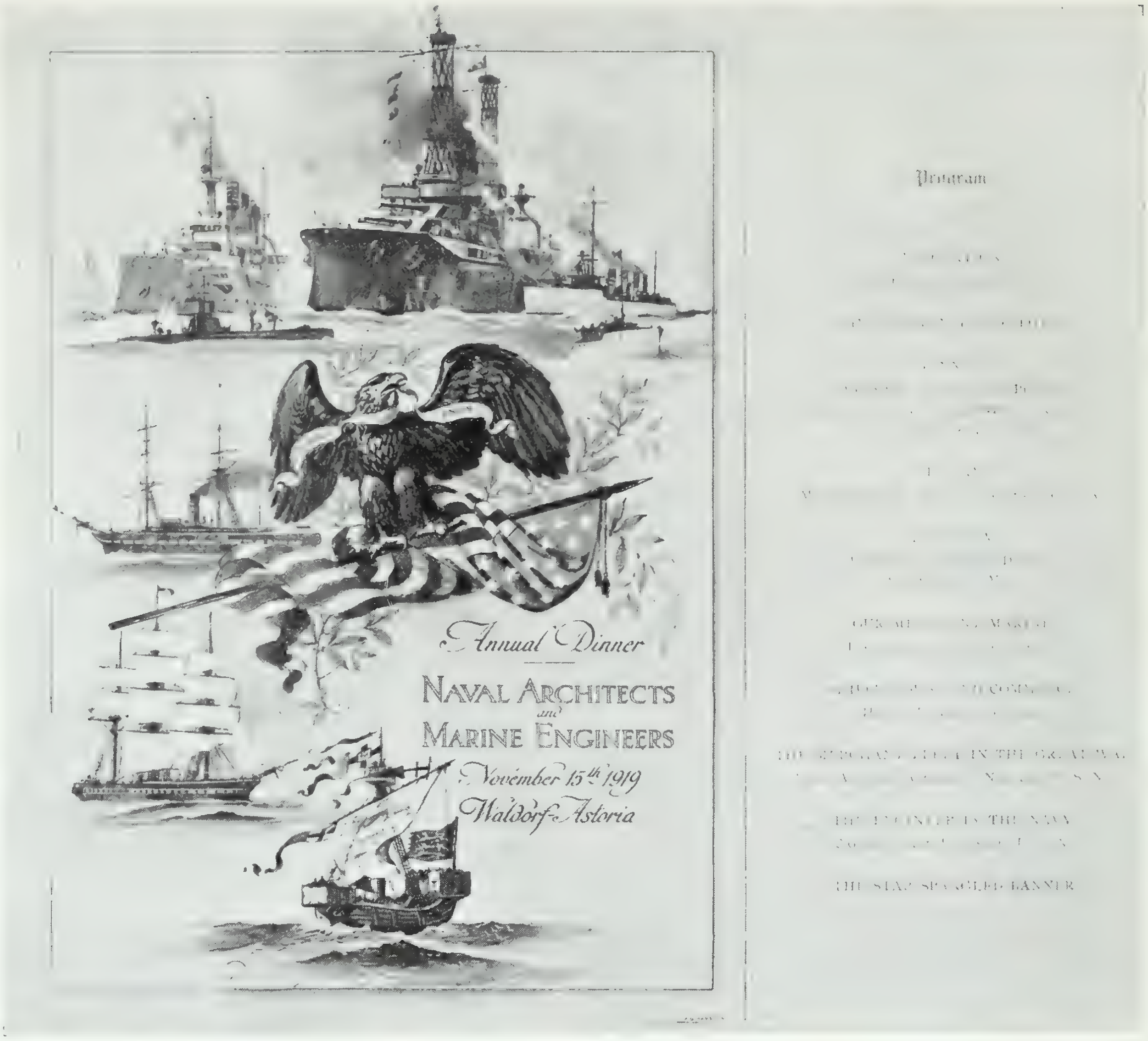
The Kerr Steamship Company is one of the most progressive of our younger American merchant marine operating companies. Under the leadership of Henry F. Kerr, its president, and Alfred E. Clegg and Edward F. Geer, vice-presidents, this company, first by charter and then by purchase, has secured fleets of steamships, enabling it to establish lines of freighters to South America, the Dutch East Indies, China, Japan, Scandinavian countries, Baltic ports, Belgium, Holland, Germany, France, Spain and Portugal. With its home port at New York and branch offices and service from Philadelphia and New Orleans, it is carrying on a thriving business with the ports of these foreign countries, and has now established offices in Paris and Antwerp, and has over two hundred agencies scattered throughout the maritime world.

The activities of this company have grown to such an extent that coincident with the absorption of the William Cramp & Sons' interests, it has purchased the property at Nos. 38 to 40 Beaver street, next door to the Consolidated Exchange, Lower New York, on which it is now erecting a twelve-story building, largely for its own offices.

The board of directors of the American Ship & Commerce Corporation includes: Major General George W. Goethals, president; Captain Kermit Roosevelt, secretary; Joseph W. Harriman, president of the Harriman National Bank and senior partner in the firm of Harriman & Company; John L. Ogden, of F. B. Keech & Company; Parmley W. Herrick, son of Myron T. Herrick, of Ohio, formerly governor of Ohio and United States ambassador to France; J. Leonard Replogle, president of the American Vanadium Company; C. M. Dahl, vice-president of the Chase National Bank; P. M. Chandler, banker; Henry F. Kerr, president of the Kerr Steamship Company, and Alfred E. Clegg, vice-president of the Kerr Steamship Company.

Prior to this amalgamation, the Kerr Steamship Company included the Kerr Navigation Corporation, the Kerr Chartering Company, the Northern Dock Company, the Jason Navigation Company, and the Carib Steamship Corporation. Among the executives managing this huge business are Christian J. Beck, general manager, whose long experience as freight traffic manager of the Hamburg-American line makes him peculiarly valuable in this capacity. In charge of cargo operating is John J. Sharp, who has a very thorough knowledge of port facilities and trade conditions throughout the world. Others connected and worthy of mention are: Jacob E. Waldorf, formerly in charge of the Atlas Line; Oliver C. Long, many years associated with J. Bruce Ismay on the executive staff of the White Star Line; and Robert A Krug. Victor M. Smith, at one time connected with the Dollar Steamship Company, and more recently president of the Anglo-Oriental Shipping Company, is special representative. Wilmer M. Wood, for years identified with the Pennsylvania Railroad, is general freight agent, and Ralph J. MacBrayne is assistant general freight agent. William Goepfert, who is manager of the Inward Freight and Claims Departments until recently, was associated with Walter B. Pollock, marine director at New York for the United States Railroad Administration and is regarded as an authority on claim and demurrage matters.

The new plans of the Kerr Steamship Company include large preparations for passenger business and also the carriage of the United States mails to Germany. This company was the first American operator to carry a cargo to Hamburg after the signing of the armistice. Already twenty of its steamers have been unloaded at Hamburg and regular weekly sailings are maintained from Atlantic and Gulf ports. It has been rumored that the merger of the William Cramp & Sons Ship and Engine Building Company with the Kerr Steamship Company means the construction and operation of a fleet of first-class Burmeister & Wain motorships under American registry and it is certainly to be hoped that this rumor will soon become an accomplished fact.



Naval Architects' Meeting

THE twenty-seventh general meeting of the Society of Naval Architects and Marine Engineers held in New York City, November 13 and 14, 1919, brought out a number of very interesting papers. This is the first meeting free from the influence of what might be called the shipbuilding hysteria of the war period. Saturday, November 15, was devoted to sight-seeing tours and on Saturday evening at the Waldorf-Astoria occurred the annual banquet, program for which is shown in the illustration above.

The paper on "Launching Ships in Restricted Waters," by Captain H. M. Gleason and Lieutenant-Commander H. E. Saunders, was published in the December issue of Pacific Marine Review. Elsewhere in this number appear the papers on "Electric Propulsion of Merchant Ships," by W. L. R. Emmet, and on "Non-Rolling Passenger Liners," by Elmer A. Sperry.

For the benefit of our busy readers we have summarized the more important of the other papers, as follows:

Steel Ship Construction from a Management Viewpoint, by Creighton Churchill, Esq., Member.

This paper is the analysis of the results of the studies of operations in over 50 per cent of steel shipbuilding yards engaged in construction for the Emergency Fleet Corporation.

According to Mr. Churchill, the factors under direct control of shipbuilders are organization, management, methods, and to some extent men. Material is controlled by the prevailing market. Wages are not under control of the shipbuilder and are passing at the present time out of the control of market conditions. Therefore, for the purposes of this paper, attention is concentrated on factors that are under control of the shipbuilder.

The analytical studies referred to above show that during the war over 80 per cent of the faults were chargeable to the factors of organization, management and methods. They also show that it is quite practicable to reduce very substantially the construction costs by removing the faults of both men and management. Calculations are made for a 7500-ton deadweight cargo vessel which show an intimate relation between fabricating capacity, number of ways, construction program and man efficiency, the last being expressed in deadweight tons of output per man per year. Some very interesting results are developed. 1. With a given man-efficiency there are, for most economical construction, a definite number of ways and a certain building program. 2. As man-efficiency increases, cost decreases according to a diminishing ratio, but not in direct proportion to the increase in efficiency. 3. The lower the man-efficiency the greater number of ways, and the longer the building program to secure the most economical construction.

The conclusion is drawn that construction costs are dependent to a very large extent on tonnage and therefore each individual yard should confine itself to vessels that come within its field and that field is determined from the most economical building program at a given tonnage. For instance, with a 7500-deadweight ton cargo ship, the most economical building program is 113 days on the ways, 30 days at the outfitting dock, at a man-efficiency of 35 deadweight tons and a fabricating capacity of 100 tons per eight hours with a five-way yard. The following example is interesting: A contract to deliver a 7500-deadweight ton cargo vessel in 155 days (125 days on the ways and 30 days outfitting) shows a cost of $117 a deadweight ton with a man efficiency of 65 deadweight tons a year per man and a cost of $158 a deadweight ton with a man-efficiency of 25 deadweight tons a year per man. It is suggested that standards be set according to the following table, where "b" is the actual performance in tons of steel erected per man in going yards:

D. W. T. Tonnage	Standard per Man Year	Value of "b"
3,500	30 D. W. T.	10
5,000	36 D. W. T.	12
7,500	45 D. W. T.	16
10,000	53.5 D. W. T.	20
12,000	61 D. W. T.	23

Economical Cargo Ships, by Alfred J. C. Robertson, Esq., Member.

This paper gives a very interesting analysis of the various factors which determine the over-all economy of a cargo ship in operation and figures out a table as shown in our insert. This table shows for various sizes of ship and various speeds the elements entering into the cost of operation and the profit per annum per million dollars investment, assuming a minimum port detention.

Submarines in General — German Submarines in Particular, by Commander E. S. Land, Construction Corps, United States Navy.

A very complete summary in two parts of the submarine situation. The first part deals with lessons learned from submarine operation during the war and the second part gives the results of the inspection of German submarines by the American Submarine Inspection Board, of which the author was a member.

This board made a casual inspection of about 100 of the submarines surrendered by Germany and a very careful detailed inspection of one vessel of each type. The report of this inspection is summarized in considerable detail.

Propulsive Efficiency of Single-Screw Cargo Ships, by Commander William McEntee, Construction Corps, United States Navy, Member.

This paper gives some very interesting results obtained in a series of experimental tests made with models at the United States experimental model basin. The characteristics of the models used are shown by the following table:

Model Number	Longitudinal coefficient	Per cent of parallel middle body	Run in per cent of length	Displacement—tons
2181	0.74	30	38.70	12.341
2182	0.76	35	37.03	12,675
2183	0.78	40	35.37	13,009
2184	0.80	45	33.70	13,344
2185	0.82	50	32.03	13,678

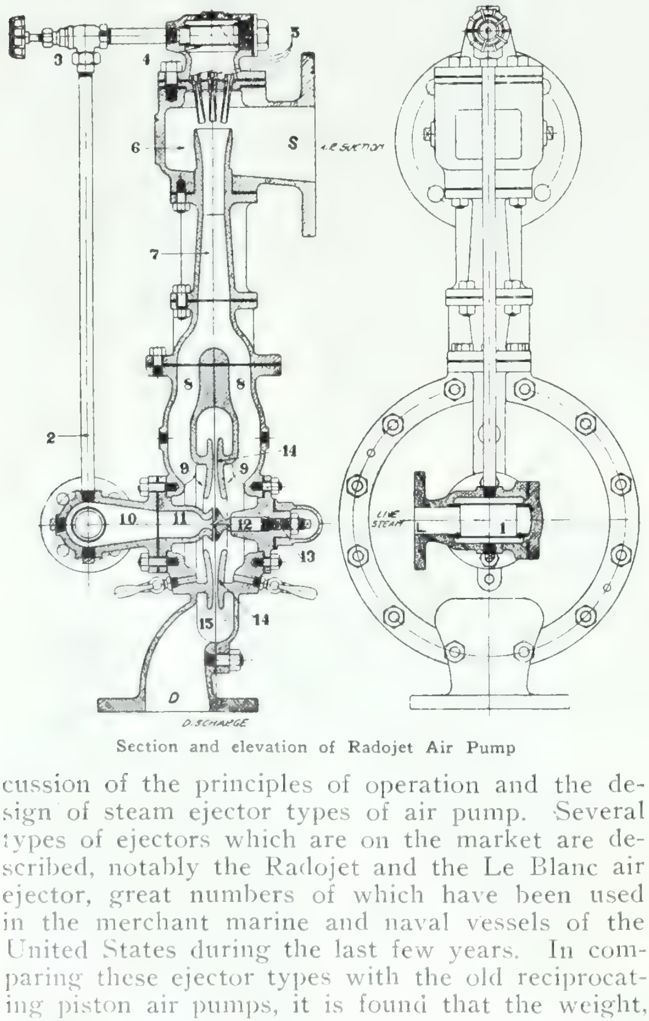
The tests were made with the object of determining the effect of varying the proportion of parallel middle body and the longitudinal coefficient simultaneously while maintaining the principal overall dimensions. As an example it may be stated that the curves deduced from these experiments show that with a ship of practically 13,000 tons displacement, represented by model 2183, at a speed of 11 knots, an increase of the longitudinal coefficient from 0.78 to 0.80 corresponding to an increase

Annual Dinner of the Society of the Naval Architects and Marine Engineers at the Waldorf-Astoria, New York City, November 15, 1919 in displacement of 335 tons or 2.75 per cent, would require an 8 per cent increase in effective horsepower and a 12.27 per cent increase in shaft horsepower. Of the increased displacement, therefore, only part would be available as cargo-carrying capacity, owing to the necessity of increasing weight of hull, machinery and fuel. On a given trade route with a given cost of fuel and a known operating expense, these curves would enable the architect to figure the best displacement for over-all economy.

A summing up of the result of this series of experiments and others formerly undertaken, allows the author of this paper to state that for a well-designed hull and propeller running at about 90 revolutions a minute, it is safe to assume that with a single screw cargo ship a hull efficiency of 1.09 and a propulsive efficiency of 0.65 may be expected.

New Developments in High Vacuum Apparatus,
by G. L. Kothny, Esq., Member.

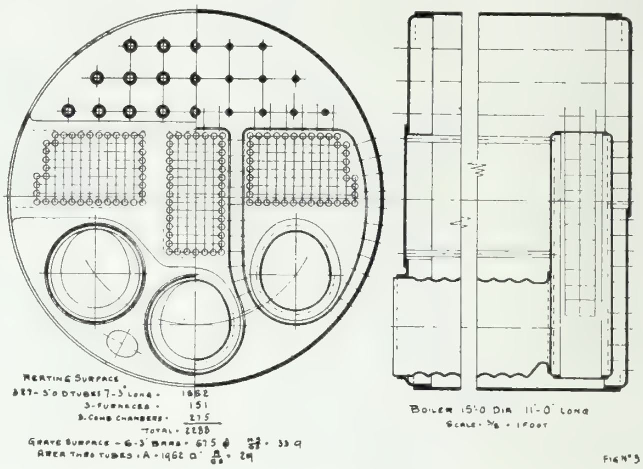
A discussion of the changes brought about in vacuum apparatus, and particularly in air pumps, by the necessity of obtaining high vacuum in order to reach high efficiency and economy in steam turbine practice. Some very interesting observations are given as to the theory of the maintenance of vacuum in marine surface condensers and a discussion of the principles of operation and the design of steam ejector types of air pump. Several types of ejectors which are on the market are described, notably the Radojet and the Le Blanc air ejector, great numbers of which have been used in the merchant marine and naval vessels of the United States during the last few years. In comparing these ejector types with the old reciprocating piston air pumps, it is found that the weight, cubical space and floor space for equal capacities compare as follows:



Section and elevation of Radojet Air Pump

	Weight Lbs.	Cubical Space Cu. Ft.	Floor Space Sq. Fft
Twin-beam air pump	14,500	375	33
Two air ejectors and one condensate pump	2,100	18	8

The ejector type has these further advantages: No moving parts or valves, no lubrication required, no attendants during operation, operation noiseless, simple and reliable, no foundations required, no restriction as to location, maintenance cost practically nil. The steam air ejector was first tried out on board ship about four years ago. Marine engineers feared that to discharge the co-mingled steam and air into the feed tank would cause a greater amount of air to be absorbed by the feed water than would be the case when using a reciprocating piston air pump. Comparative tests have shown that this fear is groundless. Indeed, when using the ejector, the amount of air absorbed in the feed water was 35 per cent less than when using the twin beam air pump. The air ejector has rapidly gained the confidence of marine engineers and shipbuilders, and today over 500 ships built in the United States are equipped with steam ejectors.


HEATING SURFACE
387-5'0 D TUBES 7-3' LONG = 1962
3-FURNACES = 151
3-COMB CHAMBERS = 275
TOTAL = 2288
GRATE SURFACE - 6-3' BARS = 67.5 ◊
AREA THRO TUBES = A = 1962 □'
BOILER 15'-0 DIA 11'-0" LONG
SCALE = 3/8 = 1 FOOT
FIG Nº 3

Standard design for Scotch tubular Boiler, 15 feet diameter by 11 feet long

The Application of Standardization and Graphical Methods to the Design of Cylindrical Return Tubular Boilers, by Henry E. C. Meyer, Esq., Member.

This paper is devoted entirely to boilers of the so-called "Scotch" type, which are subject to faulty design due to the designer lacking sufficient previous data to build upon, and an effort is made to supply data so that any designer may plan a boiler to give good results.

The British Institution of Naval Architects, in conjunction with Northeast Coast Institute of Engineers and Shipbuilders, and several other engineers' institutes and societies in the United Kingdom, have recently investigated standardization of propelling machinery and their report issued in the spring of 1919 states: "The committee thinks, however, that at present it would serve no useful end to attempt a standardization of boiler design." In America, on the other hand, during the last three years many firms have been manufacturing this type of boiler without any experience to guide them. The writer of this paper has developed, for the guidance of the designers of such firms, a series of diagrams, grapically illustrating the relation between the various characteristics of boilers of this type and a standard design for an 11-foot diameter boiler, a 13-foot diameter boiler and a 15-foot diameter boiler, all 11 feet in length.

Non-Rolling Passenger Liners

Observations on a Large Stabilized Ship in Service, Including the Plant and Economies Effected by Stabilization

By Elmer A. Sperry, Esq., Member

NOW that it has been adequately demonstrated in the case of a number of important installations that a ship can be guaranteed against all rolling, a great forward step is possible and a new era opened up for the American passenger-carrying service. The traveling American demands the greatest possible degree of comfort, and shipping interests will not be slow to meet this demand by the latest and most up-to-date equipment cast strictly on American lines.

We will have at no distant date the service-deluxe on the Atlantic and probably also on the Pacific, or, in American travel lore, the "Pullman Service of the Sea." Plans are already in progress for an extensive adoption of the new principle, so that the benefits and economies resulting from a ship guaranteed against roll will be available to the traveling public. This great forward step has been made possible by work going steadily on here in America for the past fifteen years.

The point of large-scale demonstration has now been reached, and full stabilizing moments, requisite for preventing all roll of even the largest ships, have been practically developed. The great principle thus finally established is that full stabilizing moments can now be simply and effectively delivered to a ship that is quiescent and entirely free from motion. The motion of the ship itself having heretofore invariably been relied upon to create the quenching moments, anything like full extinction of roll has of course been impossible.

In all previous attempts to prevent rolling, the equipment has operated on the passive principle, depending on a certain amount of roll for the stabilizing moments, as stated; and the amount by which the roll has been reduced has never been satisfactory, nor have the means themselves been practicable. Another difficulty is that the phase lag is found to be insurmountable, the stabilizing effect, such as it is, arriving "the day after the fair."

The active gyro stabilizer solves the problem and works entirely independently of the motion of the ship. Delivering full counter-moments to a motionless ship, it is thus free to deal directly with the wave slopes themselves, i. e., with the rolling increments of the sea as they are in the process of developing, even before incipient rolling has set in. The active stabilizer thus acts as a simple preventive of rolling, working in harmony with the slow period of the ship, yet dealing alertly with each increment as it arrives, irrespective of magnitude or direction; holding the ship most satisfactorily upon an even keel, apparently without effort; demonstrating how little is really required to keep a ship from rolling, or, rather, from beginning to roll, if only a basically preventive method is employed.

With the complete solution thus in hand, accomplished with a small and simple equipment, it is believed that the older passive types, with their great weight, fractional results, and uncertain operation, will become obsolete.

The equipment that brings about this important result is so simple and unique that a brief résumé of its development, the principles involved, and the performance of the non-rolling ship itself, cannot fail to be of interest at this time.

The possibility of producing the non-rolling ship was known to the leading naval architects and investigators in England, notably the elder Froude,

United States Army Transport Henderson which is fitted with Sperry stabilizers. The size and fore and aft position of the stabilizing plant is shown by the black patch on the side of the ship.

prior to 1880. A little later Sir Phillip Watts, one of the great masters of this noble art, became convinced from Froude's work that, inasmuch as it takes so little to hold a ship on an even keel and to prevent it from rolling, this very desirable result should be accomplished. As chief of construction of the British Admiralty, he, with a corps of engineers, at once started in to establish this great principle and to put it into executon, by building "anti-rolling tanks," as they were called, into the ship's structure and then filling these elongated tanks up to a certain critical point with sea water. These were expected to take on periodic oscillations from the ship's rolling motion, thus creating moments which would always be in opposition to the rolling and tend to reduce it. These tanks were actually built into two war vessels by the Admiralty, and experiments were undertaken with rather discouraging results, on two counts:

First, it was found that there were required a large tank and a large amount of water, representing quite an appreciable percentage of the total displacement of the ship—such a large percentage, in fact, as to be prohibitive. The other point was the difficulty in maintaining proper phase relation between the natural period of the ship, the period of the water in the tank, and the period of the waves of the sea. More about this farther on. It will suffice to say that when this phase relation is not maintained, these tanks can easily become dangerous, tending to increase the roll rather than to reduce it.

Later the great English engineer, Sir John Thornycroft, undertook to accomplish the same result by a large horizontal pendulum operated hydraulically down in the hold of the ship; and the report of Sir William White — one of the Admiralty's greatest naval architects — on the actual operation of this device in a ship at sea in a storm makes one of the notable chapters in the early history of attempts at stabilization of ships. This stabilizer worked well at times, but it was found to have the same difficulty as the anti-rolling tanks, namely, in order to secure a sufficient reduction in roll to make the equipment commercial and practical, the weight of the equipment was prohibitive.

Later, Herr Frahm of Hamburg re-invented Sir Phillip's tanks, but though he made a contribution to the mathematical treatment of the subject and introduced some refinements in manual control valves and also in shape and contour, the tanks were found to be open to the same objections as those of Sir Phillip.

Dr. Schlick, who had done such wonderful work in balancing marine engines, then came forward with his passive "gyrostat" or "Kriesel," as he called it. This was installed on a small torpedo boat and tested in the North Sea. The Admiralty sent Sir William White—who, by the way, was a friend and admirer of Dr. Schlick—to report upon this device, and Dr. Schlick's rights were taken over by a leading English firm. The report is interesting. Sir William found this to be another device which depended for its action on the initial roll of the ship—that is, the quenching moments were dependent solely upon the ship's motion—and these would have been quite effective as a roll reducer had it not been for the same unavoidable lag in phase, which seriously impaired their efficiency. In any event, the combined difficulties, some of which are cited, were sufficient to prevent the adoption of this device, or, for large ships, even its serious consideration.

Later the action of anti-rolling tanks came under careful review by our own Taylor. This was before he became admiral and chief of the Bureau of Construction of our Navy, and while he still had charge of the big experimental tank at Washington, designed and constructed by him, and of the great collateral equipment that forms a part of the experimental and model department of the Navy. In this connection, Admiral Taylor, with his wonderful grasp of all these intricate phenomena, designed tanks that were unique; and to make his research and investigations complete he went at the matter in the most thorough manner, not confining his observations to one tank alone, but going to sea with a ship equipped with no less than three tanks. This was the most complete equipment, and the investigation was one of the most searching into the action of anti-rolling tanks that have ever been made the world over—as is characteristic of all of Admiral Taylor's work, which is conceived from a most complete and comprehensive standpoint and carried out in the most rigid and searching manner.

It is difficult to believe that the great art of naval architecture appreciates to the full the debt that it owes Admiral Taylor. Some little glimpse is had of the relation that this distinguished authority bears to the world-wide art, when we remember that at the time the Hawk, warship of the British Admiralty, hit the Olympic near Southampton, within four hours of this memorable collision both sides had tried to reach Admiral Taylor by cable to retain him in the suit that they knew was imminent as the result of this accident. So the government released Admiral Taylor to the Admiralty in order that important precedents might be established in the maritime world.

But to revert to Admiral Taylor's anti-rolling tank experiments. In this connection he reached certain conclusions, as he always does. These conclusions are interesting, as here we have the real crux of this whole matter. His verdict was that outside of the prohibitively large weights and extremely important athwartships space occupied by the tanks, neither the United States Navy, nor, in fact, any navy or marine, possessed the personnel requisite to keep the period in phase relation with the natural period of the ship and also with the period of the sea. So at last this phase of the art has had the extremely great advantage of passing under critical review by probably the greatest living authority on these matters.

The difficulty with all of these attempts on this most important problem can be reduced to an extremely simple proposition: With all of these methods of attack, a pound weighs only a pound and its effectiveness is measurable in simple terms of the lever-arm of its application, or the distance from the center of oscillation of the ship at which the moments become effective. This is the reason for the excessive and even prohibitive weights necessarily present in all these methods of reducing the roll of ships.

Now what is wanted is not the reduction of roll, but the actual prevention of all rolling of ships, and it is just here that the powers and resources of the active gyroscope step in. For years engi-

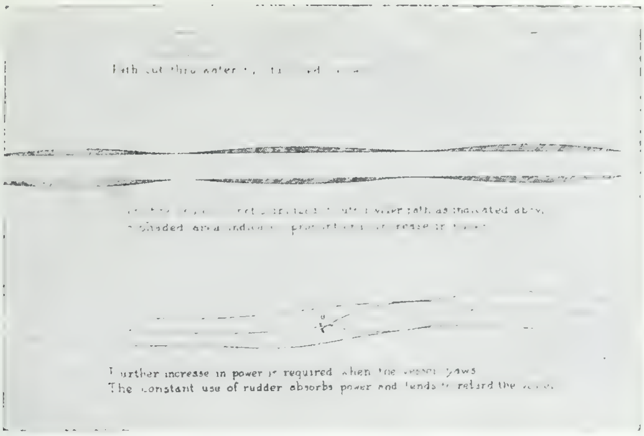

Further increase in power is required when the vessel yaws
The constant use of rudder absorbs power and tends to retard the

Diagram to illustrate power wasted by the failure of non-stabilized ships to maintain a straight line course

neers have observed the strange peregrinations of the gyroscope, but have failed to perceive the enormous powers that lie dormant in this simple apparatus, only awaiting the application of artificial "precession" to place it under perfect control and to render it abundantly serviceable for stabilizing even the largest ship. By the way, the larger the ship is, the easier it is to stabilize her.

In the gyro we have a most unusual illustration of the phenomena that Cicero classed among "real blessings"—that is, when nature's laws work to aid rather than to obstruct progress, by no means a too frequent occurrence in engineering. The gyro outclasses all other mechanisms in that, while its weight and cost vary as the cube of a lineal dimension, its stabilizing power varies no less than the fifth power. This runs into a very great gain in gyro stabilizers for large ships.

Why is the gyroscope more available for solving this great problem than the tanks on the one hand or the great pendulum of Thornycroft on the other? The answer is simple. Whereas in the prior art, as we have stated, a pound is only a pound, in the gyroscope a new and extremely far-reaching situation is created. In arriving at the powers available to stabilize the ship with the gyro, every pound is multiplied by the velocity of the particle, so that a comparatively few pounds are actually capable of doing the work of tons. With the active gyro this is all held in phase, and, as described, is available for the important purpose of holding the ship free from even the beginnings of roll.

Those unfamiliar with the subject, and even some naval architects, have feared that the forces and stresses involved might endanger the ship's structure in case of a heavy storm. The exact nature and magnitude of these stresses are perfectly well understood and have now been brought under careful observation in quite a large number of equipments in actual service. We are therefore speaking from a wide range of accurate knowledge on this important item, and it will be interesting to know that the conclusions by the highest authorities are that a ship which freely rides the waves with its mast held vertical, being completely stabilized by the little gyro equipment in her hold, is subjected to less than one-fourth and often less than one-sixth of the very large strains present when it is allowed to roll under exactly the same storm and weather conditions and with the heading unchanged in the same sea. With the gyroscopic stabilizer equipment on board, we have the unique situation of being able instantly to throw it on or off, in action or out, at will, by stopping its slow precessional movements, so that we can observe exactly what happens under the two conditions and repeat each condition as often as we choose and hold each under complete observation as long as we choose, under any given sea or weather condition. And just such tests as these have been repeatedly made and studies pursued until they are well known and understood. Thus the presence of the stabilizer on the ship reduces and holds to a very low value the stresses and strains which in the case of an unstabilized ship in storms often rise to high and dangerous magnitudes. Many thousands of feet of record have been made and studied.

Here again Admiral Taylor's work comes to the fore. The development of the active gyro stabilizer was aided materially through the encouragement given by this naval officer. He was among the first to appreciate the important results likely to follow the application of the active principle, i. e., the ability to develop pure torque stresses in ships without change in loading or moving of weights or masses, and to direct these stresses and emplace them at will upon a ship independent of the state of motion of the ship itself and also independent of any particular position of the equipment upon or within the ship. This whole art certainly owes much to Admiral Taylor.

Everyone is familiar with the groanings, creakings and weird noises that are always present in heavily laboring or rolling ships. These illustrate the stresses and strains to which she is being subjected. Imagine the sensation when the stabilizer is thrown into action and these sounds cease forthwith, positively demonstrating that the heavy stresses have vanished. The stabilizer thus becomes one of the greatest safety devices yet invented imparting absolute security to the great hull and structure of the ship and materially prolonging its life. All of this, of course, is wholly outside of the consideration of comfort, which is one of the prime reasons for the installation on passenger ships.

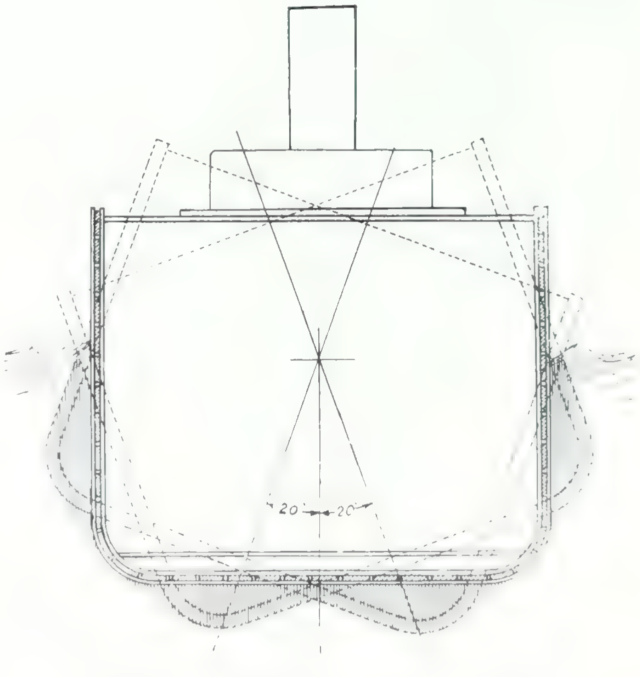


Diagram illustrating power consumed by rolling

In this connection it will be interesting from a technical standpoint to know that some time before the first stabilizer equipment was installed by the United States Navy, the great English naval architect, Sir William White, was brought to this country in consultation on this subject. He stated, after careful review of the facts, that from the naval architect's standpoint the strains introduced by the gyroscopic stabilizer in holding a vessel absolutely free from roll were insignificant, and that if we laid hold of a single frame of an ordinary steel ship we would have a factor of safety of about six, and furthermore that these strains and stresses were only a small fraction of those existing in the hull and general structure of a ship when rolling in a storm.

This great authority went further and stated something that our highest authorities in this country then doubted, namely, that as soon as a ship was stabilized in a storm and rolling was prevented, that ship would not ship seas, but her decks would immediately begin to be dry and would remain dry. Although we did not at the time believe that this could possibly be true, our universal experience since we have had these installations in operation demonstrates the absolute truth of the statement, as the result of many observations and experiments, incidentally showing the great insight of Sir William.

Even some excellent authorities, before actually having the unique and extremely interesting experience of being aboard a stabilized ship, have confused a stablized ship with a dock, expecting the waves to pound the ship when stabilized, and it is with great surprise and satisfaction that they have repeatedly discovered just the reverse to be true. A stabilized ship invariably rides the sea, gradually rising and falling with the sea with a wonderful degree of gentleness. Her masts quickly come to the vertical, and all pounding and splashing disappear as soon as stabilizing sets in.

Other facts have been learned from the performance of the stabilizer in heavy weather. It is found actually to contribute a number of definite economies in the operation of the ship. Anyone who has ever undertaken to pilot a heavily rolling ship and to hold her to her course has realized the enormous amount of "helm" that is constantly required, and the resulting very sinuous course that the ship takes in spite of the best efforts the helmsman can make under these conditions.

No pains have been spared in studying this important phase of the contribution of the stabilizer. The gyro compass with its enormous directive power enables automatic records to be made of the most minute orientation of the ship. These have been secured and also simultaneous graphic records of the amount of helm being used by the ship, also automatic, so that there could be no question as to exactly what was happening. The study of these records has been full of interest developing an accurate method of analyzing and aiding to establish the losses under this division.

Operating engineers and naval architects know that even a very slight amount of "helm" acts as a tremendous retarder in the forward progress of the ship, and especially is this emphasized when a very large amount of helm has to be constantly employed. This slows down the ship, uselessly wasting a great deal of the propulsive power of her engines. Again, the sinuous course that is invariably steered by a wallowing ship causes it to travel a considerable extra distance, always accompanied with a "bad angle of attack," causing a large extra power consumption. A stabilized ship is practically self-steering. This comes as a sort of by-product of stabilization, the stabilized ship requiring practically no helm, regardless of weather.

But there is still a greater source of power waste in rolling ships. As the hull constantly oscillates back and forth, its form-lines encounter and constantly displace laterally, with extra friction of impact, hundreds and even thousands of tons of water, and this persists, going forward with every roll. This, in connection with the extra wetted surface involved, added to the extra stream-line losses and skin friction impingement, especially when bilge keels are present, amounts to losses of very great magnitude in terms of actual horsepower wasted. Model experiments and resulting calculations indicate that these losses are much higher than have been supposed. For a 15,000-ton vessel at eighteen knots—away inside the maximum roll—this loss may easily reach from 1000 to 1200 horsepower, and this power is absolutely dissipated and wasted.

Just here the stabilizer steps in with a saving of nearly all of this—practically the entire amount, minus the small and comparatively insignificant quantity of power that is required to keep the gyro wheel spinning in a vacuum. In the course of a very few voyages this power saving, in terms of fuel saving, amounts to enough to pay for the entire stabilizing equipment.

Very full corroboration of this is found in the service performance of a fast passenger and cargo ship, by taking ten consecutive trips over the same course in the same direction with almost identical load conditions and under conditions of constant propeller revolutions. These trips are sufficiently long, 4600 miles, to be convincing in the results shown. This data has been plotted in revolutions per knot and gives interesting and positive indication of the retardation of the ship owing to weather conditions. A very great amount of the losses in headway due to the retardation effect of the disturbances discussed above will be entirely eliminated by full stabilization. Let us examine what this means in dollars. Suppose the operating expense per twenty-four hours to be $6000. The extra expense—that is, the expense over and above the average—in the stormy months amounts to not far from $100,000. This, taken with the amount saved through elimination of bilge keel losses, develops an earning capacity of the stabilizer of not far from 100 per cent per annum. All of this is over and above the many other important gains, both direct and indirect, resulting from the stabilizer installation.

The stabilizer achieves another economy of very great significance to both the operator and the passengers of fast ships. This is the practical avoidance of the necessity for slowing down ships in stormy weather or when heavy seas prevail, the ships being able to make practically the same time under storm conditions. This has been repeatedly demonstrated and is a result so startling that, when first experienced, it has often been claimed as an original discovery by the skippers of stabilized ships.

So insignificant are the stresses required to prevent all rolling that it is interesting to compare them with, or to state them in terms of the specific loading permitted by the underwriters. Take a concrete case of the transport Henderson, of 10,000 tons displacement, 488 feet length, with maximum beam of 48 feet and draught of 19 feet 9 inches—the allowable load per running foot for the section where the stabilizer is located is 14.5 tons. The load due to the weight of the stabilizer plus the maximum gyroscopic stabilizing moments, figured as load upon the vessel, is at maximum only ten tons, and with average stabilizing moments about six tons per running foot. In other words, the stabilizer loads are much less than normal cargo loads. Some of the vessels carrying heavy machinery to France were loaded as high as 28 tons per running foot. The foregoing makes clear, in a very practical way, the relation these forces bear to the vessel's ordinary loads.

Another definite advantage secured by the stabilizer is the elimination of the bilge keels. Dealing only as they do with "V" square, they can never be of service other than in the heaviest rolling—at all other times they are a positive menace. The well-known drag of bilge keels in perfectly calm weather is not only ever present but represents positive losses, even in excess of those calculated. This has now been positively observed in the case of a large 20-knot ship, the perforfmance with and without bilge keels for the same shaft revolutions, loading and trim being known. Moreover, a ship is never trimmed very accurately longitudinally, giving the bilge keels a frontal attack component with the attendant eddies, consuming additional power of no small magnitude.

In rough weather the bilge keels afford an extra opportunity for the waves to lay hold of the vessel in rolling. Recently it has been definitely determined that the power required by bilge keels under the condition of pitching, even in a moderate sea, increases the propelling power to a point much beyond what had been supposed. In the case of a 10,000-ton vessel with standard keels, even with moderate pitching, an increased propelling power of about 9 per cent has been observed. In a stabilized ship it is possible to eliminate bilge keels. There should be no hesitancy in omitting keels, as an exceptionally large and successful fast passenger ship has been operated without bilge keels for years.

A reduction in stresses of the propelling machinery of a stabilized ship represents another important gain, especially in the case of twin-screw vessels where the windward propeller is held very much more satisfactorily to its duty—not only saving power but preventing the racking strains due to overspeeding when the screws are "rolled out." The efficiency of a propeller falls off abruptly as its blades even approach the surface, especially where the dip of the waves allows the slightest aeration of the water. For efficiency a propeller requires to be kept down in stiff water.

Prevention of deterioration in cargo applies especially to ships carrying live stock. Figures have been furnished by a concern transporting horses during the war showing that, in a heavy storm during a single trip, their losses per trip often amounted to $30,000 or $40,000, a sum sufficient in a short period to equip the vessel with a stabilizer.

The ability to roll the ship has proved in actual experience to be important in case of emergency to free the vessel from sand and mud banks, by opening the contacting crevices and gradually liquifying the encumbent mass. This has been discussed in a former paper, also the field of the active gyro in rolling ice-breakers and preventing them from freezing in when cutting through rivers and harbors during the winter months. The most important use for rolling, however, is as an aid to gunnery.

As outlined, we have been accumulating a large amount of actual sea experience with various sized equipments. The government has been of the greatest assistance in encouraging the development. The war has seriously interfered with the work, but even during this period the Navy has allowed us to complete the largest gyro equipment yet attempted, and though the installation has been retarded by the ship being in constant transport service, this fact has offered additional opportunity for final testing.

This ship has operated with as high as 11,500 tons displacement, and the stabilizer has been repeatedly operated under overload conditions without difficulty, the journals running with perfect temperature control under the heaviest duty, including overload conditions. Even different lubricants have been tried, all giving about the same results; in fact, the plant, since the journals have been worked in, has operated normally in service, and the records show that the guaranteed stabilizing moments have been easily developed.

This equipment has undergone additional protracted tests as an ordnance fitting, reaching results in this connection which are extremely interesting; operating in this part of the work in conjunction with the base equipment of our latest fire-control system. The exacting nature of these tests and their severity have contributed in no small measure to another extremely interesting result, as follows: The complete knowledge we now have of the behavior of these equipments and the measured results and records have placed us in a position to guarantee unqualifiedly the stabilization of practically any ship to accurate specification and also the equipment by means of which this important result is secured.

NEW FRENCH MANAGER

GEORGES SCHRIMPF, formerly manager of the shipping department of the French High Commission to the United States, has just arrived in New York for a brief stay.

In connection with his visit, it is announced that he has been appointed manager for France of the France & Canada Steamship Corporation of New York. The appointment constitutes another link in the chain that binds the constantly increasing friendship and business relations of the United States and France.

For sixteen years Mr. Schrimpf was manager of the Constantinople office of the Compagnie Fraissinet of Marseilles. While a member of the French High Commission he made his headqaurters in New York. This connection ended in January, 1918, and, until his present appointment, he was general agent of the Compagnie Chargeurs Reunis of Bordeaux.

Electric Propulsion of Merchant Ships

By W. L. R. Emmet

Paper read at the Twenty-seventh General Meeting of the Society of Naval Architects and Marine Engineers, New York

THE use of electricity for propelling ships was first advocated in the case of large warships in which it affords particular advantages in the matter of cruising economy through change of speed ratio, interchangeability, space distribution, etc. The first application, however, was made in the case of the United States collier Jupiter, which is in most features a ship of the merchant type. The demonstration of geared-turbine propulsion came after the first serious proposals of electric drive, and the advantages which have been attributed to the geared method have suspended such activities as were considered in this country in the direction of electric drive for merchant ships, while, in the case of warships, electric drive activities have been uninterrupted. In the meantime certain electrically driven ships built in Europe, operated with very high degrees of superheat, have shown wonderful fuel economy, and many more such ships are being equipped.

The larger American shipbuilders, having their own facilities for machinery construction, have, not unnaturally, been opponents of electric drive, and the Emergency Fleet Corporation, which for some time has represented ownership, has for various reasons discontinued such activities in this direction as had been planned.

Two or three years ago the writer was of the belief that the geared equipments then being made afforded a solution of the problem which in cost and results would probably prevent commercial success of electric drive in merchant ships, although it was realized that the margin of possible advantage was small. Since that time improvements in electrical designs have been developed, and limitations of gear possibilities have appeared which put the question in a different light, and it is now the writer's belief that electric drive is justified in all large ships and that it will very soon develop a wide application, notwithstanding the great efforts of skill, organization and capital which have been given to the introduction of the gear drive for vessels of all classes.

The discussion of this subject is largely a matter of comparison with other methods, and the purpose of this paper is to make clear what is proposed in a specific case and to suggest comparisons which may affect relative value.

The case selected is that of a vessel of 8800 deadweight tons, length 424 feet, beam 54 feet, having a cubic capacity of 460,000 cubic feet and capable of making 11.5 knots with 2500 shaft horsepower delivered to a propeller operating at 100 revolutions a minute. Plates 1 and 2 show an electric propelling equipment applied to such a ship, and, for comparison, an equipment with triple-expansion engines is shown in Plate 3. It will be observed that in this design the motor is placed as far aft as convenient, affording space for disassembling and for removal of the tail shaft. The generating unit and controlling equipment are placed near the boilers in such a manner as to afford a maximum convenient saving of cargo space, the condenser being suspended below the turbine in the same compart-

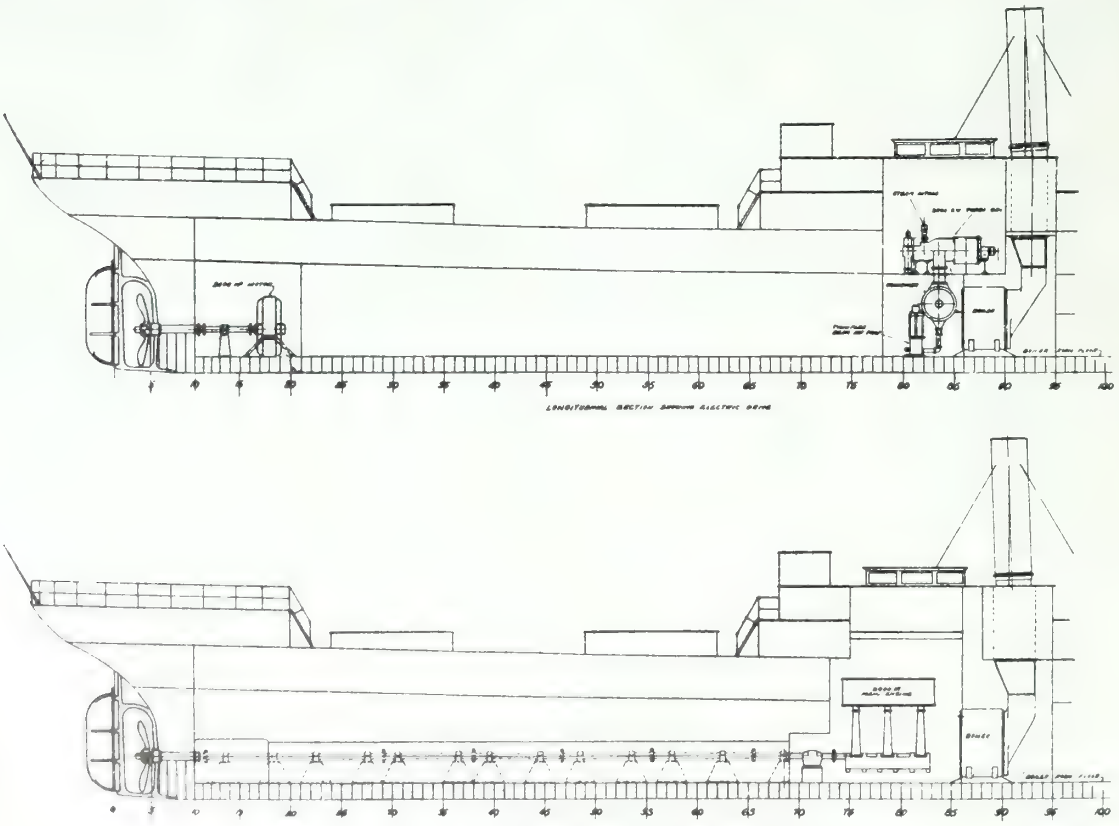
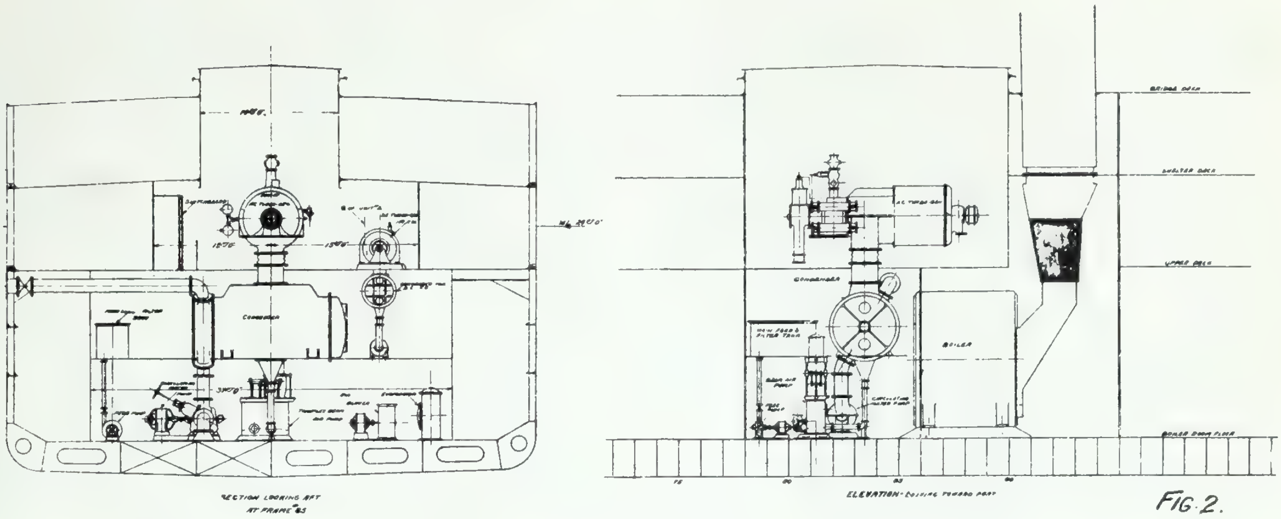


FIG. 1.

Partial inboard profile showing installation in a freighter of turbo-electric drive as compared with reciprocating steam engine drive



Section and partial profile through power plant of turbo-electric drive

ment with boilers. The auxiliaries are distributed in convenient locations in the turbine room and in the space below near the condenser.

The weight of this equipment, including generating unit, motor, controlling mechanism and direct current exciter, will be about sixty-seven tons.

Auxiliaries

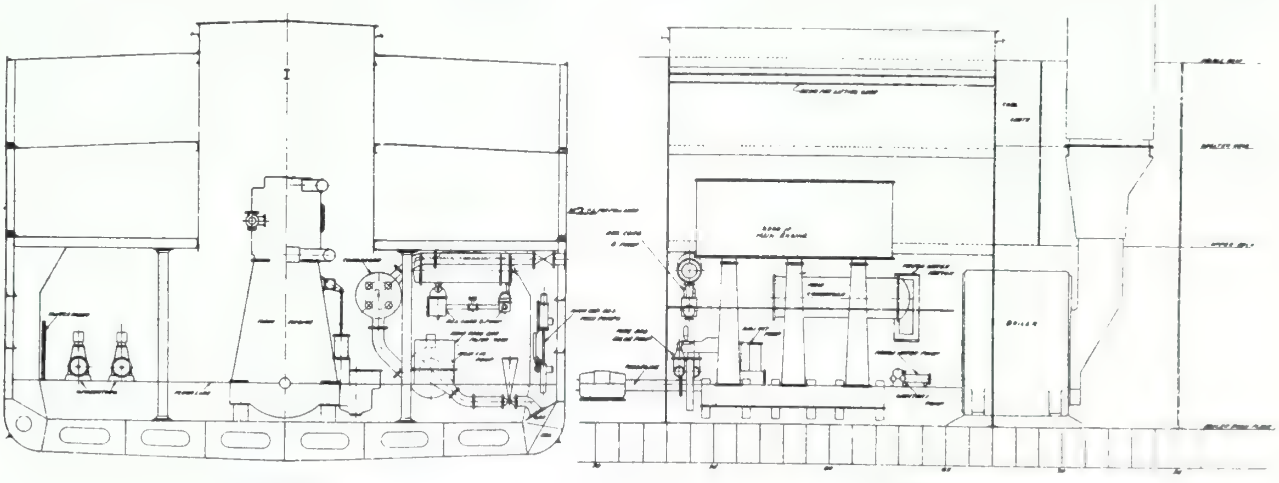
In connection with such equipments it is proposed to use, as much as possible, electrically driven auxiliaries. It is necessary to maintain an electrical supply independent of the main generator for purposes of excitation and lighting. The losses involved in the operation of larger auxiliary generating equipment are relatively much less, and there is no increase of complications. With such an equipment it is proposed to install two 150-kilowatt turbine-driven direct-current auxiliary generating units, one being required for service and the other installed as a spare. Excitation and lighting will only amount to forty kilowatts, leaving 110 kilowatts available for any possible auxiliary uses. A little more than half of this should be sufficient for normal conditions. While the ship is at sea, for reasons of simplification and economy, it is proposed to exhaust the auxiliary generating unit into one of the lower stages of the main turbine at a pressure somewhat above the atmosphere, so that some of this exhaust steam will be available for feed heating if that obtained from steam-driven auxiliaries is insufficient. In port these auxiliary units would be exhausted into an auxiliary condensing plant which would be idle while the ship was at sea.

Motor Compartment

The motor carries the thrust bearing and is also equipped with a simple, slow-moving oil pump which maintains automatic lubrication in the motor compartment. This lubrication can be arranged with a storage tank and with an emergency drip supply to the low-speed bearings contained in the after compartment, so that, even if the oil pump should fail, many hours might elapse before injury could result to any of the bearings. With such an arrangement the self-lubrication of this compartment becomes entirely simple and safe, and with occasional inspection it should be operated without an attendant and without any passage connecting it with the engine room; in fact, there is nothing that an attendant can do in this compartment, and there would be quite as much reason for keeping an attendant on the truck of an electric locomotive where the electrical and lubricating conditions are far more complicated.

Space Saving

It will be observed that the omission of the shaft alley and the diminution of space required for the engine room materially increases the cargo space and simplifies its shape. This increase amounts to something over 12,000 cubic feet, nearly 3 per cent of the total capacity of the ship. The omission of the shaft alley, shafting and supporting bearings effects a weight saving of about sixty tons, and



Section and partial inboard profile through power plant of reciprocating steam engine drive there will be an additional weight saving in the machinery itself, since the electrical equipment will weigh about nine tons less than the engine equipment for such a ship.

Economy

If this equipment is operated with 200 pounds' steam pressure, 200 degrees Fahrenheit superheat, and a vacuum of 28.5 inches, the steam consumption per shaft horsepower hour, not including auxiliaries, will amount to 9.5 pounds. Under normal conditions at sea, with most of the auxiliaries driven electrically, this should give a steam consumption for all purposes not greater than eleven pounds per shaft horsepower hour. Such a steam consumption will require at least 30 per cent less fuel for all purposes than would be required by a good reciprocating engine equipment operating without superheat, and even if an equal superheat were used with a reciprocating engine equipment, the gain would still be over 20 per cent.

In this connection it must be considered that large numbers of American ships are now being equipped with reciprocating engines and without superheat, although it has been amply demonstrated abroad that the use of high superheat is practical and economical.

If such a ship were in operation 250 days in the year between California and Australia, burning fuel oil at $1 a barrel, the saving in fuel over a similar engine-driven ship operating without superheat would amount to about $17,000, and the increased freight capacity leaving California would amount to 585 tons, which is 7½ per cent of the deadweight tonnage.

Reliability

A study of the records and uses of such electrical apparatus as is applied in this case will show that the equipment is less liable to interruption of service than any other form of single-screw equipment which is applied to vessels. With such an equipment, however, arrangements could easily be made by which the ship could be navigated about half speed with the main generating unit out of service. This could be done by providing a motor-generator set or rotary converter so arranged that the power of auxiliary generating units could be delivered to the main motor. In an electrically-propelled ship, electricity is produced simply for one definite purpose, and the arrangement is simpler and more reliable than shore applications where power is taken from large distributing systems. It is also possible to provide automatic means which, by interrupting excitation, guard against the possibility of serious damage through possible accidents or insulation failures. Such electrical apparatus of the type used in ships is very easily repaired, and, even when damaged, can generally be temporarily connected so as to be operative. The knowledge necessary for such repairs is very easily imparted and is constantly being practiced in our industries by persons who have had little or no electrical training.

Reliability of Gearing in Ships

To make comparison of such an equipment with a gear-driven ship is much more difficult, since a great variety of arrangements of turbines and gears have been applied to ships of this type. In the matter of reliability, as has been said, the electrical equipment is entirely beyond question, while many evidences of serious trouble and deterioration have developed in geared ships of most types which have been produced. Gears have been very successful in many warships, but these are subject to only occasional short periods of high-power service. In some merchant ships gears have been very successful, and in others most serious trouble has been encountered. Variations of results in similar equipments in different ships illustrate some of the possible uncertainties. Parsons' original gear applications operated with a single reduction, very small diameter pinions, and a large diameter gear on propeller shaft. Some of these have been reported to be very successful, but the gains in economy shown in Parsons' publications are nothing like so great as those accomplished by high-speed turbines with double reduction gears. There have, however, been many cases of failure with gears of this type. In fact, there seems to be no type of gearing with which trouble has not been experienced after long service in cargo vessels.

Recent production of so-called "Standard-English ships" shows they are being equipped with double-reduction gearing, and at the same time that this change of method is being adopted in England the use of single reduction is being extensively advocated and applied here. Although all the original American equipments in merchant ships were double reduction, the writer has seen a solid-gear double-reduction equipment of American make in which the gears were badly worn and pitted after 17,000 miles of service, and in this case the proportions of gears are closely equivalent to those which have been adopted in the new standard English ships, and the conditions of design and manufacture quite as good.

These indisputable facts and many others certainly indicate that gearing for ships has not yet reached a state of finished development.

One of the uncertainties of gear operation in ships is illustrated by the very great difference in durability of gears in ship propulsion and in shore uses. In trials on shore, gears have borne without blemish, for equal periods, loads equivalent to approximately four times the average loads which have caused bad destruction of similar gears at sea.

The reasons for these astonishing differences have never been adequately explained. Fig. 5 shows a record taken from a torsion coupling on a cargo vessel operating in ballast in a moderate seaway. This record shows that the torque on propeller shaft varied from zero to approximately 75 per cent overload under certain wave conditions. The effect of bad weather on endurance of gears has often been observed, and it is quite possible that variations much greater than that here shown may at times be experienced. In this case the ship was pitching only four degrees. Part of the small, quick variations shown in this record were caused by a transmitting ring which ran slightly out of true in the instrument, but otherwise the conditions were such that the record must be substantially correct.

Another matter of uncertainty in geared-turbine equipments is the matter of temperature in turbines. The operation of turbines in the reverse direction occasions large temperature variations, and temperature variations constitute a fruitful source of danger to turbine structures. Fig. 4

shows a record for temperature taken by a pyrometer situated between the nozzle and bucket of the last stage of a marine turbine while the turbine was being operated at normal speed in the reverse direction. It will be observed that the high temperatures shown by that record were produced in an extremely high vacuum by the introduction of small amounts of steam.

A turbine when operated in the reverse direction has a friction loss something like ten times as great as when it operates in a normal direction. In the General Electric shops it has been discovered that reversing wheels of marine turbines turn blue with heat when operated at normal speed in a vacuum of twenty inches. While no definite information can be given concerning the possible effects of high superheat in reversals of a marine turbine, the facts here given indicate that such effects may be serious and should, if possible, be avoided. A turbine which is kept running in its normal direction is not subject to any large temperature variations. The economies incident to the use of superheat on shipboard are very great and cannot long be neglected, although there have been few applications of superheat to American ships. The following extract from a letter from Van Nievelt, Goudriaan & Company, Rotterdam, Holland, illustrates the superheat possibilities in engine-driven ships:

> "We are using during the last five years, in our multitubular boilers, 3½-inch tubes, very high funnels and Diamond blowers, and have no trouble at all in getting sufficient steam. We have practically no leakage at the connections of the pipes and boxes. The original pipes are still in use. The capacity of a 20-ton evaporator is sufficient for supplying feed water. Three of our steamers have been running half a year without superheaters with a coal consumption of twenty-four to twenty-five tons. After fitting superheaters the consumption was about twenty-two tons, making a saving of at least 10 per cent."

In electrically-driven ships the gain is quite as great as is here shown, and no practical difficulties can result even from degrees of superheat which would be impracticable with reciprocating engines.

Efficiency of Transmission

The selection for comparison of a ship of low power is unfavorable to the electric drive in the matter of transmission efficiency, the conditions being better for this method in ships of higher power. The generator designed for this case has an efficiency of 95.6 per cent and the motor 95.9 per cent, making the transmission efficiency, including cable loss, etc., 91.6 per cent. In machinery designed for certain high-power ships, the efficiency is as high as 94 per cent.

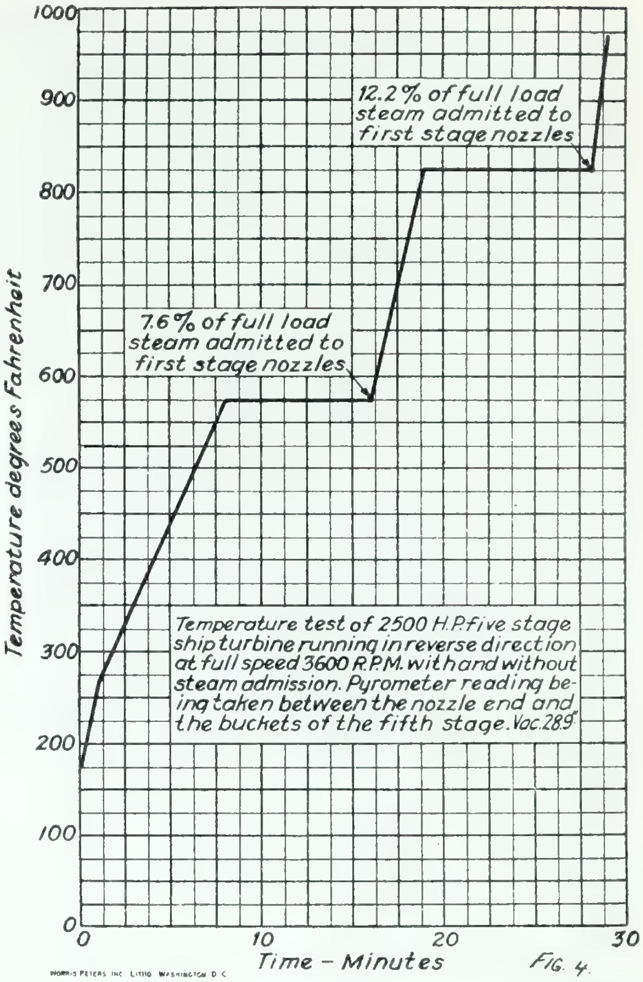


FIG. 4.

Pyrometer record showing excessive temperatures developed in the last stage of a marine turbine operated at normal speed in the reverse direction

To determine the efficiency of gear transmission as compared with the figure given above, very careful tests have been made at Schenectady. A 2400-horsepower ship turbine was connected through two sets of double-reduction gearing to a generator, and the steam consumption was tested at various degrees of load and speed; then the same turbine was connected to the same generator without gearing, and tests were run with the same conditions and the same degree of steam flow. All this was done on a testing stand where conditions are uniform and accurate, the gears ran with perfect smoothness, and all conditions were favorable. Since the comparison gives the loss of two gears, the differences are considerable and the determination should be very close to the correct value. This test showed that the performance of a single gear is as follows:

Shaft H. P.	R. P. M.	Loss of Two Sets Gearing	Efficiency of Gears
2400	87	250 horsepower	95.0%
1420	77	160 horsepower	94.7%

In addition to these gear losses, we must also consider the loss in friction of the reversing turbine, which is estimated from reliable data to be twenty-eight horsepower, and we must also consider the bearing losses on about 100 feet of shaft, which in perfect alignment will be 8..5 horsepower. These additional losses reduce the transmission efficiency to 93.5 per cent, leaving only 1.9 per cent advantage to the gearing. With shaft more or less out of line and gears operating under sea conditions, it is probable that the losses given would be greatly increased. Noise is an indication of loss, and most marine gears are at times noisy, while the gears in this test were almost silent.

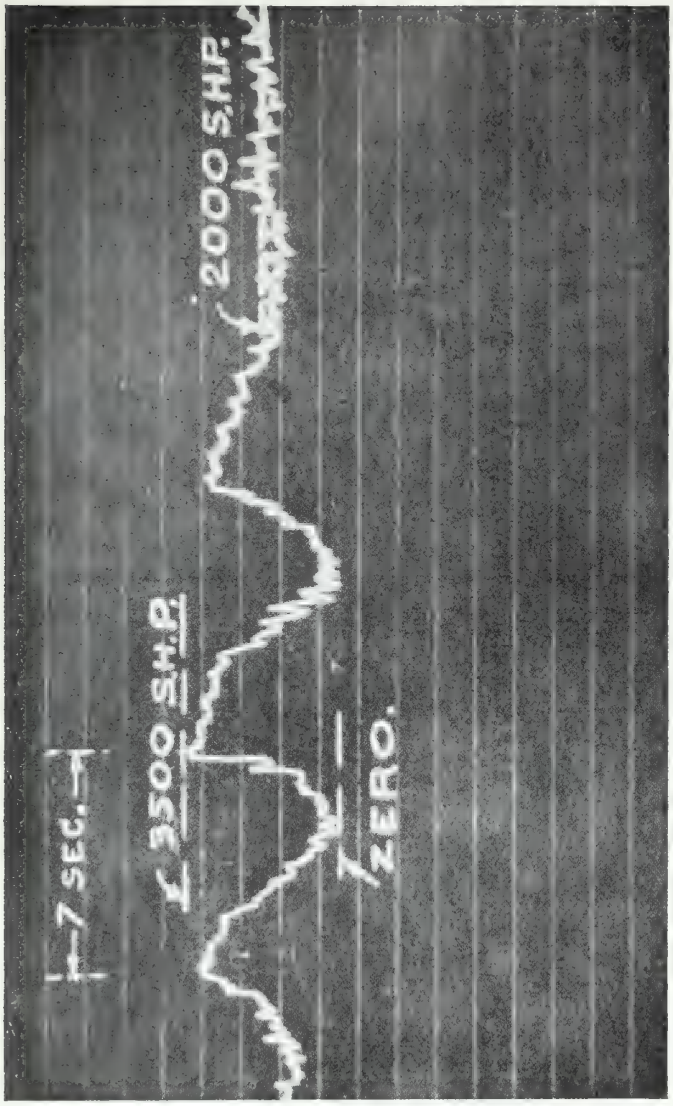


Figure 5. Curve showing the torque record of a torsion coupling on a cargo vessel operating in ballast in a moderate seaway

The gears tested in this case were of the General Electric Alquist type, and it might be claimed that other kinds of gears would be more efficient, but it is obvious that, under fixed load and with similar gear speeds and diameters, there could be no advantage in any other type even if it ran with equal smoothness.

Cost

In the present condition of prices it is very difficult to compare costs, but the cost estimates of the General Electric Company on electric equipments for cargo boats and geared equipments of recent design indicate that the electric is slightly cheaper. If we consider savings in shafting support, shaft alley, oiling system, etc., the saving with electric drive should be as much as 20 per cent of the cost of the driving machinery.

Propeller Speeds

In ships requiring less than 3000 horsepower, there is some practical disadvantage in using propeller speeds below 100 revolutions a minute because of the large number of motor poles required if a high-speed turbine is adopted. Studies recently made by the Navy Department and elsewhere have indicated that there is practically no disadvantage in using a propeller speed of 100 revolutions a minute on an 11-knot 2400-horsepower ship, but in all cases of electric drive the matter of propeller speed should be carefully studied. In ships of higher power it is not desirable to use extremely high turbine speeds, and therefore there can be no difficulty about propeller speeds. Even in low-power ships, lower turbine speeds could be used if expedient, but this is disadvantageous to a small turbine, and the relative advantages and disadvantages should be duly considered.

Operating Force

The history of the electric industry has repeatedly shown that persons who have not used electrical apparatus assume that its operation requires a high order of skill and expert knowledge, and of this assumption we have already heard much in connection with electric drive for ships. A vast amount of experience has repeatedly shown that this assumption is the direct reverse of the truth, and a little thought as to the conditions in electrical apparatus should make the reason obvious. Conductor circuits are much simpler mechanically than pipes and mechanical motions, and electrical machinery is simply a combination of electric circuits with motion of rotation. The connections are easily shown by diagrams, and little mechanical skill is required to make them. The work of insulation can be so done that, under such conditions as exist in ship installations, troubles which might involve difficulty of repair by unskilled persons are very improbable. In all the extensive uses of electricity in mills, mines, railways and other industries, it has seldom failed to immediately become popular with the operating forces. In no case has this been more marked than in the ships which have been driven electrically. Large electrical apparatus is generally simpler than small, and the machinery used to propel a ship is in many respects simpler than that which is used to light it. Instead of introducing difficulties in the matter of operating force, the adoption of electric drive will eliminate them and make ships much less dependent upon skill and resourcefulness in their crews.

One of the New York Shipbuilding Company's torpedo boats sliding into the Delaware

TABLE TO ILLUSTRATE "ECONOMICAL CARGO SHIPS" BY ALFRED J. C. ROBERTSON

			350-Foot Ships, Minimum Port Detention				350-Foot Ships, Double Port Detention			
1	Column No. 2	3	4	5	6	7	8	9	10	11
2	Length on Waterline	Feet	350'-0"	350'-0"	350'-0"	350'-0"	350'-0"	350'-0"	350'-0"	350'-0"
3	Breadth	"	49'-0"	49'-0"	49'-0"	49'-0"	49'-0"	49'-0"	49'-0"	49'-0"
4	Load Draft	"	21'-9½"	21'-9½"	21'-9½"	21'-9½"	21'-9½"	21'-9½"	21'-9½"	21'-9½"
5										
6	Speed on Service	Knots	10.0	11.0	12.0	13.0	10.0	11.0	12.0	13.0
7	Speed-Length Ratio	$\frac{V}{\sqrt{L}}$	535	587	641	695	535	587	641	695
8	Block Coefficient	C_M	768	740	712	689	768	740	712	689
9	Load Displacement	Tons	8,196	7,897	7,595	7,353	8,196	7,897	7,599	7,353
10	Indicated Horse Power	I.H.P	1,566	1,970	2,470	3,028	1,566	1,970	2,470	3,028
11	Ratio, Tons Displ. per I.H.P	Tons	5.234	4.008	3.076	2.428	5.234	4.008	3.076	2.428
12										
13	Weight of Hull and Outfit	Tons	2,108	2,081	2,055	2,034	2,108	2,081	2,055	2,034
14	Weight of Propelling M/cy	"	392	492	618	757	392	492	618	757
15	Total Deadweight	"	5,696	5,324	4,926	4,562	5,696	5,324	4,526	4,562
16	Ratio Deadweight to Displ.	"	.695	.675	648	620	695	675	648	620
17										
18	Cost of Hull and Outfit	$	580,750	574,000	567,500	562,250	580,750	574,000	567,500	562,250
19	" " Propelling Machinery	"	203,580	256,100	321,100	393,640	203,580	256,100	321,100	393,640
20	" " Ship	"	784,330	830,100	888,600	955,890	784,330	830,100	888,600	955,890
21	" " " per Ton Deadwt	"	137^{76}	155^{51}	180^{39}	209^{53}	137^{76}	155^{51}	180^{39}	209^{53}
22										
23	Fuel Consumed per Voyage	Tons	265	300	342	384	285	320	362	404
24	Stores and Fresh Water	"	132	150	171	192	142	160	181	202
25	Cargo Deadweight	"	6299	4874	4413	3586	5263	4844	4383	3956
26										
27	Time on Voyage	Days	14.58	13.26	12.15	11.22	14.58	13.26	12.15	11.22
28	" in Port	"	5.15	5.15	5.15	5.15	10.30	10.30	10.30	10.30
29	" for Annual Overhaul	"	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
30										
31	Number of Trips per Year		16.97	18.20	19.36	20.46	13.46	14.22	14.92	15.57
32	Time on Voyage per Year	Days	247.4	241.3	235.2	229.6	196.4	188.5	81.3	174.6
33	Time in Port per Year	"	117.6	123.7	129.8	135.4	168.6	176.5	83.7	190.4
34	Percentage Time under Way	%	67.8	66.1	64.4	62.9	53.8	51.6	49.7	47.8
35										
36	Cost of Manning and Managet. P.A.	$	72,915	72,915	72,915	72,915	72,915	72,915	72,915	72,915
37	Depreciation, Insurance, Upkeep, P.A	"	101,963	107,913	115,518	124,266	101,963	107,913	15,518	124,266
38	Fuel Oil @ $6.00 a Ton per Annum	"	26,588	32,760	39,727	47,141	23,017	27,302	32,406	37,742
39	Dues @ $1.50 per Nett Ton, P.A	"	69,543	71,854	73,549	75,211	55,159	56,155	56,681	57,235
40										
41	Annual Cost of Operation: Fuel @ $6.00 No Dues	$	201,866	213,588	228,160	244,322	197,895	208,130	120,839	234,922
42	" " With Dues	"	271,409	285,442	301,709	319,535	253,054	264,285	77,520	292,158
43	" @ $12.00 " "	"	298,397	318,202	341,436	366,674	276,071	291,587	309,926	329,900
44										
45	Cargo Moved P.A per $1,000,000	Tons	114,650	106,863	96,146	81,553	90,422	82,980	73,592	64,437
46										
47	Cost of Operating per Annum per Million Dollars Investment: $6 fuel, no dues	$	257,374	257,304	256,763	255,596	252,311	250,729	248,525	245,763
48	$6 " with "	"	346,039	343,864	339,533	334,278	322,637	318,377	312,311	305,640
49	$12 " " "	"	380,440	383,329	384,240	383,594	351,983	351,267	348,780	345,123
50										
51	Profit P.A per $1,000,000 Investment @ $6.00 per Ton, less $1.00 Handl. & 1½% Comm: $6 fuel no dues	$	298,678	260,981	209,545	139,936	186,236	151,724	108,396	66,756
52	$6 " with "	"	210,013	174,421	126,775	61,254	115,910	84,076	44,610	6,879
53	$12 " " "	"	175,612	134,956	82,068	11,938	86,564	51,186	8,141	Loss 32,604
54										
55										

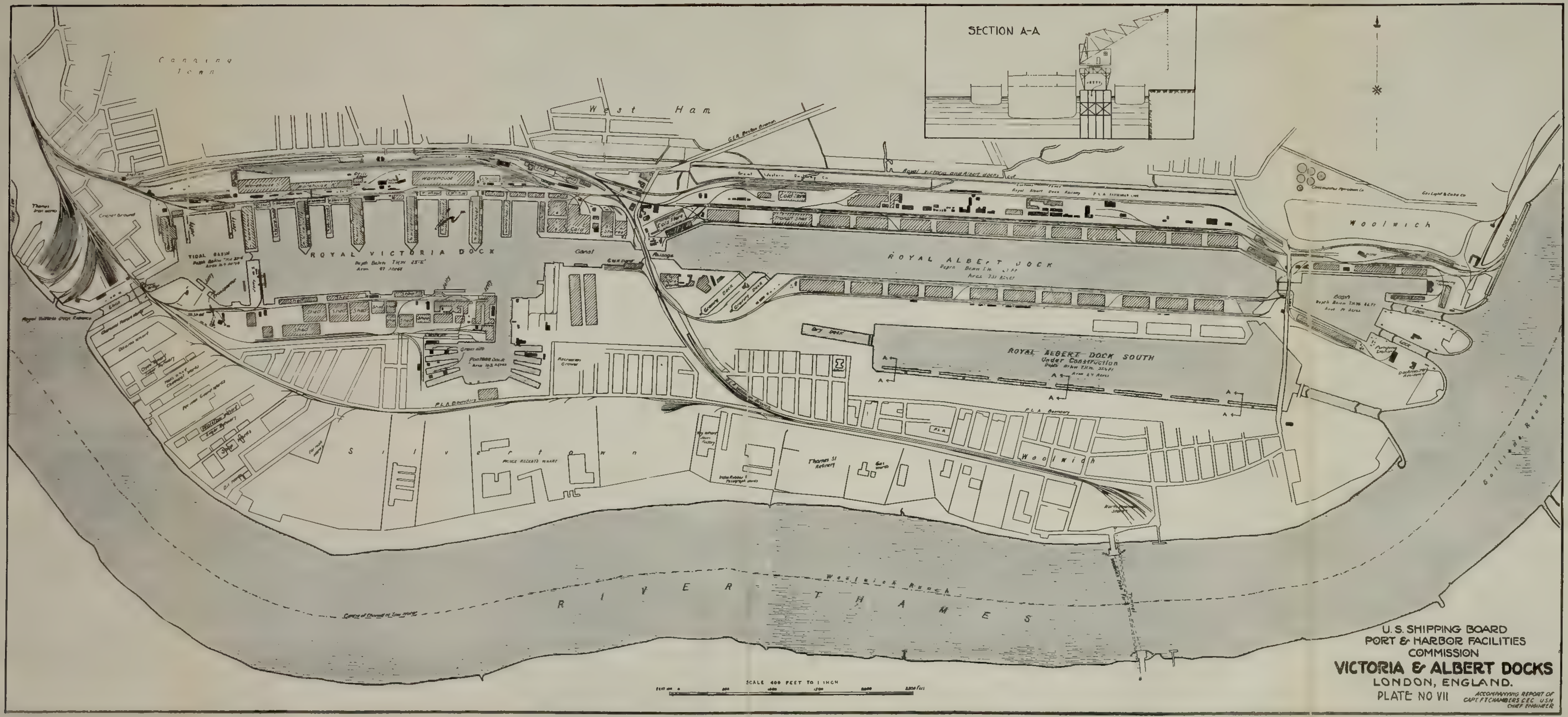
			400-Foot Ships, Minimum Port Detent.				450-Foot Ships, Minimum Detention			
1	Column No. 2	3	12	13	14	15	16	17	18	19
2	Length on Waterline	Feet	400'-0"	400'-0"	400'-0"	400'-0"	450'-0"	450'-0"	450'-0"	450'-0"
3	Breadth	"	54'-0"	54'-0"	54'-0"	54'-0"	59'-0"	59'-0"	59'-0"	59'-0"
4	Load Draft	"	24'-0"	24'-0"	24'-0"	24'-0"	26'-2½"	26'-2½"	26'-2½"	26'-2½"
5										
6	Speed on Service	Knots	10.0	11.0	12.0	13.0	10.0	11.0	12.0	13.0
7	Speed-Length Ratio	$\frac{V}{\sqrt{L}}$	.50	55	60	65	471	.518	.565	613
8	Block Coefficient	C_M	.789	762	.734	711	809	782	.755	731
9	Load Displacement	Tons	11,686	11,286	10,872	10,531	16,090	15,553	15,016	14,539
10	Indicated Horse Power	I.H.P	2,021	2,515	3,121	3,862	2,600	3,200	3,877	4,749
11	Ratio, Tons Displ. per I.H.P	Tons	5.782	4.487	3.483	2.727	6.188	4.860	3.873	3.061
12										
13	Weight of Hull and Outfit	Tons	3,015	2,978	2,941	2,905	4,166	4,119	4,069	4,026
14	Weight of Propelling M/cy	"	505	629	780	966	650	800	969	1,187
15	Total Deadweight	"	8,166	7,679	7,151	6,656	11,274	10,634	9,978	9,326
16	Ratio Deadweight to Displ.	"	699	680	658	632	701	.684	664	641
17										
18	Cost of Hull and Outfit	$	833,750	824,500	815,250	807,250	1,155,750	1,143,500	1,131,000	1,120,250
19	" " Propelling Machinery	"	262,750	326,950	405,730	502,060	338,000	416,000	504,010	617,370
20	" " Ship	"	1,096,480	1,151,450	1,220,980	1,309,310	1,493,250	1,559,500	1,635,000	1,737,620
21	" " " per Ton Deadwt	"	134^{27}	149^{95}	170^{74}	196^{71}	132^{46}	146^{65}	163^{85}	186^{32}
22										
23	Fuel Consumed per Voyage	Tons	346	387	436	494	446	494	548	611
24	Stores and Fresh Water	"	173	198	218	247	223	247	272	305
25	Cargo Deadweight	"	7,647	7,099	6,497	5,915	10,605	9,893	9,161	8,410
26										
27	Time on Voyage	Days	14.58	13.26	12.15	11.22	14.58	13.26	12.15	11.22
28	" in Port	"	5.80	5.80	5.80	5.80	6.50	6.50	6.50	6.50
29	" for Annual Overhaul	"	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
30										
31	Number of Trips per Year		16.44	17.58	18.66	19.68	16.89	16.95	17.98	18.90
32	Time on Voyage per Year	Days	239.7	233.1	226.7	220.8	231.7	224.8	218.2	212.1
33	Time in Port per Year	"	125.3	131.9	138.3	144.2	133.3	140.2	146.8	152.9
34	Percentage Time under Way	%	65.7	63.9	62.1	60.5	63.5	61.6	59.8	58.1
35										
36	Cost of Manning and Managet. P.A.	$	81,300	81,300	81,300	81,300	98,490	98,490	98,490	98,490
37	Depreciation, Insurance, Upkeep, P.A	"	142,542	149,688	158,727	170,210	194,122	202,735	212,550	225,891
38	Fuel Oil @ $6.00 a Ton per Annum	"	34,130	40,822	48,815	58,332	42,522	50,241	58,729	69,290
39	Dues @ $1.50 per Nett Ton, P.A	"	96,059	99,204	101,456	103,615	127,835	131,803	134,844	137,384
40										
41	Annual Cost of Operation: Fuel @ $6.00 No Dues	$	257,972	271,810	288,842	309,842	335,134	351,466	369,769	333,671
42	" " With Dues	"	354,031	371,014	390,278	413,457	462,969	483,269	504,613	531,055
43	" @ $12.00 " "	"	388,161	411,836	439,093	471,789	505,491	533,510	563,342	600,345
44										
45	Cargo Moved P.A per $1,000,000	Tons	114,655	108,385	99,344	88,907	112,835	107,526	100,742	91,475
46										
47	Cost of Operating per Annum per Million Dollars Investment: $6 fuel, no dues	$	235,275	236,069	236,565	236,645	224,433	225,371	226,158	226,557
48	$6 " with "	"	322,879	322,215	319,643	315,782	310,041	309,887	308,632	305,622
49	$12 " " "	"	354,006	357,667	359,623	360,334	338,517	342,103	344,951	345,498
50										
51	Profit P.A per $1,000,000 Investment @ $6.00 per Ton, less $1.00 Handl. & 1½% Comm: $6 fuel no dues	$	320,804	289,608	245,253	194,554	322,817	296,125	262,441	217,097
52	$6 " with "	"	233,198	203,452	162,175	115,417	237,209	211,609	179,967	138,032
53	$12 " " "	"	202,071	168,000	122,195	70,865	208,733	179,393	144,048	98,156
54										
55										

			500 Foot Ships, Minimum Detention				500 Foot Ships, Double Detention			
1	Column No. 2	3	20	21	22	23	24	25	26	27
2	Length on Waterline	Feet	500'-0"	500'-0"	500'-0"	500'-0"	500'-0"	500'-0"	500'-0"	500'-0"
3	Breadth	"	64'-0"	64'-0"	64'-0"	64'-0"	64'-0"	64'-0"	64'-0"	64'-0"
4	Load Draft	"	28'-5¼"	28'-5¼"	28'-5¼"	28'-8¼"	28'-5¼"	28'-5¼"	28'-5¼"	28'-5¼"
5										
6	Speed on Service	Knots	10.0	11.0	12.0	13.0	10.0	11.0	12.0	13.0
7	Speed-Length Ratio	$\frac{V}{\sqrt{L}}$	447	491	536	581	447	491	536	581
8	Block Coefficient	C_M	825	80	775	750	825	80	775	750
9	Load Displacement	Tons	21,452	20,802	20,152	19,500	21,452	20,802	20,152	19,500
10	Indicated Horse Power	I.H.P	3,254	3,994	4,825	5,828	3,254	3,994	4,825	5,828
11	Ratio, Tons Displ. per I.H.P	Tons	6.592	5.708	4.176	3.345	6.592	5.208	4.176	3.345
12										
13	Weight of Hull and Outfit	Tons	5,626	5,568	5,506	5,448	5,626	5,568	5,506	5,448
14	Weight of Propelling M/cy	"	814	998	1,206	1,457	814	998	1,206	1,457
15	Total Deadweight	"	15,012	14,236	13,440	12,595	15,012	14,236	13,440	12,595
16	Ratio Deadweight to Displ.	"	.700	684	666	646	700	684	666	646
17										
18	Cost of Hull and Outfit	$	1,562,750	1,548,250	1,532,750	1,518,250	1,562,750	1,548,250	1,532,750	1,518,250
19	" " Propelling Machinery	"	423,020	519,220	627,250	757,640	423,020	519,220	627,250	757,640
20	" " Ship	"	1,985,770	2,067,470	2,160,000	2,275,890	1,985,770	2,067,470	2,160,000	2,275,890
21	" " " per Ton Deadwt	"	132^{27}	148^{22}	160^{71}	180^{67}	132^{27}	145^{22}	160^{71}	180^{67}
22										
23	Fuel Consumed per Voyage	Tons	568	620	678	751	583	670	728	801
24	Stores and Fresh Water	"	279	310	339	375	291	335	364	400
25	Cargo Deadweight	"	14,175	13,306	12,423	11,469	14,138	13,231	12,348	11,394
26										
27	Time on Voyage	Days	14.58	13.26	12.15	11.22	14.58	13.26	12.15	11.22
28	" in Port	"	7.25	7.25	7.25	7.25	14.50	14.50	14.50	14.50
29	" for Annual Overhaul	"	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
30										
31	Number of Trips per Year		15.34	16.33	17.26	18.14	11.52	12.07	12.57	13.02
32	Time on Voyage per Year	Days	223.7	216.5	209.7	203.5	168.0	160.0	152.7	146.2
33	Time in Port per Year	"	141.3	148.5	155.3	161.5	197.0	205.0	212.3	218.8
34	Percentage Time under Way	%	61.3	59.3	57.5	55.7	46.0	43.8	41.8	40.0
35										
36	Cost of Manning and Managet. P.A.	$	106,176	106,176	106,176	106,176	106,176	106,176	106,176	106,176
37	Depreciation, Insurance, Upkeep, P.A	"	258,150	268,771	280,800	295,865	258,160	268,771	280,800	295,865
38	Fuel Oil @ $6.00 a Ton per Annum	"	51,358	60,750	70,214	81,739	40,297	48,521	54,906	62,574
39	Dues @ $1.50 per Nett Ton, P.A	"	156,385	169,848	173,912	176,865	123,563	125,540	126,655	126,945
40										
41	Annual Cost of Operation: Fuel @ $6.00 No Dues	$	415,684	435,697	457,190	483,780	404,623	423,468	441,882	464,615
42	" " With Dues	"	572,069	605,545	631,102	660,645	528,186	549,008	568,537	591,560
43	" @ $12.00 " "	"	623,427	666,296	701,316	742,384	568,483	597,529	623,443	654,134
44										
45	Cargo Moved P.A per $1,000,000	Tons	109,501	105,098	99,269	91,414	82,018	77,243	71,858	65,183
46										
47	Cost of Operating per Annum per Million Dollars Investment: $6 fuel, no dues	$	209,331	210,739	211,662	212,568	203,761	204,874	704,575	204,146
48	$6 " with "	"	288,084	292,891	292,176	290,280	265,[illegible]85	265,546	263,211	259,925
49	$12 " " "	"	313,[illegible]47	322,275	324,683	326,196	286,278	289,015	288,631	287,419
50										
51	Profit P.A per $1,000,000 Investment @ $6.00 per Ton, less $1.00 Handl. & 1½% Comm: $6 fuel no dues	$	321,749	238,986	269,793	230,790	194,018	169,804	142,936	111,991
52	$6 " with "	"	242,996	216,834	189,279	153,078	131,802	109,082	85,300	56,2[illegible]2
53	$12 " " "	"	217, 33	187,450	156,772	117,162	111,509	85,613	59,880	28,718
54										
55										

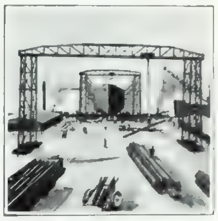
			500 Foot Ships 10% Greater Power				500-Foot Ship, Block Coeff. .750			
1	Column No. 2	3	28	29	30	31	32	33	34	35
2	Length on Waterline	Feet	500'-0"	500'-0"	500'-0"	500'-0"	500'-0"	500'-0"	500'-0"	500'-0"
3	Breadth	"	64'-0"	64'-0"	64'-0"	64'-0"	64'-0"	64'-0"	64'-0"	64'-0"
4	Load Draft	"	28'-5¼"	28'-5¼"	28'-5¼"	28'-5¼"	28'-5¼"	28'-5¼"	28'-5¼"	28'-5¼"
5										
6	Speed on Service	Knots	10.0	11.0	12.0	13.0	10.0	11.0	12.0	13.0
7	Speed-Length Ratio	$\frac{V}{\sqrt{L}}$	447	491	536	581	.447	491	536	581
8	Block Coefficient	C_M	825	80	775	750	750	750	.750	750
9	Load Displacement	Tons	21,452	20,802	20,152	19,500	19,500	19,500	19,500	19,500
10	Indicated Horse Power	I.H.P	3,579	4,393	5,308	6,411	2,582	3,460	4,519	5,828
11	Ratio, Tons Displ. per I.H.P	Tons	5.993	4.735	3.797	3.041	7.552	5.636	4.315	3.346
12										
13	Weight of Hull and Outfit	Tons	5,626	5,568	5,506	5,448	5,448	5,448	5,448	5,448
14	Weight of Propelling M/cy	"	895	1,098	1,327	1,603	1,457	1,457	1,457	1,457
15	Total Deadweight	"	14,931	14,136	13,319	12,449	12,595	12,595	12,595	12,595
16	Ratio Deadweight to Displ.	"					.646	646	646	646
17										
18	Cost of Hull and Outfit	$	1,562,750	1,548,250	1,532,750	1,518,250	1,518,250	1,518,250	1,518,250	1,518,250
19	" " Propelling Machinery	"	465,323	571,142	685,975	833,404	757,640	757,640	757,640	757,640
20	" " Ship	"	2,028,073	2,119,392	2,222,725	2,351,654	2,275,890	2,275,890	2,275,890	2,275,890
21	" " " per Ton Deadwt	"	135 [illegible]	149^{22}	166^{83}	188^{90}	180^{67}	180^{67}	180^{67}	180^{67}
22										
23	Fuel Consumed per Voyage	Tons	614	682	746	826	454	543	640	751
24	Stores and Fresh Water	"	307	341	373	413	227	271	320	375
25	Cargo Deadweight	"	14,010	13,113	12,200	11,210	11,914	11,781	11,635	11,469
26										
27	Time on Voyage	Days	14.58	13.26	12.15	11.22	14.58	13.26	12.15	11.22
28	" in Port	"	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
29	" for Annual Overhaul	"	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
30										
31	Number of Trips per Year		15.34	16.33	17.26	18.14	15.34	16.33	17.26	18.14
32	Time on Voyage per Year	Days	223.7	216.5	209.7	203.5	223.7	216.5	209.7	203.5
33	Time in Port per Year	"	141.3	148.5	155.3	161.5	141.3	146.5	155.3	161.5
34	Percentage Time under Way	%	61.3	59.3	57.5	55.7	61.3	59.3	57.5	55.7
35										
36	Cost of Manning and Managet. P.A.	$	106,176	106,176	106,176	106,176	106,176	106,176	106,176	106,176
37	Depreciation, Insurance, Upkeep, P.A	"	263,649	275,521	288,954	305,715	295,865	295,865	295,865	295,865
38	Fuel Oil @ $6.00 a Ton per Annum	"	53,712	66,822	77,235	89,913	41,786	53,203	66,278	81,739
39	Dues @ $1.50 per Nett Ton, P.A	"	156,385	169,848	173,912	176,865	149,565	159,217	168,285	176,865
40										
41	Annual Cost of Operation: Fuel @ $6.00 No Dues	$	423,537	448,519	472,365	501,804	143,827	455,244	468,319	483,780
42	" " With Dues	"	579,522	618,367	646,277	678,669	593,392	614,461	636,604	660,645
43	" @ $12.00 " "	"	633,634	685,189	723,512	768,582	635,178	667,664	702,882	742,384
44										
45	Cargo Moved P.A per $1,000,000	Tons	105,969	101,036	94,736	86,471	80,303	84,531	88,238	91,414
46										
47	Cost of Operating per Annum per Million Dollars Investment: $6 fuel, no dues	$	208,837	211,626	212,516	213,383	195,013	200,030	205,775	212,568
48	$6 " with "	"	285,947	291,766	290,759	288,592	260,730	269,988	279,717	290,280
49	$12 " " "	"	312,431	323,295	325,507	326,826	279,091	293,365	308,839	326,196
50										
51	Profit P.A per $1,000,000 Investment @ $6.00 per Ton, less $1.00 Handl. & 1½% Comm: $6 fuel no dues	$	305,1[illegible]3	276,398	246,954	206,001	194,457	209,945	222,179	230,790
52	$6 " with "	"	228,063	197,259	168,711	130,792	128,740	139,987	148,237	153,078
53	$12 " " "	"	201,519	166,730	133,963	92,558	110,379	116,610	119,115	117,162
54										
55										

			500 Foot Ship, Block Coeff .825			
1	Column No. 2	3	36	37	38	39
2	Length on Waterline	Feet	500'-0"	500'-0"	500'-0"	500'-0"
3	Breadth	"	64'-0"	64'-0"	64'-0"	64'-0"
4	Load Draft	"	28'-5¼"	28'-5¼"	28'-5¼"	28'-5¼"
5						
6	Speed on Service	Knots	10.0	11.0	12.0	13.0
7	Speed-Length Ratio	$\frac{V}{\sqrt{L}}$	447	491	536	581
8	Block Coefficient	C_M	825	825	825	.825
9	Load Displacement	Tons	21,452	21,452	21,452	21,452
10	Indicated Horse Power	I.H.P	3,254	4,032	5,935	8,215
11	Ratio, Tons Displ. per I.H.P	Tons	6.592	5.320	3.614	2.611
12						
13	Weight of Hull and Outfit	Tons	5,626	5,626	5,626	5,626
14	Weight of Propelling M/cy	"	2,054	2,054	2,054	2,054
15	Total Deadweight	"	13,772	13,772	13,772	13,772
16	Ratio Deadweight to Displ.	"	642	.642	642	642
17						
18	Cost of Hull and Outfit	$	1,562,750	1,562,750	1,562,750	1,562,750
19	" " Propelling Machinery	"	1,067,950	1,067,950	1,067,950	1,067,950
20	" " Ship	"	2,630,700	2,630,700	2,630,700	2,630,700
21	" " " per Ton Deadwt	"	191^{02}	191^{02}	191^{02}	191^{02}
22						
23	Fuel Consumed per Voyage	Tons	569	623	824	1038
24	Stores and Fresh Water	"	279	312	412	519
25	Cargo Deadweight	"	12,934	12,837	12,536	12,215
26						
27	Time on Voyage	Days	14.58	13.26	12.15	11.22
28	" in Port	"	7.25	7.25	7.25	7.25
29	" for Annual Overhaul	"	30.00	30.00	30.00	30.00
30						
31	Number of Trips per Year		15.34	16.33	17.26	18.14
32	Time on Voyage per Year	Days	223.7	216.5	209.7	203.5
33	Time in Port per Year	"	141.3	148.5	155.3	161.5
34	Percentage Time under Way	%	61.3	59.3	57.5	55.7
35						
36	Cost of Manning and Managet. P.A.	$	106,176	106,176	106,176	106,176
37	Depreciation, Insurance, Upkeep, P.A	"	341,991	341,991	341,991	341,991
38	Fuel Oil @ $6.00 a Ton per Annum	"	51,450	61,041	85,333	112,576
39	Dues @ $1.50 per Nett Ton, P.A	"	164,552	175,172	185,148	194,588
40						
41	Annual Cost of Operation: Fuel @ $6.00 No Dues	$	419,617	509,208	533,500	561,143
42	" " With Dues	"	664,169	684,380	718,648	755,731
43	" @ $12.00 " "	"	715,619	745,421	803,981	868,707
44						
45	Cargo Moved P.A per $1,000,000	Tons	75,420	79,685	82,248	84,228
46						
47	Cost of Operating per Annum per Million Dollars Investment: $6 fuel, no dues	$	189,918	193,564	202,798	213,306
48	$6 " with "	"	252,469	260,151	273,177	287,274
49	$12 " " "	"	272,026	285,355	305,615	330,219
50						
51	Profit P.A per $1,000,000 Investment @ $6.00 per Ton, less $1.00 Handl. & 1½% Comm: $6 fuel no dues	$	175,869	192,908	196,105	195,200
52	$6 " with "	"	113,318	126,321	125,725	121,232
53	$12 " " "	"	93,761	103,117	93,288	78,287
54						
55						AJCR

ROYAL VICTORIA AND ROYAL ALBERT DOCKS, LONDON



Material Handling



London's Largest Dock

PERHAPS no stream in the world is so intimately associated with merchant marine history and romance as is the River Thames from London to the sea. Since the early days of the Christian era this stream has seen come and go on its ebb and flow the ships of all the maritime nations. During the earliest known history of Britain it was a favorite port of entry for the marauding pirates of the Scandinavian countries, as well as for the traders from the Mediterranean.

A journey by small boat from London Bridge down the twenty-five miles of river to Tilbury Docks, with side trips into the various wet dock basins, would provide a student interested in commercial history with a pictorial and graphic review of the progress of cargo handling machinery and dockage and warehousing facilities for the last three or four hundred years.

Originally the river at spring tide spread widely over marsh lands on both banks and at low tide the river channel had little water in it for some distance back from the seashore. Even at the present time, with the river confined between embankments, as it has been for many hundreds of years, mud flats are exposed in front of the quays when the tide is out. The channel of the river is tortuous, assuming just below London Bridge a sort of triple horseshoe curve and then meandering in longer curves of easy radius down to the estuary below Thames Haven. There is a tidal rise near the sea of some 14½ feet, which increases to 16½ feet at Gravesend, 18¼ feet at Deptford and 21 feet at London Bridge. Under such tidal conditions the river is evidently not adapted for the simple dockage of ocean-going ships, and therefore the system of wet basins and docks, as they are called, behind locked gates, was established as early as 1703, when the Howland great wet dock was constructed. This consisted simply of a ten-acre area of water, the basin of which was excavated from the land and the entrance equipped with a single pair of gates, which could only be opened at high tide. This dock was without stores or sheds, and its area is now a part of the Surrey dock system. Since that date there has been a constant expansion to meet the growing needs of the port, so that now, from the Tower Bridge down the river twenty-five miles to the Tilbury docks, practically the entire river front and the lowland lying inside the horseshoe curves mentioned above is occupied by a system of river quays and wet dock basins which is the most extensive in the world. The old docks in London were built before the railroads and all extensions have been greatly hampered on account of the fact that the adjoining land was already occupied for other purposes and very expensive to acquire. Modern extensions have been planned with regard to railway distributions and are in a great measure located at a distance from congested areas of the city.

The port of London is the greatest distributing center in the United Kingdom. The population of the metropolitan area known as Greater London amounts to nearly seven million people, and practically all the imports used by this immense population—that is, practically all their supplies and daily necessities—are brought in through the port. This addition to the re-distribution of foreign import cargoes and the immense export of British manufactured articles gives the port a tremendous volume of tonnage. The largest single undertaking in this system of docks is what is known as the Royal Victoria and Albert docks, which, in fact, are claimed to be the largest single dock system in the world.

These docks lie parallel with a long, easy curve of the river, extending for three miles, and have entrance and exit at each end. The Royal Victoria dock was sanctioned by Parliament in 1850 and the Albert dock in 1875. The former has a total water area of about 94½ acres and a land area of 181½ acres, while the Royal Albert has a water area of 89½ acres and is now being paralleled with a new Royal Albert dock, so that its total water area will be increased to 157½ acres. These two docks will have adjacent to them a land area of 663½ acres. The Royal Victoria dock has a depth of 25 feet 6 inches below tidal high water, the Royal Albert dock a total depth of 27 feet, and the new addition to the latter has a depth of 35 feet 6 inches with a provision of impounding water to an additional depth of 2 feet 6 inches above the high tide mark. This new dock, as will be noted in the plans shown herewith, is provided with what is known as the jetty system. This system consists of narrow open work wharves parallel with the quay wall on which gantry cranes are operated. The space between the edge of the jetty and the edge of the quay is just sufficient to accommodate standard width lighters and canal boats, and the gantry cranes on the jetty have sufficient reach not only to plumb any part of the hatch of a ship lying alongside the jetty, but also to reach over the space between the jetty and the quay, in order to be able to handle goods either from ship to quay, ship to car, ship to lighter, or the reversal of any one of these operations. It will readily be seen that with these jetties it is quite practicable to load or unload a ship from barge or lighters on both sides of the ship at the same time, or to coal a ship from both sides at the same time, or to coal on one side and load or unload on the other.

It is very interesting in this dock system to note the progress from the time of the building of the Royal Victoria dock down to the present new dock in course of construction. The Victoria dock consists of parallel quays with piers projecting from the northerly side and having little or no provision for railway distribution on the piers. The Albert dock, on the other hand, consists of two parallel quays with transit sheds lining practically the entire length of both quays and with railway trackage on both sides of both lines of sheds. The Royal Victoria and the Royal Albert docks together form a very good combination. Ships whose cargoes are to be distributed by lighter or canal barge would always use the Victoria and those discharging to railroad distribution would use the Albert. The new South Royal Albert dock is a flexible and efficient arrangement for handling both classes of freight.

Organization

All the various docks on the Thames from London Bridge down to the Tilbury docks, which is the latest development sanctioned by Parliament, were managed separately by dock corporations. Along with this governmental organization of the docks themselves there had sprung up along the river a very powerful organization of affiliated bodies of wharfingers and lightermen, and as trade developed competition and rivalry between the various corporations and between the corporations as a body and these other associations had grown to be very bitter, so that many open quarrels occurred and much discussion in Parliament until the situation reached the point where it began to appear that the port in general would lose much of its prestige, and the volume of trade which had been built up in the past by great expense and with much labor would be dissipated. At various times Royal commissions of inquiry were appointed to try to right this situation. The last of these Royal commissions of inquiry was ordered in June, 1900, and after two years' work submitted a very comprehensive report, pointing out that the division of powers among different authorities and the financial condition of the various dock corporations, together with the inadequacy of the river channel and the dock systems, presented great handicaps to progress in trade. This commission recommended that a new authority be created, into which should be absorbed the property, powers and obligations of all the dock companies; of the Trinity House within the limits of the port; of the Thames Conservancy Commission below Teddington; and of the Waterman's Company. (The Trinity House was responsible for the lighting, buoying and pilotage of the port. The Watermen's Company was an ancient Labor Guild empowered by royalty in very early days to license lightermen, gaining by this power a monopoly which had long been the cause of widespread complaint.)

In the opinion of the commission, the existing distribution of power was contrary to the interest of the port as a whole. Finally the commission recommended a scheme in which the London County Council and the City Corporation were to be identified with the financial provisions and recommended that a new administrative body should consist of forty persons, twenty-six of whom were to be nominated by the County Council and City Corporation and fourteen to be elected by the trading interests. The commission's report and financial proposal were very coldly received by Parliament, but in 1903 the government brought in a bill which was practically the report of this commission.

This bill in 1904 was dropped at the request of the Board of Trade. Mr. Lloyd-George, the present premier, was then president of that board, and it is very interesting to note that for some time he had been employing a firm of accountants to investigate the finances of the various dock undertakings. This investigation he continued for some years, and in the spring of 1908 he privately entered into negotiations with the various dock companies for the purchase of their property for transfer to public authority. When an agreement had been reached on these negotiations, the announcement was made that the government would take over the property of the four companies at a collective valuation of twenty-three million pounds, and in July, 1908, a comprehensive bill was introduced into the House of Commons and passed promptly. This bill provided not only for the purchase of the docks, but vested the new authority—to be known as the Port of London Authority—with the powers of the Thames Conservancy Commission as far as they affected the river below Teddington and also of the Watermen's Company. The corporation of Trinity House had protested bitterly against the loss of any of its powers in connection with the port and the government listened to its complaint.

This bill promptly became an act, and since the 31st of March, 1909, the Port of London Authority has had complete control of the management and development of the port of London, with the exception of the lighting and buoying or the river, the policing of the port, and the supervision of sanitary conditions. Both of the latter are taken care of in the civil government of the city.

The constitution of the Port of London Authority is as follows: "There are ten members appointed, one by the Admiralty, two by the Board of Trade, four by the London County Council, two by the City Corporation, one by the Trinity House. Eighteen members are elected, seventeen by the payers of dues, the lightermen and the owners of river craft, and one by the wharfingers. In addition, the chairman and vice-chairman may be appointed by the Authority outside of its membership, making a possible total of thirty. The elected members of the original Authority were appointed by the Board of Trade after consultation with experts. In future years they will retire from time to time and their successors be elected.

One of the first duties of the new Authority was to prepare a schedule of tolls. This was ratified and came into operation on November 1, 1910, and under its terms trans-shipment goods are altogether free, a condition which was provided in order to maintain London's remarkably favorable position as a world market and trans-shipping port. Other exported goods pay duties which are merely nominal. The great bulk of the income is provided by goods imported for home consumption. the total tonnage of this home-consumed merchandise is so colossal that the dues per unit are relatively insignificant.

Bunkering

All coal received in London by water comes to the river front quays and is there transferred to barges. These barges practically constitute the marine bunkers. They are warped through the locks into the wet basin docks and alongside such ships as require bunkering. The greater part of this bunkering is done manually by shoveling into tubs which are hoisted by the ship's tackle and by winches on lighters alongside. There are a few mechanical elevators and several floating coal elevators which usually consist of a tower with booms on a floating barge, the grab bucket traveling from the far end of the boom over the coal barge through the tower to the end of the ship's deck. The coaling at the jetty system at the new Albert dock has already been described.

There is no apparatus at the port of London for the bunkering of fuel oil. Practically all the ships entering this port are coal burners and those which burn oil come from overseas and carry sufficient oil for the round trip.

Handling Machinery

Practically all London quays, both along the river and in the wet basins, with exception of the Albert docks and the Tilbury docks, are equipped with hydraulic gantry cranes. These are usually of the movable type, running on tracks at the edge of the quay, and they all appear to be very effective tools, although not as efficient as the modern electric cranes. They usually have a capacity of about thirty hundredweights and develop a fair rate of hoisting speed. The number of such cranes is very large and probably averages four to each ship's berth, and in some cases six will be found working on one ship. At the Royal Albert dock, modern electrically-operated gantry cranes with gibs of sixty-five feet reach are installed. Four to six of these cranes are available to every ship berthed. They run on tracks having a gauge of about fifteen feet with sufficient clearance between the legs of the gantry to pass a standard gauge freight car. Some smaller cranes are provided which run on the standard gauge track beneath the gantry of the larger cranes. The wall of the dock sheds is thirty-six feet or more from the edge of the quay, so that there is ample handling space between the ship and the shed. Most of the transit sheds are one-story high, although a few have two stories and some a basement in addition. In the older docks there are many warehouses privately owned alongside the quays, some being several stories high.

On the south side of the Victoria dock, two large flour mills are located, equipped with electrically-operated belt conveyors for the unloading of grain. At the Albert dock there is another interesting belt conveyor installation in a group of cold-storage warehouses. These warehouses were started five years ago at an estimated cost of five million pounds, which has been largely increased due to changed conditions. The construction is of reinforced concrete of the best type, and very solid. There are two main buildings—one alongside the quay, with room for the berthing of two ships at one time, with ample unloading facilities in the way of gantry cranes and conveyors. Frozen meat is taken from the hold by the gantry cranes, loaded on a belt conveyor, where it is inspected and classified and carried by the conveyor to the refrigerating chambers, of which there are twenty. A belt conveyor runs just inside the storehouse for its whole length and parallel to the quay on the upper floor. Fifty separate portable belt conveyors are provided which can be placed anywhere on the floor and the end of any portable conveyor may be attached to any point of the fixed conveyor. This arrangement allows meat coming along on the latter to be deflected to a portable conveyor, from the other end of which it is deposited upon another belt and so can be carried to any point on the floor. The portable conveyors are operated by portable electric motors which can be detached at will. There is also at this plant an overhead trolley system for handling quarters of beef so that a hook on a chain hanger from the overhead trolley can be fastened to a shank of beef on the conveyor mentioned above and the meat sent directly through the transit sheds to freight cars on the opposite side of the warehouse or to barges farther down on the quay front.

The Victoria and Albert docks are also equipped with floating grain elevators and with floating cranes of the revolving type with a capacity up to fifty tons.

Dry Docks and Repair Plants

There are many graving docks connected with the wet basins under the Port of London Authority. At the head of the Royal Albert dock there are two, one 501 feet long with 22 feet depth of water on the sill and the other 575 feet long with 22 feet 5½ inches on the sill, and at the new South Royal Albert dock the graving dock at the head of the basin will be 750 feet long, 100 feet wide, and with provision of thirty-five feet of water on the sill. This dock in future may be lengthened. These docks are used almost exclusively for cleaning and painting ships, no extensive repairs ever being attempted there. They thus are able to handle an immense number of ships and to render real service in the quick turn over of vessels at the port without causing any congestion.

Towage and Lighterage

Tugs used inside the wet basin docks are all owned and operated by the Port of London Authority and all moving about of ships and barges inside the basin is done under the management of the port board. Towage and lighterage on the river is under private enterprise and the business has vast proportions. There is a great deal of co-operation between this lighterage and barge business on the river and the control of the wet basins as the main idea of the Port of London Authority is to bend every energy to the quick turn-over for ocean ships which makes the port attractive to that class of business. One will often find that a ship is unloaded with great dispatch onto the river barges, which have a capacity of from fifty to 150 tons, and the whole area of special dock basins where the depth of water is insufficient to take ocean ships will be given up to the accommodation of these loaded barges, which will then have their cargoes unloaded and distributed, while the big freighter goes on about her business or takes on another cargo at the lower docks. Often this method of handling may cause considerable increase in the actual cost to the port authority, but this cost is absorbed by the method of exacting tolls in such a way that it really falls on the city of London itself.

Labor and Stevedoring

It is a very interesting fact and worthy of attention and study by those responsible for the management of American dock systems that practically all the manual labor in general stevedoring and handling of cargoes by the Port of London Authority is on a piece work basis.

THE LARGEST OUTFITTING CRANE

THE McMyler Interstate Company have just completed the largest shipbuilding crane in the world for the Bureau of Yards and Docks, United States Navy.

This crane has been erected at the United States navy yard, League Island, Philadelphia, and is now being put through a series of tests. On Saturday overhauling similar to that which the Patricia is bration, at which time the crane was christened, taking the name of "The League Island." Although the idea of christening a crane is a new one, the installation deserves unusual consideration on account of its unusual proportions.

As stated above, it is the largest crane in the world, being of the stationary type of pintle cantilever design, having a working capacity of 350 gross tons at a radius of 115 feet, with a clear lift from the top of the pier of the main hoist hook, when in the highest position, of 170 feet. The main hoist hook is mounted in an equalizer beam and the hoisting is effected by divided mechanism, each having a capacity of 175 gross tons. These mechanisms may be used separately for loads up to 175 gross tons' capacity.

There is an auxiliary hoist which operates on a horizontal trackway or cantilever between the two 175-ton capacity hoist runways. This auxiliary hoist can operate at a maximum radius of 195 feet and has a capacity of fifty gross tons.

The crane is operated by electric motors and electric control, furnished by the General Electric Company.

The operating mechanism of the crane, which includes the two main hoists, the auxiliary hoist, the trolley racking mechanism for the two main hoists, the auxiliary hoist and the sluing mechanism, is all operated from an operator's cab by remote master-control. With the exception of the sluing mechanism, all the operating mechanism is mounted on the rear cantilever enclosed in a steel frame structure similar to the modern factory building. In this structure an overhead electric traveling crane travels on a crane runway, which crane runway extends out through the back of the building, enabling material to be hoisted from the ground and delivered anywhere in the machinery house.

The crane will be used for fitting out all types of vessels, especially the larger men-of-war, and has sufficient capacity for handling complete gun turrets assembled on the dock, and placing these gun turrets intact on the vessel.

CAUSES OF PRESENT HIGH OCEAN FREIGHTS

BUSINESS men engaged in international trade are continually asking two questions, "When will ocean freights be lower?" and "Why are freights higher now than before the war?"

One of the reasons is that a ton of shipping today performs, according to well-informed British shipowners, only about half the service it did five years ago—a state of affairs largely attributable to the congestion at the different ports of Great Britain. A few days ago fifty vessels were lying idle at Cardiff and others were waiting outside in the roadstead, Swansea was overcrowded with some 200, and half as many were at Newport. Much the same condition prevails on the East Coast. Among other reasons assigned for high freights in the United Kingdom are:

1. Relative shortage of tonnage because of the failure to make good losses sustained during the war, and the large number of vessels still being "conditioned" after the stress and strain of war service.
2. Post-war government needs in the matter of transport, and labor delays generally.
3. Greatly increased cost of ships, and higher insurance values as a result.
4. High cost of repairs and maintenance.
5. Increased wages for officers and seamen and heavier bills for their food and ships' stores.
6. Higher dock dues.
7. Higher prices for bunker coal.

High Cost of Coal—Other Factors

The price of bunker coal is especially heavy now upon shipping. Before the war bunkers could be obtained in Great Britain for 15s. to 20s. (from $3.65 to $4.87) a ton. Since coal represents from 40 to 50 per cent of the outlay for operating ships under normal conditions, it is apparent that the price paid for bunkers looms large in calculating the expenses of a voyage. The Daily Telegraph makes the following comparison of charges for coal required for ships and for industrial purposes at various ports of the United Kingdom: London—bunkers, 110s. ($26.77); industries, 40s. ($9.73). Liverpool—bunkers, 100-110s. ($24.33-$26.77); industries, 35-40s. ($8.52 - $9.73). Cardiff—bunkers, 82s. 6d. ($20.08); industries, 39s. ($9.49). Tyne—bunkers, 70s. ($17.03); industries, 33s. ($8.03). Glasgow—bunkers, 70s. ($17.03); industries, 35s. ($8.52).

Cost of crew including wages and sustenance has more than doubled since 1915.

The Pilot, an Acme engined towboat of the Fletcher-Wheeler Navigation Company. Fifty-two feet long, 14-foot beam and with a speed of twelve miles an hour, this boat is proving very serviceable on the Sacramento River

Navigation of the Columbia and Snake Rivers

By A. L. Haley, Engineer

Mr. A. L. Haley

A REPORT prepared in 1915 for the executive committee of the Open River Association of Portland, Oregon, states on authority that there is produced in the portions of Oregon, Washington and Idaho east of the Cascades that are naturally tributary to the Columbia and Snake Rivers, the following products:

Grain, bushels....47,000,000
Wool, pounds 10,000,000

besides live stock, and fruit and vegetables that are not fully enumerated, but which would run up into the thousands of carloads, and hay and fodder running up toward a million tons. This is substantially the output today under normal conditions.

In the aggregate there is in excess of three or four million tons of agricultural products of this territory commonly known as the Inland Empire, the greater part of which must be shipped either to the east by rail or to Pacific ports.

In addition, there is a large tonnage of freight that must be imported into the Inland Empire, much of it being from Pacific ports, and including lumber, fuels, foodstuffs, and tropical and Oriental goods.

Practically all this great tonnage is handled by the railroad lines. Two important railroads parallel the Columbia and Snake Rivers, with feeders reaching out into the back country, and these roads collect all Inland Empire products for export and distribute all imports.

All traffic to or from Pacific states and ports thus centers in the main trunk lines paralleling the river. These lines are like the neck of a bottle, save that they have to pass not only the contents of the bottle, which are the exports and imports to the Inland Empire, but all transcontinental business of the country as well. The result is great local congestion of rolling stock, particularly when the grain crop is moving west for export, as cars accumulate at terminal points on the seaboard with little return freight offering.

Normally, the great bulk of the Inland Empire shipments are grain going west by the roads paralleling the river.

Some idea of the relief that the railroad system would enjoy if this tonnage would be water-borne may be gained by the statement that the movement of the grain crop alone involves not less than 50,000 carloads, equivalent to nearly 1200 freight trains of forty cars each.

The navigation of the Columbia River has been the subject of earnest thought and desire for a number of years.

It is unnecessary at this time to go into the history of the origin and construction of the Cascade Locks and Celilo Canal, or to attempt to detail the past, present or prospective uses of the river for navigation. These are well known. It is sufficient to state that the United States has expended to date close to $10,000,000 on permanent works to render the river navigable for boats of shallow draft from deep water at the mouth of the Willamette to the mouth of the Snake, this sum being exclusive of the annual expenditure for channel improvements, such as dredging, snagging, blasting rocks and reefs, and removing other obstructions.

Practical results of this great investment are not at all gratifying. Only a few small steamers ply on the river and the traffic above the Dalles is negligible.

The tonnage handle is comparatively insignificant even below the Dalles, with little expectation of substantial increase in sight. That river navigation serves as a regulator of rail rates and tends to induce the railroads to establish a rate as low or nearly as low as would be a water rate may be dismissed as absurd in view of the fact that the rail rate from the proposed river terminal at the mouth of the Snake to seaboard is at least three times and probably more than four times the amount that suitable river boats could afford to profitably charge the public for service between those points.

The existence of navigable water does not to any appreciable extent act as a rate regulator in this case. Competition between the railroads is much more effective as a regulator, but in these days of rate fixing by the various Federal and State commissions having jurisdiction, rates are determined on other considerations than the existence of theoretical water competition.

On the other hand, the actual existence of two competitive lines of railroads on both sides of the river with practically unlimited power to cut rates and to prevent or to hinder the necessary feeding of the river traffic, offers a most serious impediment to the establishment of river service that would be of substantial benefit to the nation and the local community.

With the railroad systems in private control, operated with the main purpose of private profit, as they necessarily must be, there is little encouragement for capital to invest in river navigation or the facilities for collecting and handling river-borne traffic advantageous or even possible. It must be clearly recognized that the obstacle to successful river traffic is railroad competition. This statement is not made in any inimical or critical sense to railroads, but merely as a statement of fact.

The river route is paralleled by two excellent railroad systems and all facilities in existence for collecting and distributing freight have been built up, and are owned and operated by the railroads and centered upon the railroad systems. On the other hand, there are practically no facilities for collecting or distributing cargoes on a river line, and, moreover, the railroads are prohibited by law from operating river boats. The basic facts should be clearly understood, that successful river transportation on the Columbia must be in co-operation with and not in opposition to railroads, each system is a necessary complement to the other.

The Columbia is navigable all the year up to Priest Rapids above the mouth of the Snake for boats of four to five feet draft, and the Snake is navigable to Lewiston for about four months of the year. Present river carriers are unable to handle any large tonnage, first, because the freight cannot reach the boats due to lack of collection and terminal facilities, and secondly, because the boats are small and inefficient as freight carriers, being only designed for mixed business of light freight and passengers—suitable for pioneering conditions which no longer exist.

Modern types of self-propelled barges, running only between terminals and fitted with adequate loading and unloading facilities, are alone suited for the handling of this large Inland Empire tonnage. Such boats, having a capacity of 600 to 1000 tons of freight and with power for developing twelve to thirteen miles speed, will handle such commodities as grain or fuels at a cost as low as two to three cents between terminals with a present rate of fourteen to fifteen cents. This is a mere statement of what is being done elsewhere, and is in no sense theoretical. The installation of suitable river carriers has been seriously considered as a commercial venture by several large corporations during the past few years. The plan most favorably considered involved the establishment of a terminal near the mouth of the Snake as a first unit of the collection and distribution of Inland Empire freights. Under such a river transportation plan, existing railroads will collect and distribute locally as at present, but will serve as feeders to river carriers and not to the railroad trunk lines paralleling the Columbia. Thus grain will still continue to be collected and stored as at present in numerous grain warehouses scattered along the branch railroads in grain districts, but the loaded grain cars will be hauled to terminals at the river, where the river barges will be loaded for transport to seaboard. Rehandling at river terminals will be by mechanical means at a nominal cost.

Definite plans have been elaborated for handling almost the entire grain crop at three terminals in the Inland Empire along the Columbia and Snake Rivers. It is proposed that down-stream cargoes shall be largely grain and possibly livestock, and up-stream cargoes mainly fuels and lumber; the up-stream cargoes will, however, be relatively unimportant. River carriers such as proposed will carry grain between terminals at only a fraction of the present rail rates and with great celerity and convenience for delivery and export.

If the rail system is operated in harmony with river carriers, a great saving in freight rates can thus be enjoyed by producers and consumers in the entire Inland Empire. Under the present system of rates, a saving of some $800,000 per annum could be effected in the aggregate freight rates paid by both producer and consumer.

In spite of railroad competition, the advantages of river traffic are so great that probably a modern system of river navigation on the Columbia and Snake would have been installed two or three years ago save for the fact that, due to war, ocean freighters have not entered the ports of the Columbia and the grain has moved east by rail.

With the railroads operated by the government as at present, competition is eliminated and there is every reason why a boat line should be established in the interests of efficiency and economy. It is therefore proposed in connection with the development of the port of Vancouver to establish a line of river freighters to ply between that city and the mouth of the Snake and farther. Plans have been worked out with that end in view and capital to establish such a line has been promised.

It will mean the establishment of a barge building and repair plant at Vancouver, the immediate construction of from three to five river barges of 600 to 1000 tons capacity and a terminal near the mouth of the Snake. This plant will be operated in harmony and in co-operation with the railroad system, penetrating the grain districts tributary to the river terminals.

This will be the first unit of the river transportation system to be followed by other units as the needs develop. These carriers and terminals will be equally adapted for the handling of grain in sacks or in bulk. Cargoes of grain received at Vancouver by barge will be loaded directly into ocean steamers or delivered direct to the flouring mills at Vancouver or Portland.

With regard to oil and coal, these come mainly from California, Washington, British Columbia and Alaska. They will constitute the bulk of the up-stream freight and will be handled in bulk. California crude oil delivered by tank to Vancouver will be pumped into the river barges which will be fitted with tanks below the ordinary freight deck. Coal will be carried on the freight deck. The cost of transporting a ton of coal by river from seaboard to Inland Empire terminals will not exceed forty cents a ton. The installation of this service can be done at relatively low cost and expeditiously. The barges can be built in not to exceed eight months, and the terminals can also be equipped and the entire plant made ready for operation in about that time.

LARGE FLOATING CRANE FOR LIVERPOOL

The Mersey Docks and Harbor Board is considering the purchase of a large electric floating crane which was originally built for the Russian Admiralty who are unable to take delivery.

The crane is self-propelled and will handle loads up to 200 tons. It is fitted with two quick-speed lifts to handle rapidly loads up to 60 tons. The revolving range is a complete circle of 360 degrees. The pontoon or float is 160 feet in length with a beam of 90 feet.

Mechanical Engineers' Annual Meeting

At the annual meeting of the American Society of Mechanical Engineers held December 2 to 5, a number of papers were read which are of interest to marine engineers, ship operators and shipbuilders. The following abstracts are taken from the Journal of the society:

The Hvid Engine and Its Relation to the Fuel Problem, by E. B. Blakely. This paper describes a type of engine, the Hvid, which it is claimed has all the advantages and none of the disadvantages of the so-called Diesel type, and which is being produced in units as small at 1½ horsepower. It can be started cold. It has no complicated air-compressor systems and is said to be so economical that it can compete with gasoline engines of the same size. The author outlines the operation of the engine, describing in detail the suction, compression, power and exhaust strokes, and presenting a series of indicator cards. Fuel consumption is shown by means of a series of curves obtained as the result of tests performed. The paper concludes with a discussion of the heat balance and torque characteristics of the engine. It is pointed out that there are certain characteristics of the engine which ought to attract internal-combustion engineers to its study to the end, perhaps, of perfecting it and thus assisting in solving some of our fuel problems.

Emergency Fleet Corporation Water-Tube Boiler for Wood Ships, by F. W. Dean and Henry Kreisinger. This paper describes tests upon the standardized water-tube marine boiler designed by the United States Shipping Board Emergency Fleet Corporation. Of the 1352 ordered, the first 706 were alike. The other 646 were ordered with slight changes, including the use of four passes instead of three passes embodied in the original lot. In view of the large number of boilers needed, the scarcity of steel and the desire to secure competitive prices, the water-tube type was adopted instead of the Scotch marine type. This made it possible to have the boilers constructed in inland shops throughout the country and effected a reduction in the weight of steel more than 9,000,000 pounds for the total order. The boilers had a grate area of 65.54 square feet, heating surface of 2500 square feet, and a commercial horsepower of 435 on the basis of the marine rating of six pounds of water to a square foot of heating surface per hour. Under test the three-pass type showed at first an efficiency of 60 per cent, which was later raised to about 73 per cent, based upon combustible, by certain changes which were effected. The four-pass type exceeded 74 per cent on two tests. These results were obtained when the boilers were hand-fired. Subsequently an investigation was made by Mr. Henry Kreisinger of the Bureau of Mines of the mixture of air and combustible in the furnace and of the temperature of the gases, details of which are given in the text, together with tables showing the complete results of the evaporative tests.

Flow of Water Through Condenser Tubes, by William L. DeBaufre and Milton C. Stuart. This paper is the result of a series of tests which were conducted at the United States Naval Engineering Experiment Station at Annapolis, Maryland, to determine the friction loss of water flowing through ⅝-inch standard condenser tubes of No. 18 gage. The investigations covered variable velocities, water temperatures, and tube length, as well as the effect of both fresh and salt water. The computations were made in such a manner that the various losses could be separated and the results have been expressed in a general formula.

Wage Payment, by A. L. DeLeeuw. A paper which discusses the various items entering into the present relations between employer and employe. The author first calls attention to the fact that some of the terms which are most commonly used are not clearly understood. Among these are "capital," "labor," "right to organize," "collective bargaining," and "wage." He accordingly discusses each, and then takes up the subject of the various systems of payment in existence at the present time. Taking the aims of the organized labor to be: (1) proper share of the proceeds of labor, (2) reasonable working conditions and working hours, (3) right to organize, and (4) collective bargaining, the author believes that these aims could all be accomplished without strife if collective bargaining were put into actual practice instead of being a mere catch word. In conclusion he states that in his opinion the real cause of the current unrest lies in the fact that our present wage system is not based on knowledge and justice, but only on guess work and on the fear that one of the parties concerned may "do" the other.

Slow-Speed and Other Tests of Kingsbury Thrust Bearings, by H. A. S. Howarth. This paper presents operating and experimental data which show the wide range of application of the Kingsbury thrust bearings. The author describes typical installations of bearings which have been in successful operation since 1911. The Kingsbury thrust bearings have been applied to vertical and horizontal hydroelectric units, to horizontal steam turbines and to centrifugal pumps, and to determine some of the service conditions, a series of slow-speed tests were made, details of which the author presents in his paper. The results of these tests indicate that the lower the speed at which the bearing is run continuously, the better the conditions of bearing surfaces. Speeds as low as 0.38 r. p. m. have thus far been employed, using, however, only a light oil.

The Thermal Conductivity of Insulating and Other Materials, by T. S. Taylor. Although numerous experimenters have been interested in making thermal conductivity measurements, but very few data are available for such materials as are used in the construction of electrical machinery. To further investigate this field, the author accordingly conducted a series of tests based upon two methods, both of which he explains in detail. The results obtained are tabulated for such materials as fish paper, fuller board, cambric, mica tape, various kinds of woods, asbestos, plate glass, sheet steel, wool felt, etc.

Air Pumps for Condensing Equipment, by Frank R. Wheeler. This paper is devoted to a consideration of past and current practice in air-pump design and selection. After presenting a classification of air pumps the author proceeds to briefly describe the features of each type, stating their limitations and respective advantages and disadvantages.

European Marine Notes

Exclusive Correspondence of Pacific Marine Review

THE question as to what Great Britain has to fear from American shipping developments is still being debated furiously in shipping and lay quarters in this country. J. C. Gould, M. P., the well-known shipowner, who has just returned from America by the Cunarder Germania, declares that British shipping has nothing to fear from American competition, although he admits that America is certainly our most formidable rival. He reminds us that American shipping firms are making a big bid to secure the world's coal-carrying trade, and this is a matter that interests him, especially as he is a member of Parliament for Cardiff, in South Wales. Mr. Gould has, however, made a comparison of the cost of working arrangements, and this satisfies him as to the secure position of British shipping. The cost of operating tramp steamers, he says, is over three times that of the cost of ordinary British ships.

Sir Owen Philipps, another shipping member of Parliament, declares that shipping must always remain the premier industry of Great Britain. Referring to his own companies, including the Royal Mail Steamship, he mentioned that they had lost 500,000 tons of shipping during the war, which they were now replacing as fast as possible. The cost of new steamers, he said, however, was enormous; it exceeded the amount of insurance money received for the vessels sunk. British shipowners must be prepared to face very difficult days in the not far distant future. Obsolete ships, of which there were many afloat, would have to be scrapped, and only the ships equipped with the latest improvements would be able to hold their own on the seas.

On top of these two statements we have the report of the operations of Lloyd's Register of Shipping during the year 1918-1919, which also includes a general survey of the work carried out by this society during the war, and constitutes a record of valuable services rendered to the state. Its chief importance rests, however, on the comprehensive and lucid statistics and information presented with regard to the progress of shipbuilding throughout the world during the war and since the armistice was signed. While in the United Kingdom merchant shipbuilding was seriously restricted by the necessity for the production of war vessels of various kinds, and by the shortage of labor and materials, every effort was made in other countries, and particularly in the United States, by means of the extension of existing plants and the creation of new establishments, to cope with the increasing demand for tonnage. So much success has attended these efforts that, although the merchant shipbuilding activities of the United Kingdom have greatly increased since the armistice was signed, the United States has shot far ahead of all competitors in the output of tonnage.

This return, by the way, mentions rather interestingly that at the end of last year plans were approved of a number of twin screw cargo steamers of standard type to be built in Australia for the commonwealth government under the society's survey, these vessels being the first ocean-going cargo steamers constructed in Australia. The first to be completed was the steamer Dromana, built at the government dockyard, Williamstown. In the case of that vessel the engines and boilers were also made in Australia, but in the case of others the boilers have been sent out from the United Kingdom. Eight more of these vessels are under construction.

Chilean Envoy on British Shipping

Before his departure from London, Senor Don Ismael Tocornal, the president of the Chilean senate, and the republic's envoy extraordinary to King George, gave his views on Anglo-Chilean shipping relations. "Chile," he said, "has a mercantile marine of her own, which has prospered through the war, although the difficulties of shipbuilding at home have hampered and retarded its development. I may say frankly that your present British services to Chile are insufficient and uncertain. Your pre-war direct lines, which should be doing well just now, would seem to be completely disorganized. Your sailings are most irregular. A weekly line should be at once established, with one steamer proceeding to Chile via the Panama Canal, but returning through the Magellan Straits, and a second steamer proceeding by the opposite route. It is of the utmost importance that they should go through the Straits, for Punta Arenas has developed wonderfully of late as a center of production, and there are other new areas which should constitute new fields for British enterprise, but are handicapped for lack of transport. I am sorry to say that most Chileans now travel by steamers of other nationalities, simply because those of your ships that serve Brazil are lacking in modern comforts. If only you would promptly establish a regular service by first-class modern liners you could secure the lion's share of the Chilean traffic. I am assured, however, by one of your highest shipping authorities that the deficiencies of the existing services to Chile will shortly be remedied. I was glad to hear it."

The Shortage of Riveters

Another topic that is prevalent here is that concerned with the facilitating of the transition from naval work to mercantile work. This is proving to be a matter of some difficulty at times. A well-known British shipbuilder suggests to me that if the "black squad" cared, they could make the change over much less disturbing than it actually is. There is plenty of mercantile work in the principal districts—quite sufficient, I am told, to absorb all the workers who are being thrown idle through the cancellations or suspensions of Admiralty contracts. But owing to the shortage of riveters, the riveting is in practically every instance woefully behind, with the result that other operatives, such as platers, caulkers, etc., are unable to get more than two or three days' work a week. Some cannot get any work at all. There are miles of riveting waiting to be done—some Northeast firms could, in fact, provide employment at once for fifty or sixty squads—and until an effort is made to overtake it, there cannot be anything else but the unemployment of which complaint is being made. "This is," my informant declared, "a matter which the workers should obviously, in their own interest, strive to put right. The riveter himself seems to be hopeless, for instead of trying to increase the number of riveters he seems to be bent upon reducing it. On the Clyde (Scotland), for instance, he is insisting upon full squads for pneumatic hammers. Nominally his object is to reduce unemployment, but the actual effect of his proposal will be to increase it."

A Costly Quarrel

A shipping law suit which promises to rival the recently decided Rhodesian mining case as one of the longest and costliest litigations on record, has made another pause in its progress. It has monopolized twenty-nine consecutive sittings of the Chancery Court, extending to close upon two hundred hours. An additional chancery judge was appointed to hear it, in view of the congestion in other directions, and with five king's counsel, three juniors, and a small army of experts engaged, costs must already have reached an enormous total. About $500,000 has been paid into court, and expenditure is still mounting up at the rate of at least $2500 a day. Judgment in the Chancery Court is being reserved, but, whatever the decision, the case is practically certain to go to appeal. The suit is that of Isherwood & Craggs, and revolves round the Isherwood longitudinal system, which is described as having revolutionized shipbuilding. It is alleged that Mr. Isherwood entered into partnership with Mr. Craggs. Later, however, Mr. Craggs is said to have acquired a rival system—the Lilliehook—and Mr. Isherwood claims damages in respect of the building of Isherwood ships in America. The plaintiff was seven days in the witness box, and the defendant nine. During the chancery hearing the questions asked numbered 12,500.

Concrete Shipbuilding

Greenock, near Glasgow, on the Clyde, has always been well to the front in the shipbuilding world, and with the advent of the concrete ship it was fitting that two yards for building that type of vessel should be opened in the town. The works were erected by the Scottish Concrete Shipbuilding Company—one yard at the Battery Park and the other at the Mid Harbor—in the beginning of 1918, and up to the present four 1000-ton barges have been put into the water. These are the Cretehill, the Cretehut, the Cretehighway and the Cretehaven. The first, which was launched in November, 1918, is the only one which has yet been handed over to the shipping controller. The Cretehut has passed all her tests successfully, and is expected to leave Greenock shortly. One vessel—the Cretehive—remains on the stocks at the Battery Park, and arrangements are being made to have her launched this week. The new industry gave employment to a fair number of hands, but these have been reduced to about half. With the completion of the Cretehive the building of concrete vessels comes to a close in Greenock, and already the work of dismantling the premises at the Mid Harbor has been commenced. The site is included in the Harland and Wolff extension scheme, and the yard will be vacated by its present occupants about the end of November. Although shipbuilding will be stopped at the Battery Park, it is not known if the establishment will be closed down. Experiments are being carried out in the making of concrete blocks for housing purposes, and it is understood that there is a probability of this work being continued.

Shipping War Losses

An official Admiralty return has been recently issued showing the British merchant shipping losses during the war. There are three tables. Table A shows that the total gross tonnage of merchant vessels lost through enemy action up to the armistice was 7,753,090. Of this total shipping amounting to 6,635,053 tons was sunk by enemy submarines. These losses involved a loss of 14,287 lives and the destruction of 2479 vessels. Table B gives details of the number of British fishing vessels lost through enemy action up to the date of the armistice. These numbered 675, of a total gross tonnage of 71,765, and 434 fishermen lost their lives. Table C shows that 1885 merchant vessels of an aggregate gross tonnage of 8,007,967 were damaged or molested, but not sunk by the enemy during the same period. This table shows a further loss of life of 592 persons. The total gross tonnage lost was thus 7,824,855, and the total number of lives lost was 15,313.

Ex-German Steamers for Ellerman Line

The ex-German liners Patricia and Pretoria which, prior to the outbreak of war, were engaged in the Hamburg-American Packet Company's regular service between United States ports and Hamburg, have now been handed over by the British Ministry of Shipping to the management of the Ellerman Lines. No definite arrangements have yet been made as to which service these two large liners will be engaged in, as the Patricia has only recently arrived in the Mersey from New York, and is at present undergoing a thorough overhauling preparatory to again being placed in service. The Pretoria is, according to the latest advices, at present at New York, from which port she will come across to the Mersey, and after a thorough overhaul, similar to that which the Patricia is now undergoing, she will be managed by the Ellerman Line for the Ministry of Shipping.

Danish Motor Schooner Nykjobing. See page 98

Japanese Marine Notes

VESSELS building in Japan for the United States Shipping Board were launched in rapid succession in October and November. Of nine vessels launched by Japanese yards in October, totalling 48,800 tons gross, four were for the Board—Eastern Merchant, Asano yard; Eastern Gale, Uraga; Eastern Knight, Osaka Iron Works; Eastern Temple, Ishikawajima. Beginning the November launchings, the Asano yard at Tsurumi sent the Eastern Trader down the ways November 4; the next day Uchida launched the Eastern Glade; Kawasaki followed with the Eastern Moon November 6. Other launchings scheduled for November were: Eastern Importer, first of two 9100 deadweight ton steamers, Mitsui, Tama; Eastern Crown, first of two 8400-tonners, Mitsubishi, Nagasaki; Eastern Soldier, 10,500 tons, Harima (Suzuki yard), Aioi; Eastern Ocean, the second of five 9000-tonners, Kawasaki; Eastern Temple, 5500 tons, the only vessel building by the Nitta yard, Osaka.

With launchings following one another thus rapidly, deliveries should be frequent about the first of the year. The Eastern Guide, the first Yokohama Dock steamer, was dispatched to San Francisco by the Nippon Yusen Kaisha early in November.

The most important November launching was that of the Eastern Trader by Asano. She and her sister, of 13,000 deadweight tons each, not only are the largest vessels of the entire Oriental program, but are the only twin-screw steamers. The Eastern Trader was christened by Miss Asano, daughter of Soichiro Asano, president of the yard and of the Toyo Kisen Kaisha. There was no Shinto ceremony, which the Asano yard uses only when the first vessel slips from a new building way, but in other respects the launching was typically Japanese. Mrs. Raymond Spear christened the Eastern Glade, and Mrs. R. D. Read of Kobe the Eastern Moon. The Eastern Glade is an 8500-tonner.

The Emperor reviewed the Japanese fleet October 28 in Tokyo Bay. The fleet was the greatest ever assembled under the Japanese flag, and the occasion was the first review of the entire fleet by the present Emperor, both of which facts added to the interest. The day was very rainy and dark, however, and the thousands of spectators on shore saw little. A few days prior to the review maneuvers had been held off the bay, which were marred by two accidents, one of which, an explosion in a gun-turret of the Hyuga, killed several men.

It is reported that the finance department has cut down the navy department's estimates for next year, from yen 30,000,000 for new ships and 72,000,000 for new land and sea equipment, to yen 10,000,000 for ships and 35,000,000 for equipment; but despite this, it is reported, the battlecruiser and dreadnaught program will not be affected. During the next eight years, yen 1,000,000,000 was to be spent on more than 200 vessels—eight big-gun, twenty light cruisers, sixty-two destroyers, seventy-two submarines and fifty special ships. The curtailment will affect all the vessels except the capital dreadnaughts and battlecruisers.

At the first of November, the average freight rate was 18 per cent; the charter rate, 23 per cent; and the value of vessels, 41 per cent, of the figures that prevailed in the middle of 1917—the height of the war boom. But November figures were greatly in excess of those of pre-war days. The quotations that follow are for the North American route freight and charter, and values of ships for 10,000-tonners:

	Pre-War Yen	1917 Yen	Nov., 1919 Yen
Freight	9.00	100	18
Charter	3.50	47	11
Value	120.00	970	400

Prices of new steel tonnage rose slightly in November. Probably the most potent factor was the labor unrest in America, which would affect steel prices, the more because the steel and coal strikes would have a direct bearing on the cost of materials. One shipbuilding firm had heard that America would permit the exportation of only 10 per cent of its steel, but, as this is written, there has been no confirmation. Increases in prices due to the cost of materials would affect Japan and America in much the same degree; but shipbuilding labor also had to be considered, and it was questionable whether Japan might not be called upon to endure a greater relative increase, although there could be no comparison between the actual costs. After taking into consideration the different factors (pre-war and present food costs, wages, etc.), it appears that the cost of living in Japan has increased more than in the States; and, when it is borne in mind that much of the population always has been on a bed-rock diet, some readjustment is inevitable. Not only in shipbuilding but in other industries is Japan struggling to avoid the handicap of increased wage scales. How well she will succeed is the most interesting purely economic question in the Far East today.

Despite the firmer values of tonnage, charter rates, taking their cue from the immediate market, weakened in October and November. Britain's coal strike and the consequent falling-off in coal exports, the expected movement of coal from America to Europe, the addition, therefore, of more disengaged vessels to those already in European waters, many of which were Japanese that had taken foodstuffs to Europe in the late spring and summer, all contributed to bring about the weaker tone; and several deep-sea vessels were sent back to the Japanese coasting service. On the Pacific, American competition is being felt more and more. The completion of vessels for the Shipping Board and the necessary immediate use of them, so that delivery could be made in an American port, intensified the competition of the regular American lines, particularly the steamers of the Pacific Mail, Admiral Line and the new Struthers & Dixon service. Some important Japanese shipowners preferred to tie up a few vessels than to see their use depress the market farther. The Taiyo Kaiun Kaisha (Ocean Transport Company) is enlarging its services and is showing courage in competing strongly with the older, subsidized companies. A few freight rates of November 1 were: Japan-Seattle, general, $8; Seattle-Japan, iron and steel, $11; between New York and Japan, either way, about $20; Australia - Japan, wheat, 90s.; Japan-North Europe, general, 180s.; South Europe, 130s.; Calcutta - New York, general, 120s. Trade with

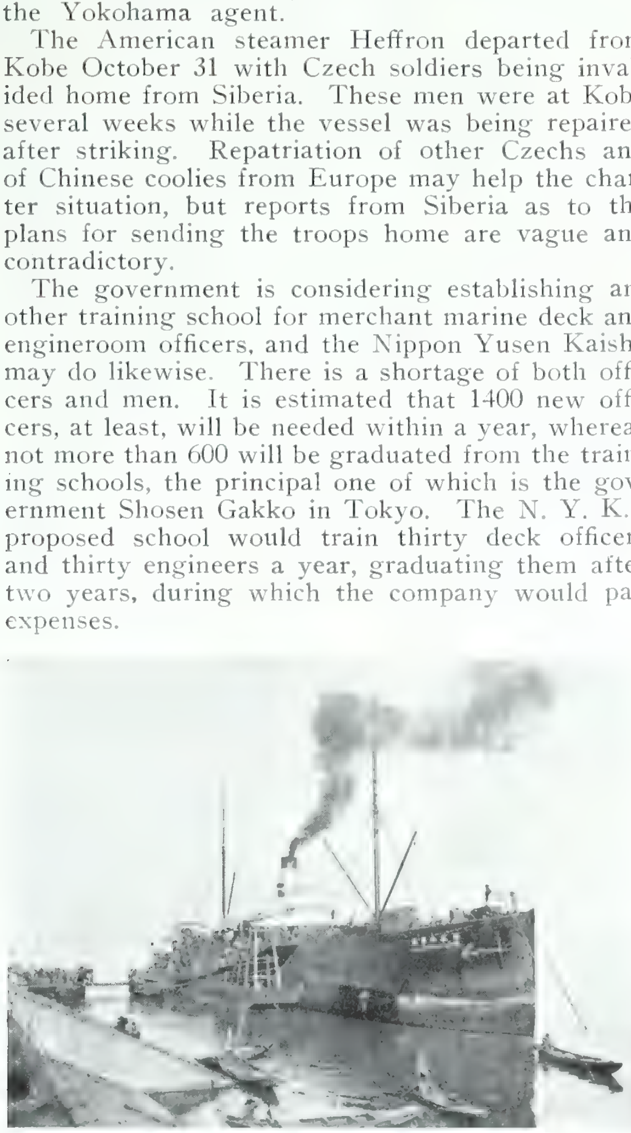
Germany did not develop well, probably because of lack of banking facilities and general means for settling accounts.

Under these circumstances, it is interesting to note that Baron Kondo, president of the Nippon Yusen Kaisha, urges that Japan turn her attention more and more to the "South Seas" (which means Australasia and Malayasia more than the South Seas proper); with South Africa and South America also important potentially. The baron said that the time had passed when Japan might hope to operate her vessels with home as a center, meaning, inferentially, that she should take a page from England's book and carry cargoes between foreign countries. When the war-time shipping regulation act has been made inoperative entirely, there will be nothing to prevent the use of her vessels in such trade, although the enforcement of the act of late has not been stringent, as it was during the war.

Struthers & Dixon, of whom mention was made, have appointed F. S. Morse of Kobe as general agent in Japan, with headquarters in Kobe. Eight steamers will be used in a four-weekly Seattle-Hongkong service and four in a San Francisco-Hongkong service. Another American branching-out is by the Admiral Line, which will open an office in Yokohama, where it has been represented by Cornes & Company. H. K. Laidlaw will be the Yokohama agent.

The American steamer Heffron departed from Kobe October 31 with Czech soldiers being invalided home from Siberia. These men were at Kobe several weeks while the vessel was being repaired after striking. Repatriation of other Czechs and of Chinese coolies from Europe may help the charter situation, but reports from Siberia as to the plans for sending the troops home are vague and contradictory.

The government is considering establishing another training school for merchant marine deck and engineroom officers, and the Nippon Yusen Kaisha may do likewise. There is a shortage of both officers and men. It is estimated that 1400 new officers, at least, will be needed within a year, whereas not more than 600 will be graduated from the training schools, the principal one of which is the government Shosen Gakko in Tokyo. The N. Y. K.'s proposed school would train thirty deck officers and thirty engineers a year, graduating them after two years, during which the company would pay expenses.



Japanese Ocean Going Steamer at Hankow, China

These tables, from Japanese sources, of men employed on vessels of three nations, indicate that seamen and engineroom crews are not as efficient as they should be.

These tables show the average number of men employed on the deck and in the enginerooms of various Japanese, British and American vessels:

Deck

D. W. Tonnage of Ship	Japan	G. B.	America
3500-4000	11.8	11	8
5600	13.0	11	10
7500	13.8	14	11
8800	18.8	14	13
12,000	19.8	14	13

Engineroom

D. W. Tonnage of Ship	Japan	G. B.	America
3500-4000	13.8	8	12
5600	16.6	9	12
7500	18.0	16	16
8800	21.6	16	18
12,000	33.0	16	21

It is not known how exhaustive was the investigation that determined these statistics, which may not be, therefore, completely authoritative.

There have been several rumors of late that the seamen of the large companies, led by those of the N. Y. K., are endeavoring to "get together" to "improve their condition." As reported, the demands will be for the same treatment at sea as ashore (what that means is obscure); for freedom to change from one ship to another; for the right to determine the time allowed for loading and unloading; and for the right to "decide the movements of the ships." No one appears to know precisely what is meant by the last. It is never easy, and usually is quite difficult, to determine precisely what weight to give such reports as these, but there does appear to be some fire behind the smoke.

The newly-organized Kokusai Kisen Kaisha has a fleet of twenty-seven vessels, of an aggregate deadweight tonnage of 232,403, which gives it first place among unsubsidized companies. The fleet will be increased to 500,000 tons in February. Next in consequence come the Kawasaki Kisen Kaisha, twenty-two steamers, 188,211 tons; Mitsui Bussan Kaisha, twenty steamers, 112,467 tons; Tatsuma Kisen Kaisha, thirteen steamers, 82,852 tons; Katsuda Kisen Kaisha, twelve steamers, 81,735 tons; Yamashita Kisen Kaisha, sixteen steamers, 74,764 tons. These figures are as of October.

At the end of September, Japanese steamers of more than 1000 gross tons numbered 755, of 2,363,795 tons gross aggregate, 706 of which were registered in Japan; thirty-six in Kwangtung; eleven in Korea, and two in Formosa. The Nippon Yusen Kaisha led with ninety-five vessels, 439,190 tons; and the Osaka Shosen Kaisha was second, with seventy-eight, of 308,704 tons. Third place has been lost by the Toyo Kisen Kaisha to the Kokusai Kisen Kaisha.

An increase in capital from yen 2,000,000 to yen 5,000,000 is being planned by the Taiyo Kaiun Kaisha. The addition will be divided into 60,000 shares, of which 40,000 will be allotted to stockholders as of October 31, share for share, and the remaining 20,000 will be offered for public subscription. Seven lines are being operated by the company now.

HONOLULU

HONOLULU HARBOR has begun to feel the post-war conditions in the return of the big Matson liners to regular service and the promise of the allocation by the United States Shipping Board of a large number of combination freight and passenger liners to the Pacific Mail Steamship Company. Already the Maui, flagship of the Matson fleet, has made two trips on a resumption of her schedule, and the Matsonia is due to arrive in the first week of January. The Wilhelmina, it is reported here, will be ready to get back into harness some time in January. On top of this, the Matson Company has announced the construction of two big freighters capable of carrying 14,000 tons of sugar each. The proposed vessels will have a speed of 12½ knots, which will permit them to make the trip between Honolulu and San Francisco in less than seven days.

The Matson Company will need all the cargo-carrying capacity it can get for the next year. Now that all Hawaiian sugar is to be transported to San Francisco, and none through the Canal to New York, it falls on the Matson people to carry the entire crop, approximately 585,000 tons, according to the estimate for 1920. In addition to this, there will be approximately 6,000,000 cases of canned pines, the great bulk of which must be transported to the States in Matson vessels.

The crying need for more ships here has moved the Chamber of Commerce and other civic and industrial organizations to take prompt action in the support of San Francisco as the port for the Shipping Board vessels which are promised for the trans-Pacific service. It is contended here that if Seattle or Portland should be chosen as the United States port for these vessels, they will eliminate Honolulu in the route to the Orient, probably going by the Great Circle. George McK. McClellan, special representative of the Honolulu Chamber of Commerce in Washington, and L. A. Thurston, Honolulu newspaper owner who is now in the States, have been requested to use their efforts to obtain favorable recognition for the claims of San Francisco and, incidentally, Honolulu, in the allocation of the Shipping Board vessels.

While the Hawaiian Dredging Company is at work on the deepening of the channel along the shores of Sand Island, preparatory to the widening of the Kalihi channel to open a new shipping area in Kalihi harbor, the United States Public Health Service has completed the work of several years in the perfecting of the efficiency and appointments of the quarantine station on Quarantine Island, and it is now considered to be one of the finest stations in the country. The island itself covers forty-seven acres of filled land, surrounded by a concrete retaining wall. There are more than fifty-five structures on the island, including the hospitals, attendants' quarters, isolation wards and European and Asiatic steerage compounds. As a necessary feature of the station, the government has constructed immense and perfect quarters for the quarantining of troops in case a transport for the Orient should enter this port with contagious disease aboard. This department of the station is considered as complete and efficient as any in the world.

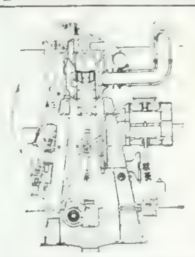
Saturday, December 7, was a record day in the history of the harbor for the movement of vessels of heavy tonnage within the space of twelve hours. Between the hours of 7:30 a. m. and 5 p. m., there were five arrivals of large steamers and the departure of five steamers and one schooner. For the first time in six years the big Canadian-Australasian Royal Mail liners Makura and Niagara lay in the harbor at the same time. The Niagara arrived from Vancouver at 8 o'clock in the morning and the Makura from Auckland at 10 o'clock. The Toyo Kisen Kaisha liner Persia Maru also arrived in the morning from Yokohama. At 9 a. m. the freighter West Cajoot came in from San Francisco and the motorship Balcatta arrived from Seattle. In the afternoon the Niagara and Makura departed within an hour of each other and the Persia Maru got away at 6 o'clock in the evening. During the afternoon the schooner Flaurence Ward left for Midway Island and the freighters West Cawthon and Stanley Dollar departed.

The Japanese schooner Nichigo Maru, which was libelled recently by Y. Takakuwa & Company, her agents, was sold at public auction to the libellers on December 9 for $7000. The libel against the vessel was for more than $10,000, the amount of the claims which had been paid for the schooner by the libellers. On the last trip of the Nichigo, six months ago, she made a large sum of money in carrying a freight cargo from the South Seas, but the captain of the vessel decamped with the freight money which had been prepaid. Y. Takakuwa & Company paid the claims of the crew and others and commenced court action which resulted in the sale. The Nichigo is estimated to be worth considerably more than the auction sale brought and probably will be put on the drydock here for necessary repairs. She can be placed in thorough seagoing condition and will be capable of making much money for her owners.

Negotiations are said to be pending for the purchase by the Inter-Island Steam Navigation Company of the steam schooner Wilmington, now owned by the Charles Nelson Company of San Francisco. The Wilmington is 200 feet in length and capable of carrying 15,000 tons of sugar.

C. P. Morse, for several years Honolulu agent for the American-Hawaiian Steamship Company, has commenced his duties as vice-president and manager of the Inter-Island Steam Navigation Company, to which position he was recently appointed by the board of directors to fill the vacancy caused by the death of Norman E. Gedge, one of Honolulu's veteran shipping men.

Oil Engines and Motorships



Motor Shipbuilding in Europe

THE demand for motorships in Europe now actually exceeds the possibilities of supply. This statement, however, needs some qualification, for it does not mean that every shipbuilding concern is fully occupied in the construction of motorships, but that every firm with considerable experience in building marine oil engines has now so many orders on hand that it is impossible to take on any more work. Nearly all shipbuilders who, in past years, have not gained this experience are now producing their first large oil engine, and some time will naturally elapse before complete trials will have been carried out; and until then the builders do not feel justified in standardizing their engines, nor are shipowners entirely willing to place large orders until they are fully convinced of the satisfactory design of the engines to be installed in their vessels.

Three New Motorships

Motorships continue to be turned out regularly from Harland & Wolff's yard at Glasgow, for the Glen Line, and the latest vessel, the Glenariffe, has just started on her maiden voyage to India. She is a boat with a deadweight carrying capacity of about 10,000 tons, being 406 feet in length and fitted with two 4-cycle, 6-cylinder oil engines, each of about 1500 horsepower. In January, 1920, it is anticipated that the first of the four 13,000-ton motorships under construction by Harland & Wolff, for the same company, will be completed, and as this is the largest internal combustion engined ship for general mercantile service which has yet been built, she will excite a great deal of interest. The machinery equipment comprises two 3200 i. h. p. 8-cylinder, 4-cycle engines, running at about 120 r. p. m., and in every respect the new vessel will represent the most modern type, having a speed of about thirteen knots at sea, and being fitted with electrical auxiliary machinery which has been so widely adopted on the successful Scandinavian boats.

Another motorship which has been put into commission within the last month is the Stureholm, built in Gothenburg for the Swedish-American-Mexican Line. She has a deadweight capacity of 8000 tons, and is equipped with twin-screw machinery totaling 2600 i. h. p. A third vessel which was also launched at Gothenburg a short time ago is the Buenos Aires, which will sail through the Panama Canal up to the Pacific Coast ports, being another of the North Star (Johnson Line), so many ships of which have been seen at San Francisco in recent years. She is one of a standard class, 425 feet in length and about 9500 tons deadweight. The machinery installed is similar to that which has been adopted in a large number of vessels comprising two 1550 i. h. p. Burmeister & Wain oil engines, with cylinders 26¼ inches in diameter and 37¾-inch stroke.

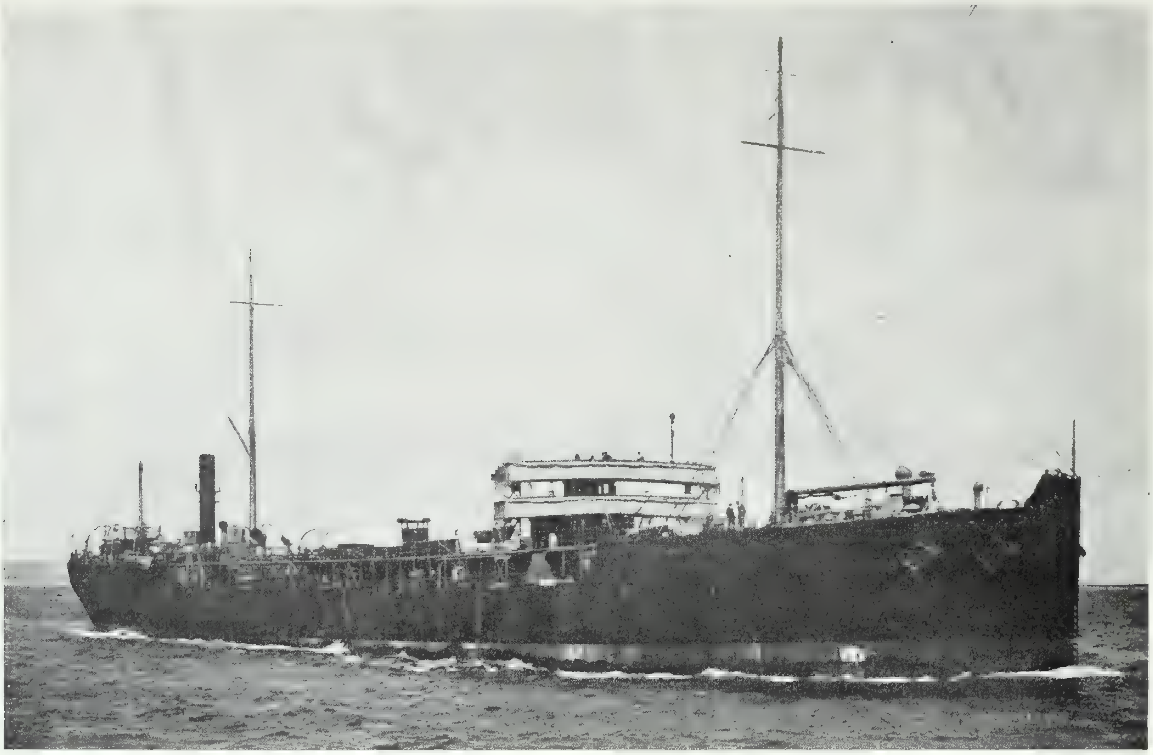
Fifty Motor Vessels on Order

Shipowners appear to consider this kind of vessel a particularly suitable type for trading between Europe and America, and the Transatlantic Company, one of the biggest shipowning firms in Sweden, has now orders on hand for eight motorships of the same size, but in accordance with modern ideas, the power is increased in order to give a speed of twelve to twelve and a half knots. Two 2000 i. h. p. engines are installed, with six cylinders 29⅛ inches in diameter and 43-5/16-inch stroke. Four of these new ships will be completed in 1920, and the remainder in the following year. Altogether there are now about fifty motorships of from 9000 to 14,000 tons deadweight capacity on order in Scandinavia, and the large majority of these are to trade to North or South America.

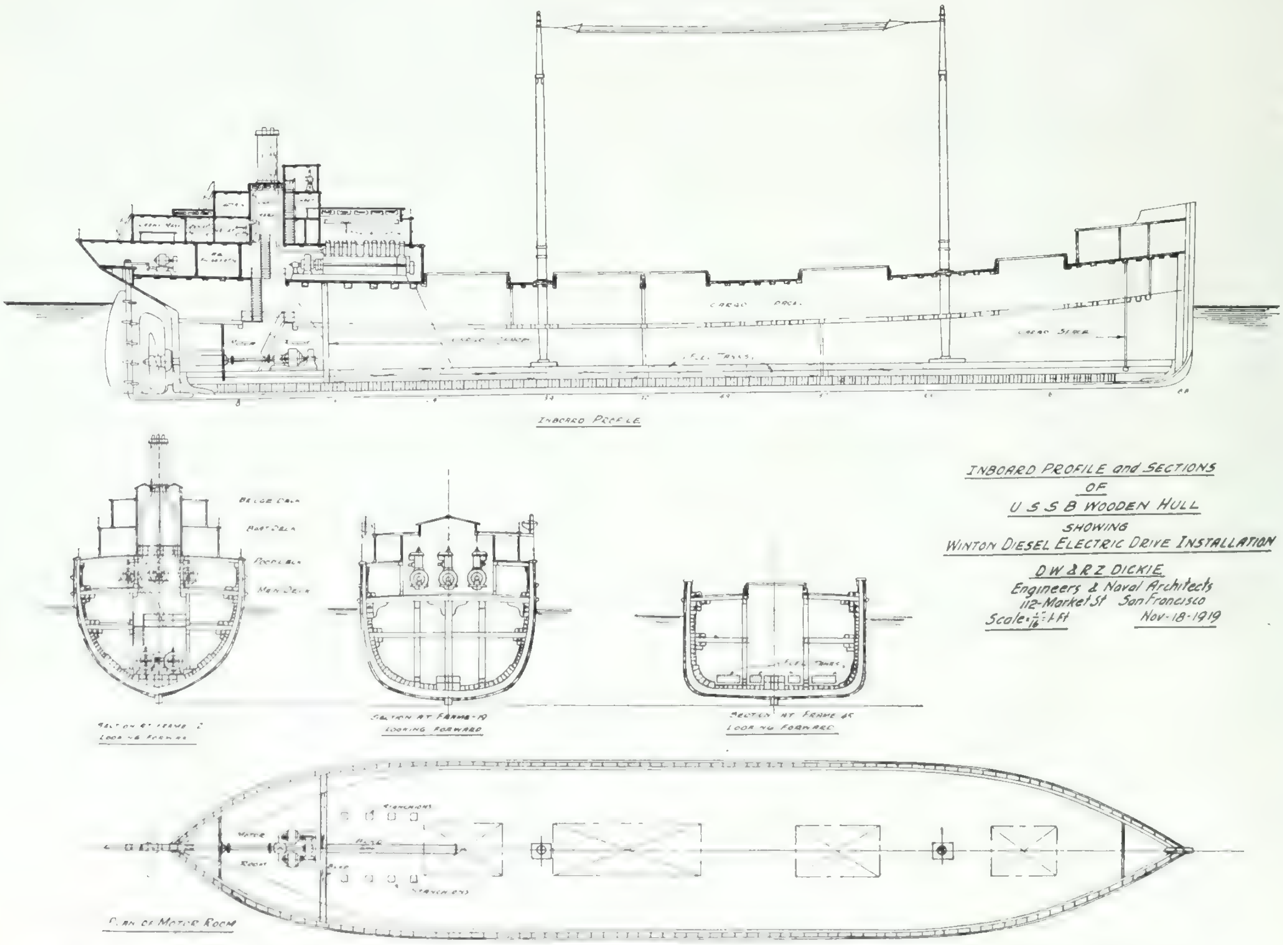
In England, a considerable amount of activity is being shown. Another order has just been placed for a 10,000-ton motor tanker, fitted with Diesel engine machinery of 3000 horsepower, while the Bibby Line has arranged for the construction of two motor cargo vessels to be placed on the Eastern run. Harland & Wolff are carrying out extensive additions to their work with the object of being able to augment their output of Diesel engines materially in order to cope with the increased demand, while Beardmores, who recently took up the license for the manufacture of Diesel engines of the Tosi type, are also reorganizing their works to carry out manufacture on a large scale.

New Diesel Engine Builders in England

A development of special interest is that Armstrong, Whitworth & Company have now become licensees for the Sulzer engine, although during the war they turned out a large number of Diesel engines of their own and other designs. It is the intention of this firm to construct high-powered motorships, and as Sulzer engines of about 4000 horsepower have already been built, it may not be long before we see motor vessels in commission with machinery totaling 12,000 horsepower. Another well-known marine engineering firm which is now busily engaged in manufacturing marine Diesel engines for installation in cargo ships is the North Eastern Marine Engineering Company, who for some years have held the license for the Werkspoor motor, but have hitherto done very little. They have now, however, many orders on hand, and as before the war they turned out more reciprocating steam engines than any other firm in Great Britain, their entry into the Diesel engine industry is of more than usual interest.



The British Motorship Santa Margherita. This vessel was originally built for the British Admiralty under the name Olympia, but was bought by Sir Thomas Royden and transferred to the Anglo-Saxon Petroleum Co., London. Her capacity is 8000 tons of bulk oil, 2000 tons of general cargo and 900 tons of bunker oil. With this cargo loaded, on a consumption of 12 tons of fuel a day, her 4850 i. h. p. engines drive the hull through the water at 11 knots an hour. Vickers Limited are now building a sister motorship for the Anglo-American Company, London.



INBOARD PROFILE
CARGO SPACE
FUEL TANKS
INBOARD PROFILE and SECTIONS
OF
U S S B WOODEN HULL
SHOWING
WINTON DIESEL ELECTRIC DRIVE INSTALLATION
D W & R Z DICKIE
Engineers & Naval Architects
112-Market St San Francisco
Scale 1/16" = 1 Ft
Nov-18-1919
SECTION AT FRAME 19 LOOKING FORWARD
SECTION AT FRAME 65 LOOKING FORWARD
MOTOR ROOM
PLAN OF MOTOR ROOM

Inboard profile and sections of Ferris type wooden hull showing the installation of Diesel electric drive, some of the engineering features of which are described in the article by Wilfred Sykes on page 97.

Some Engineering Features of Diesel Electric Ship Propulsion

By Wilfred Sykes
Engineer in Charge, Marine Propulsion, Westinghouse Manufacturing Company

Mr. Wilfred Sykes

THE SUBJECT of electric propulsion of ships using Diesel engines as prime movers has aroused considerable interest since the publication of the article by Mr. R. Z. Dickie in the December issue. A perusal of this article shows the possibilities of such a scheme for a particular type of ship and it might be of interest to discuss a little more in detail some of the characteristics of such an equipment.

One of the first questions that arises is the type of electric drive to be used — whether it will be direct current or alternating current. The direct current system has been adopted for the reason that it greatly simplifies the whole arrangement and the operation. In the first place, the primary advantage of the arrangement is that it simplifies the engine problem, inasmuch as it enables engines with relatively small cylinders without piston cooling to be used and powers in excess of those practicable with direct connected units can be obviously obtained without encountering the difficulties of design, building and operation commonly met with in large internal combustion engines.

The elimination of reversing gear reduces the Diesel engine to a very simple machine, and as long as the size of cylinders is kept small, it is well known that very reliable operation can be obtained. Using direct current generators makes it possible to run the engines at a constant speed and, connecting the generators in series, eliminates the necessity of close governing which would be necessary with machines in parallel. If alternating current were used, it would be necessary to vary the speed of the engines in order to vary the speed of the propelling motor and all engines would have to be run at exactly the same speed and have the same governor characteristics to properly divide the load. The problem of simultaneously regulating a number of governors in such a way as to vary the speed and at the same time maintain a proper division of the load, would be extremely difficult to solve. With direct current these difficulties do not exist, as slight variations in the speeds of the different engines is of no importance and the speed of the propelling motor is varied by simply regulating the excitation of the generators by means of a suitable field rheostat.

The direction of rotation of the propeller is also controlled in the same way, as reversing the direction of the generator excitation will reverse the propelling motor. Therefore the whole control of the equipment consists of handling the field current of the generator which is only about one-half of one per cent of the main current. During operation the main current is not handled and consequently the control rheostat is of very small dimensions and it can be located in any convenient place, as only a few small wires run to it.

It will be usually arranged so that the voltage of the main generators is the same as that of the auxiliary sets, so that in port one of the main sets can be used for running the winches, etc., if the load is too great for the auxiliary sets available. This obviates the necessity for large auxiliary sets, as the controlling feature is the requirement at sea.

If alternating current were used, it would be necessary to handle the main current during maneuvering and in addition the problem of simultaneous regulation of the engine speeds would have to be solved. The use of the main engines for operating auxiliaries would usually not be possible without additional apparatus, as the winch motors are almost always direct current machines which have better characteristics for such service than alternating current machines.

One very marked characteristic of such an arrangement of propelling machinery is the obvious freedom from complete shut down in case of accident. With, say, three generating sets, it is hardly conceivable that all would be out of commission at the same time. With the machines connected as shown diagrammatically in the accompanying sketch, throwing the double throw switch from the upper to the lower position would completely cut out the corresponding machine without interfering with the others. In the case of three generating units with one machine out of service, only two-third voltage would be impressed on the motor, which would correspond to about two-third speed if the motor field were not adjusted. This would only require about 30 per cent of the total power, whereas 66 per cent is available. By adjusting the motor field through a small rheostat, the speed can be raised to such a value as to use all the power available, which would give a speed

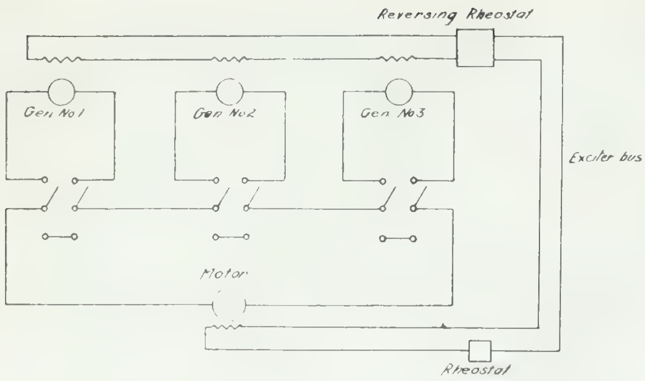


Diagram of connection between main generators and motors for direct current Diesel electric marine propulsion

of about 87 per cent of full speed. A relative result would be obtained with two machines out of service, and, even if all main units were disabled, steerage way could be obtained by connecting the auxiliary sets to the propelling motor. In the case of injury to the electrical apparatus, it would require almost complete destruction to bring about a condition that could not be sufficiently remedied in a few hours to at least enable the ship to make port.

It may be claimed that the use of direct current will require greater attention and be less reliable than alternating current. This is a matter of proper design, because if slow speed direct current machines are liberally and correctly proportioned, they are about the most reliable type we have. Of course the use of brushes requires a little attention, but with properly designed apparatus this will not be more than keeping the machines clean and replacing brushes every few years. Our largest motors in industrial service are of the direct current type and they handle the most severe service, as, for instance, the motors driving reversing rolling mills which reverse their direction of rotation twelve to fifteen times a minute all day long under loads that vary instantaneously from nothing to 20,000 horsepower. It is therefore obvious that we need not have any fears as to the ability of direct current machinery to do the work. Another factor of importance is that direct current motors can be made for any speed and are not subject in this respect to the same restrictions as alternating current machines. There is much more liberty possible in the proportions of the motors, so that if small diameter is required the machines can be correspondingly lengthened out, or vice versa.

It is believed that this system of Diesel electric drive is particularly applicable to ships of moderate power up to, say, 6000 horsepower, and that in addition to the low fuel consumption compared with any form of steam drive, it will be, if anything, more economical than direct Diesel drive of the types now used, as lower speed propellers can be used without greatly increased weight. The simplicity of the engines and the smaller weight and size of the individual parts is of great importance from an operating standpoint.

In the case of turbine electric drive, only the alternating current system can be used, as direct current generators cannot be designed to run at the speeds required for economical turbines, and as undoubtedly for large outputs the turbine can be built more easily than internal combustion engines, it would seem that for larger powers the turbine will hold the field for the present, driving the ship through mechanical or electrical gearing. For the great majority of ships, however, the Diesel electric drive opens a field of possibilities which may revolutionize this propulsion problem. Something of this kind is shown in the article by Mr. Dickie previously referred to.

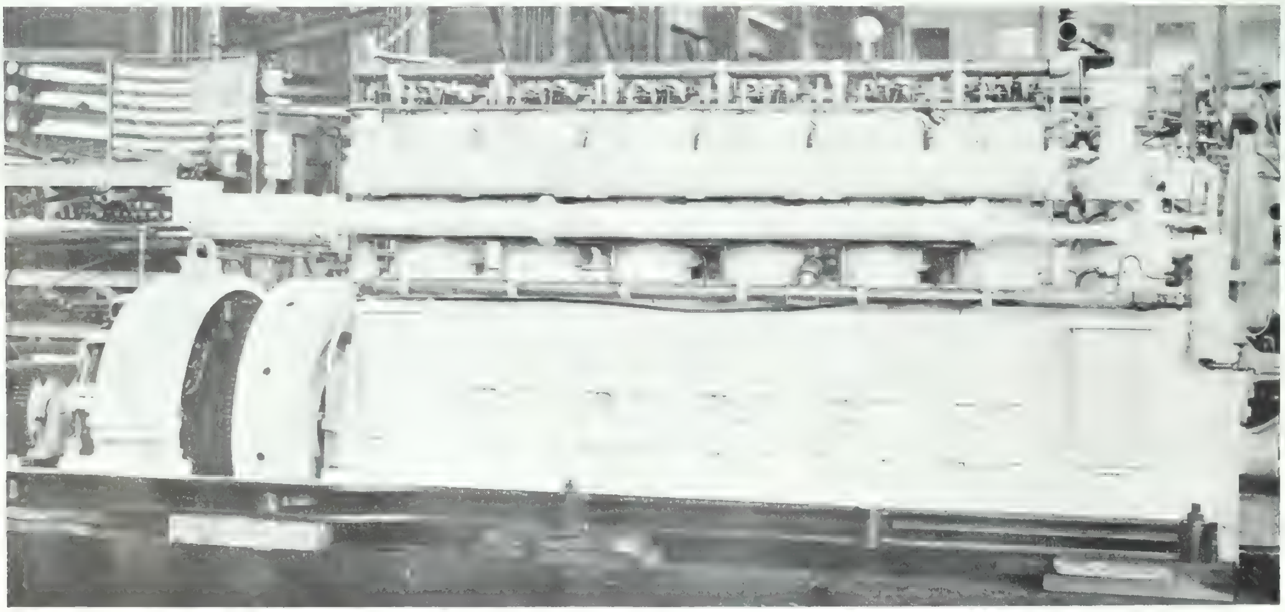
TRIAL OF MOTOR SCHOONER

The trials were run in the month of October of a motor schooner named Nykjöbing, which was constructed at the Mors Shipyard, Ltd., Glyngöre, Denmark.

Her carrying capacity is 465 tons deadweight and she has an engine of 240 B. H. P., four-cylinder, manufactured by the Densil Motor Works, Aalborg, as well as a Densil deck-motor for working the winches and a fire pump.

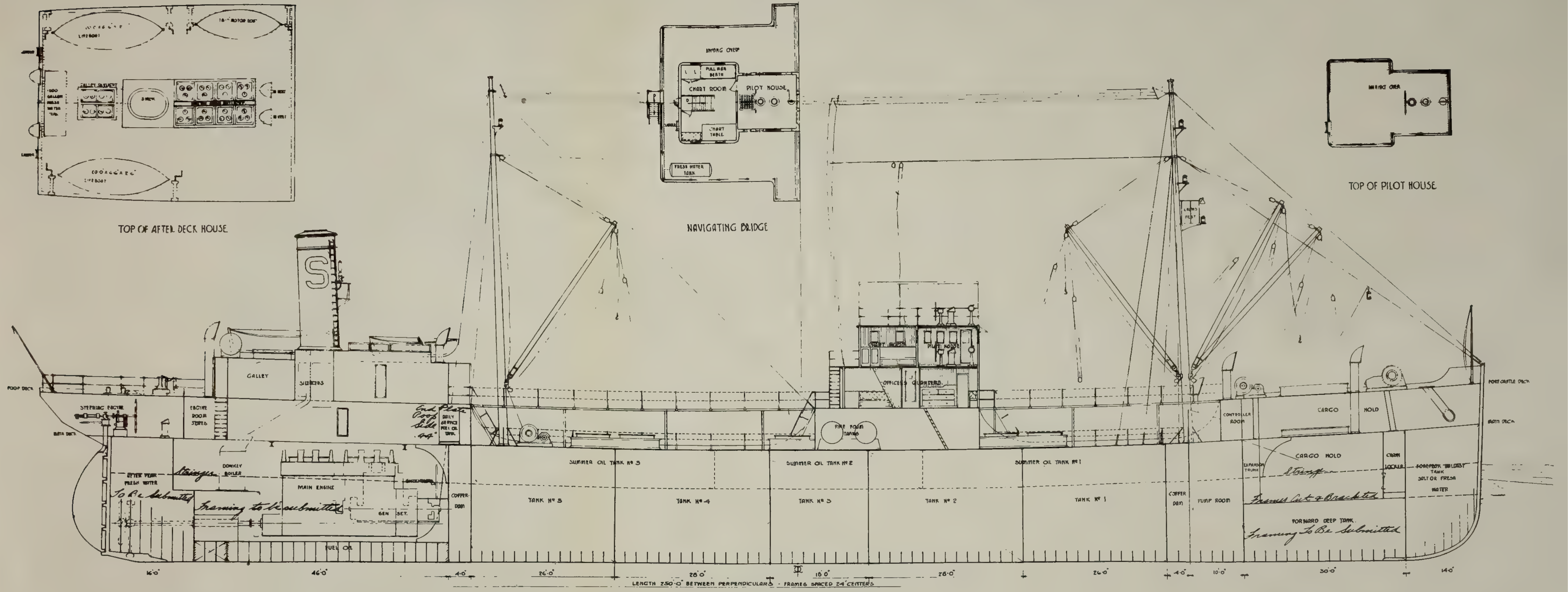
The Nykjöbing started off at eight-thirty in the morning from Glyngöre and ran into the harbor of Aalborg at two o'clock sharp, having made the distance with a speed of eight knots. The engine worked to the best satisfaction.

The next day the schooner set off for the Faroe Islands and thence to Spain.



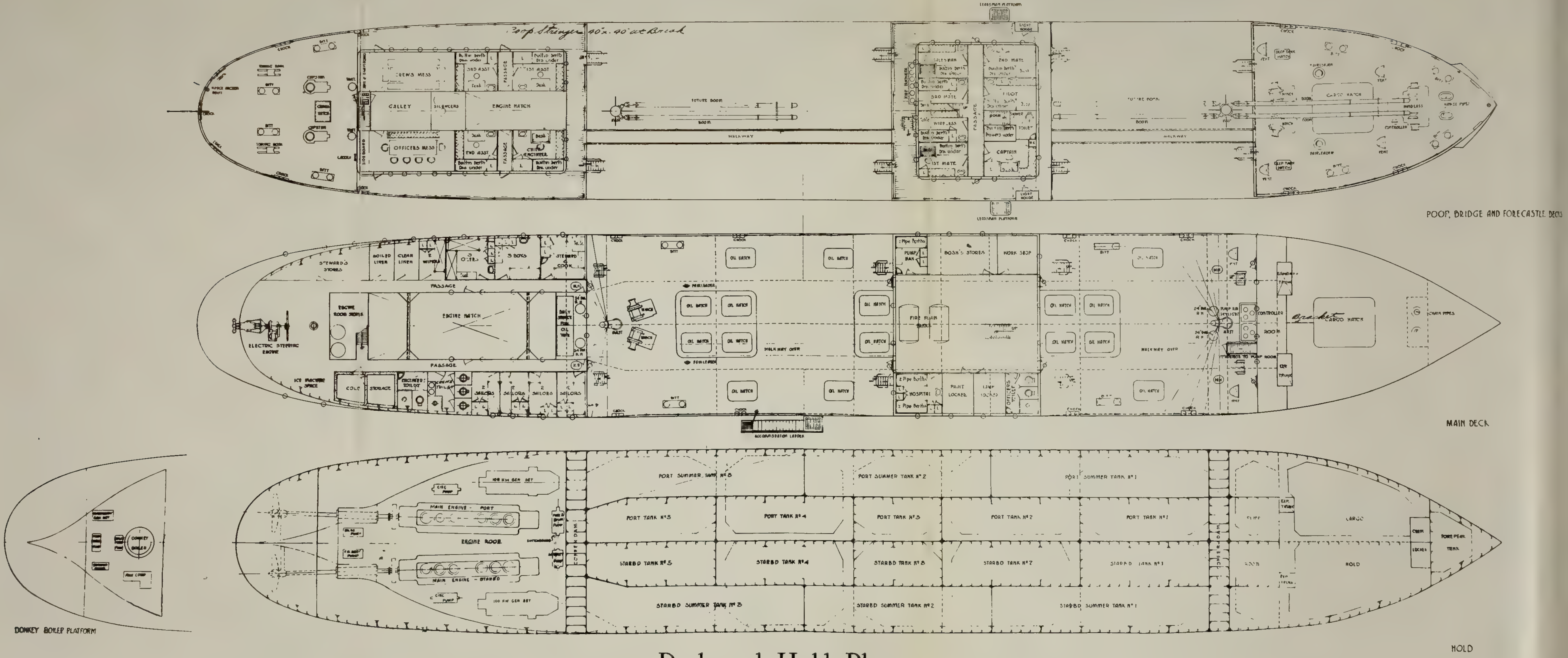
Winton full Diesel electric generating set of the type proposed for Ferris type hull propulsion

AMERICAN-BUILT AND EQUIPPED FULL DIESEL ENGINED TANKER



Inboard Profile

AMERICAN-BUILT AND EQUIPPED FULL DIESEL ENGINED TANKER



Deck and Hold Plans

American-Built and Equipped Full Diesel Engined Tanker

THE marine Diesel engine is no longer an experiment, as has been proved by the complete success of various European vessels that have been operating for the past eight or ten years, and the American owners' confidence in this type of carrier is well shown by the orders that they are now placing for duplications.

The Standard Oil Company of California is taking a leading part in the introduction of the Diesel engined motorship into the American merchant marine. This company is now having constructed at the yards of the Union Construction Company, located at Oakland, California, a full Diesel engined tanker of the following dimensions:

Length over-all	262 feet
Length between perpendiculars	250 feet
Beam, molded	37 feet
Depth, molded	21 feet

This vessel will have a carrying capacity of approximately 16,000 42-gallon barrels of refined oil, together with thirty days' supply of fuel, fresh water and stores, on a mean draft of 18 feet 3 inches.

The propelling and auxiliary machinery will be located aft, pumproom forward, and main cargo oil tanks amidships, with cofferdams at each end. Forward of pumproom is fitted a deep tank for fuel oil, with cargo hold for package freight over the same. After peak is used for fresh water storage, and double bottom under engine room for fuel oil. The fore peak may be used for either ballast or fresh water.

The quarters for the deck officers are arranged for in the bridge houses; the after deck houses are fitted with quarters for the engineers; also galley and officers' and crew's messrooms. The remainder of the crew are housed in quarters fitted under poop, being arranged with only two men to each room.

All auxiliary machinery throughout the vessel is motor-driven, and the entire galley equipment is electric. The rooms are lighted, heated and ventilated by electricity.

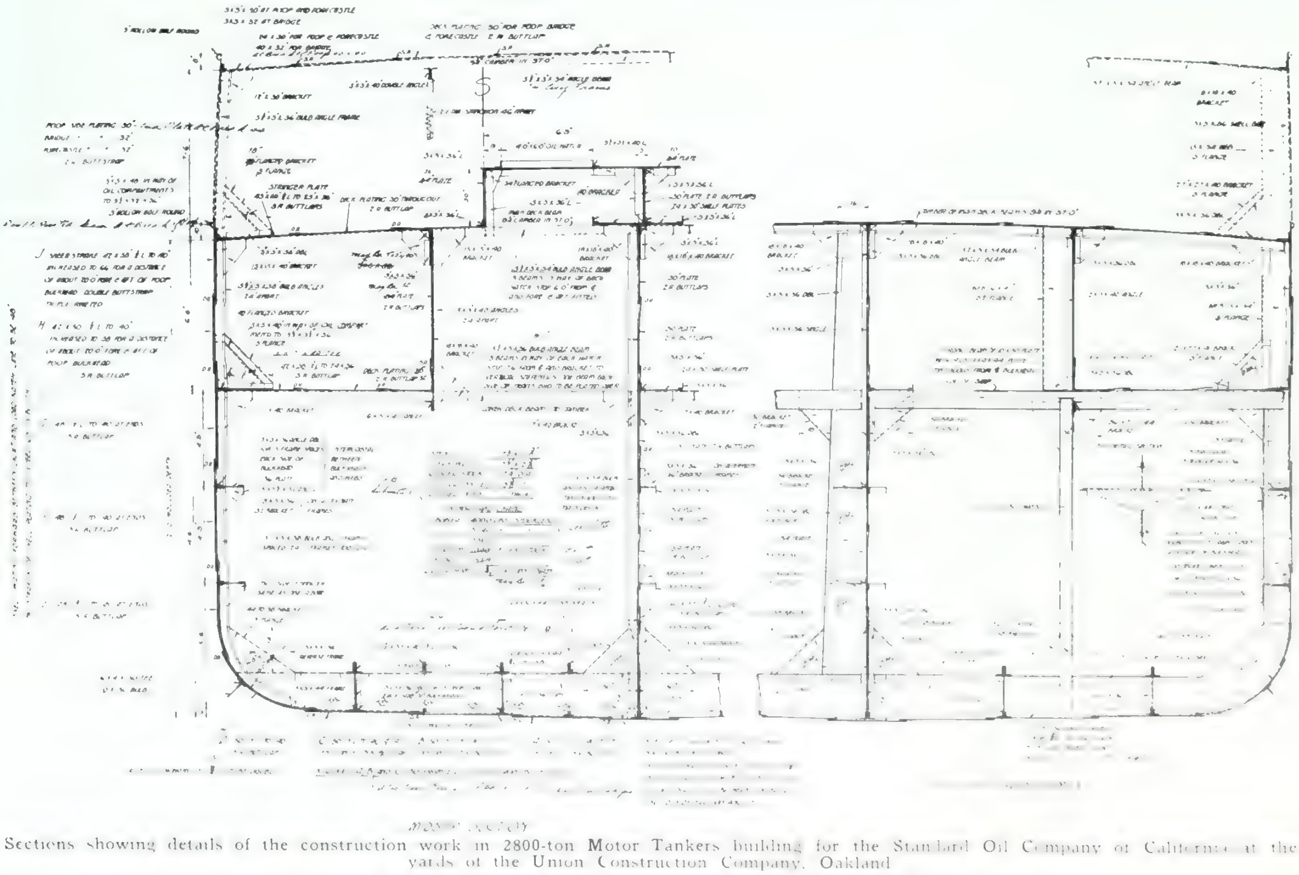
The main propelling machinery consists of two 6-cylinder Werkspoor marine Diesel engines, built by the Skandia Pacific Oil Engine Company, Oakland, California. Each of these engines is designed to develop 550 brake horsepower at 165 revolutions a minute, giving a total propelling power of 1100 brake horsepower, capable of giving vessel an estimated speed of eleven knots an hour when loaded.

The cooling water for these engines is furnished by two motor-driven centrifugal pumps furnished by the Alberger Pump & Condenser Company. Any one of these pumps is capable of furnishing the full amount of circulating water required, leaving the other pump for spare.

The main engines have a forced feed lubricating system which is supplied by two motor-driven lubricating oil pumps built by the Kinney Manufacturing Company. One of these pumps serves as spare.

There is also installed a lubricating oil cooler built by the C. F. Braun Company, and two lubricating oil filters furnished by the Richardson-Phoenix Company.

Lubricating oil drain tanks are fitted in engine



Sections showing details of the construction work in 2800-ton Motor Tankers building for the Standard Oil Company of California at the yards of the Union Construction Company, Oakland room double bottom to take drain from main engines. The lubricating oil cooler is fitted with bypasses for both fluids, leaving controlling effect entirely under the control of the operating engineer.

Fuel oil is supplied to the engines by gravity flow from a daily service tank located in the upper engine room. This tank is filled by a motor-driven fuel oil service pump built by the Kinney Manufacturing Company. This pump draws from the engine room double bottom and the cofferdam. In the pumproom is located a fuel oil transfer pump built by the same people. This pump is arranged to draw from the fore deep tank and discharge to the engine room double bottom and to the daily service tank.

In the engine room is fitted an auxiliary air compressor arranged to draw from the atmosphere and deliver maneuvering air to the four large maneuvering air tanks at a pressure of fifty pounds a square inch.

A small booster compressor is arranged to draw the maneuvering air tanks and compress to 1000 pounds a square inch for filling injection air bottles. Both compressors are motor-driven and are furnished by the Rix Compressed Air & Drill Company.

A motor-driven three-stage turbine pump is installed as a fire and bilge pump, and a two-stage motor-driven turbine pump is fitted for the sanitary system. The sanitary pump is arranged to draw from the overboard discharge of the circulating water from the main engines, and discharge into the sanitary line; in this way, warm water discharged from the main engines is utilized for all shower baths and wherever else warm water is required throughout the ship.

A motor-driven centrifugal fresh water pump, built by the Krogh Pump & Machinery Company, is fitted; this is arranged to draw from the after peak and to discharge to service tanks on top of deck houses and to galley.

A donkey boiler of the submerged head type for steaming out cargo oil tanks is fitted in the engine room. This boiler is also capable of being used as an evaporator, and is equipped with a mechanical fuel oil-burning apparatus. There is a small duplex donkey boiler feed pump which is steam-driven and is arranged to draw from sea and to discharge to boiler. A distiller is located in the upper engine room casing.

The electric plant consists of two three-cylinder 150 brake horsepower Diesel engines, each direct connected to a 100-kilowatt 250-volt direct connected generator, the engines being built by the Dow Pump & Diesel Engine Company, and the generators by the General Electric Company.

There is also installed a small emergency generating set, consisting of a 16-horsepower Skandia engine direct connected to a 10-kilowatt 250-volt direct-connected generator. This unit is capable of being started by hand, and is sufficiently large to run the booster compressor, thus enabling the injection air bottles to be filled in case the starting air should have been accidentally lost. It is also large enough to furnish lights for the entire vessel when no other auxiliaries are running.

A small balancer set is installed for obtaining 125 volts for lighting system. All main feeders are controlled from a switchboard located in the forward engine room, which contains all the control switches and other instruments.

The cargo oil system of piping is so arranged that three grades of oil may be carried and handled simultaneously without mixing, either in loading or discharging.

In the pumproom are located four Fairbanks-Morse power pumps with superimposed motors. There are three separate suction and discharge lines with one pump connected to each line, and the fourth is so connected that it can assist or replace any of the other three. All these pumps are also capable of drawing from the sea and discharging overboard.

All motors in the pumproom are gas-proof and of the ventilated type, it being necessary to exclude possible accumulation of gases in the motors where sparking may occur. Air for ventilating these motors is supplied by a Sturtevant blower direct connected to a three-horsepower motor. This unit is located in a steel gas-tight control room which is directly above the pumproom. In this room is also located all the control apparatus for the motors in the pumproom. In this way all danger from explosive gas is eliminated.

The deck machinery consists of one windlass with a 25-horsepower motor, four cargo winches, each with a 15-horsepower motor, and two capstans, each with a 10-horsepower motor. All this machinery is furnished by the Allan Cunningham Company of Seattle. The motors are all waterproof and control apparatus is mounted in watertight base of each unit, arranged with ventilated openings.

The steering engine is of the hydro-electric type, built by the Hyde Windlass Company of Bath, Maine, and is fitted with the Donkin type of hydro-electric telemotor and electric indicator.

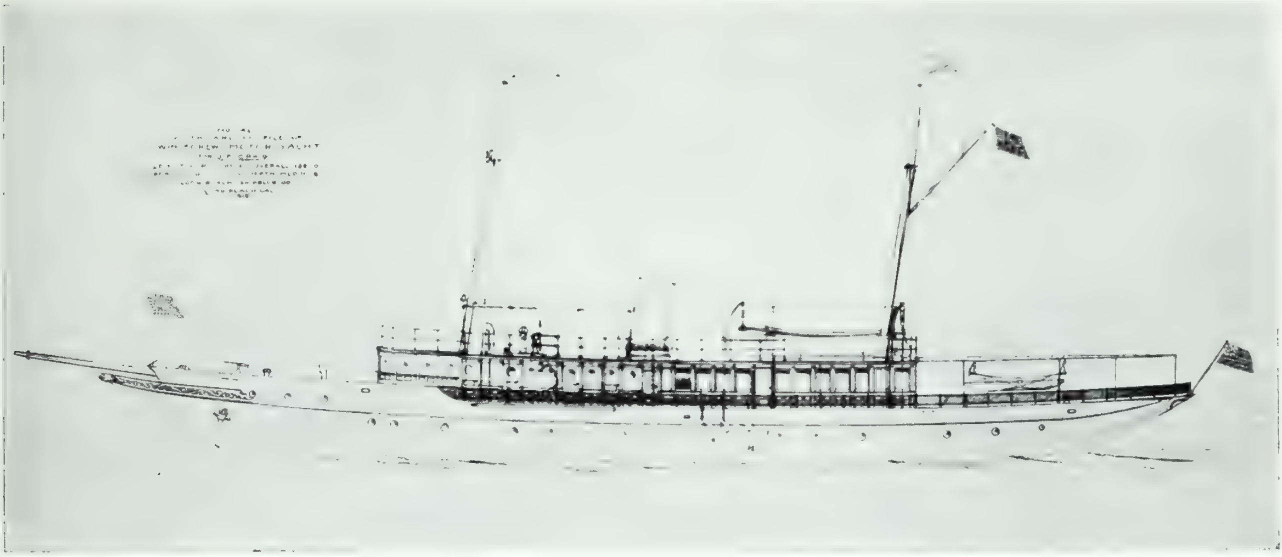
The crew's quarters on the after deck are ventilated by a Sturtevant blower, belt connected to a one-quarter horsepower motor. This unit supplies air through a duct running fore and aft on each side of ship, with individual branches with dampers leading to every room.

All rooms are equipped with electric air heaters of the navy type, furnished by the American Electric Heater Company.

The electric galley equipment consists of a range, broiler, griddle, water heater with a thermostat switch, and two coffee urns. All of this equipment is furnished by the Edison Electric Appliance Company.

This vessel is also equipped with a very novel feature, viz., a fire foam fire extinguisher outfit, consisting of soda and acid tanks, hoses, mixing nozzles, etc. The tanks are charged with pressure from the maneuvering air tanks in the engine room.

The general arrangement plan and midship section are printed herewith.



A New Type of Yacht for the Pacific Coast

MR. JOHN A. CRAIG, of the Long Beach Shipbuilding Company, has under construction for his own use a motor yacht in which there have been several distinct departures from the design of the customary Pacific Coast pleasure craft. The yacht was launched during the month of December at the yards of the Long Beach Shipbuilding Company, and it is believed that when completed she will rival any craft of similar type that is at present on the Pacific Ocean.

Mr. A. E. Hudson designed this yacht, embodying ideas that have been maturing in the mind of Mr. Craig for over a decade, or since he sold the Edith on the Great Lakes in 1908.

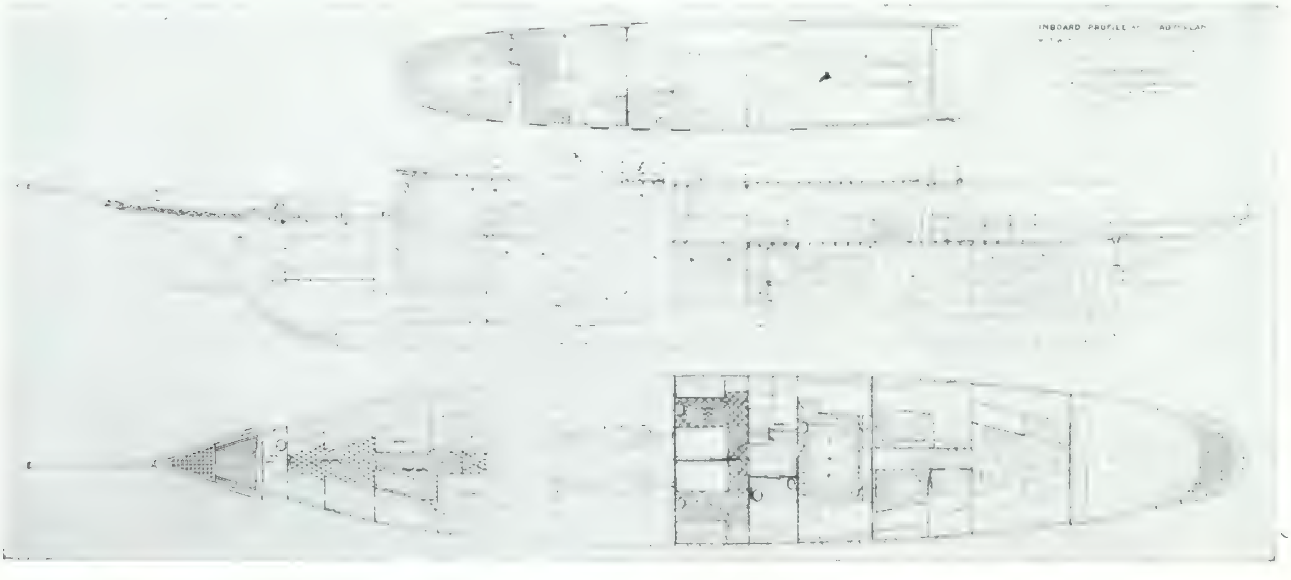
The yacht will have a raised forecastle deck and a high bow, as shown in our illustration of the outboard profile. This will add to her seaworthiness and give a greater capacity for fuel and supplies. In the tanks, in the forepeak and in the double bottoms she can carry 334 barrels of fuel oil, which is enough to give her a cruising radius of 5000 miles. Her underdeck space is divided into six water-tight compartments by five bulkheads, and Mr. Craig claims that she will be practically unsinkable. Length between perpendiculars is 105 feet 3 inches; length over-all 136 feet; molded beam 21 feet; molded depth 11 feet 6 inches. She is to be engined by twin Diesel motors and will carry sail rigging for emergency purposes.

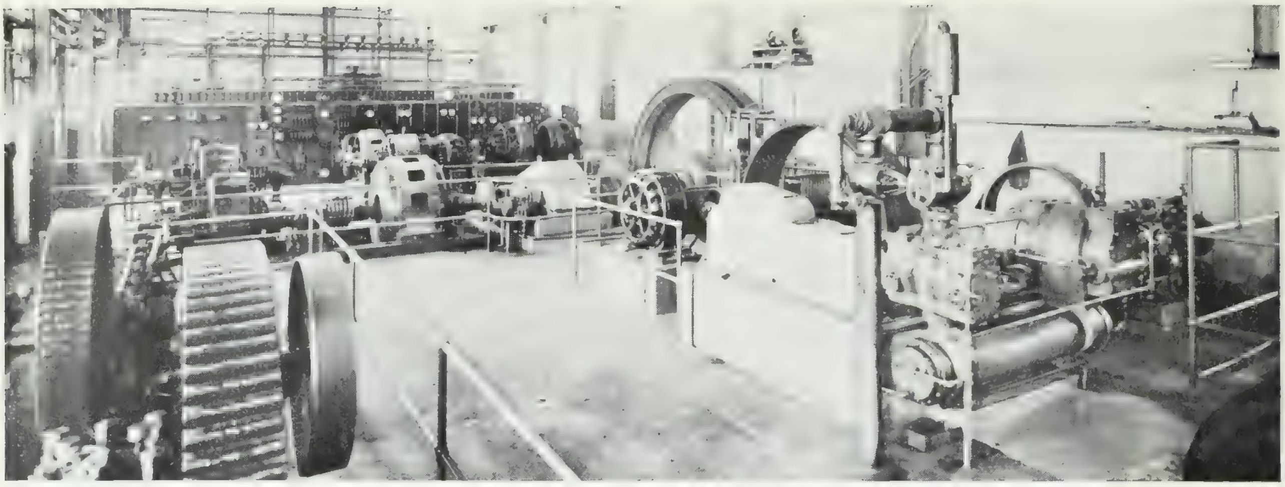
The hull is of steel plate of the highest specifications, and no pains have been spared to make the exterior and interior finish as luxurious as possible. The deck is of white spruce. The steel deck house will be panelled with mahogany inside and out.

The boat equipment consists of a 24-foot motor boat; a gig 18 feet long, and a dinghy 14 feet long.

There are six staterooms with double berths; two glazed tile baths; and the main saloon is fitted with folding divans.

Mr. Craig intends to combine business with pleasure in the use of this yacht. He is an active director of the new California & Mexico Steamship Company, and is intensely interested in the success of that enterprise. He is now planning several Mexican cruises in which he will act as a pioneer for the business of that company.





The power plant of the Rolling Mill and Foundries of the Llewellyn Iron Works, at Torrance, California

Llewellyn Iron Works

ROLLING MILL AND FOUNDRIES, TORRANCE, CALIFORNIA

PERHAPS no similar plant in the world, and certainly none on the Pacific Coast, has been so rapidly developed into its completed form as the rolling mill plant and foundry of the Llewellyn Iron Works, located at Torrance, California.

Three years ago the site of this plant was a grain field; today the twenty-five-acre site is completely occupied by the material yards and buildings of a thoroughly modern rolling mill and foundry.

The buildings and practically all the machinery throughout the plant therein were designed and built by the Los Angeles plant of the Llewellyn Iron Works. The electric motors and controllers used as the drive for the various units were practically the only equipment bought outright.

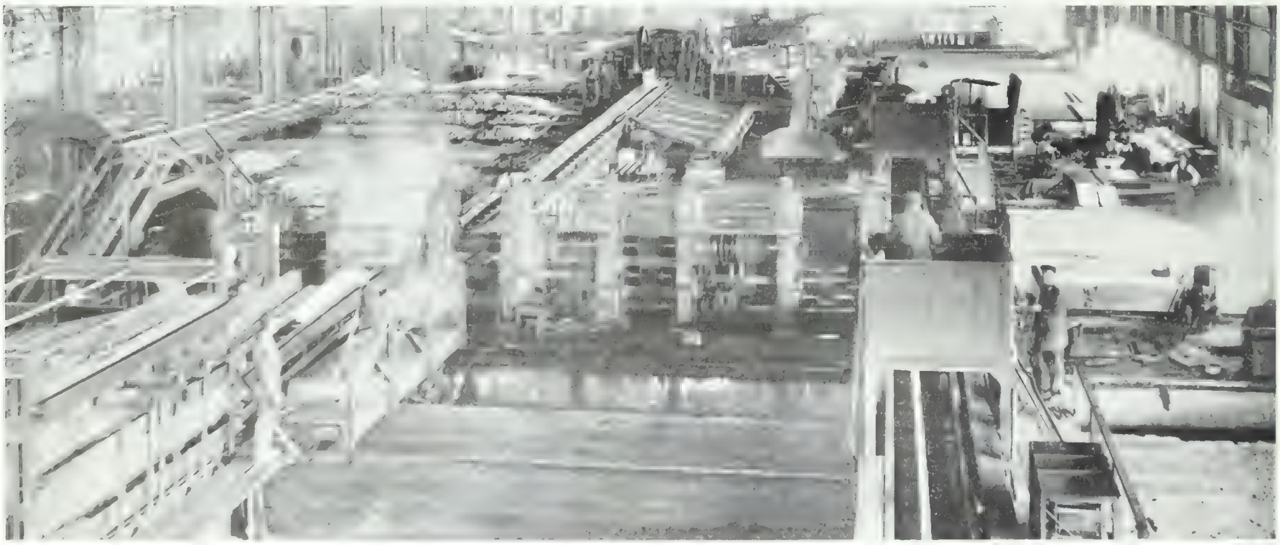
The location of the steel plant of the Llewellyn Iron Works is at the new industrial town of Torrance, which is a modern industrial city situated on high ground near Los Angeles harbor. The town site and adjoining property, consisting in all of about 3500 acres, are completely laid out along the lines of a model industrial city. There are twenty miles of paved roads, complete sewer system, complete water system with a reservoir of 17,000,000 gallons' capacity, also complete electric light system, gas system, etc. There are districts restricted for business, industrial property and residences.

The Llewellyn Iron Works is located about one-quarter mile from the center of the town on a piece of property in such a location that land is available for future extensions, should the present acreage prove inadequate.

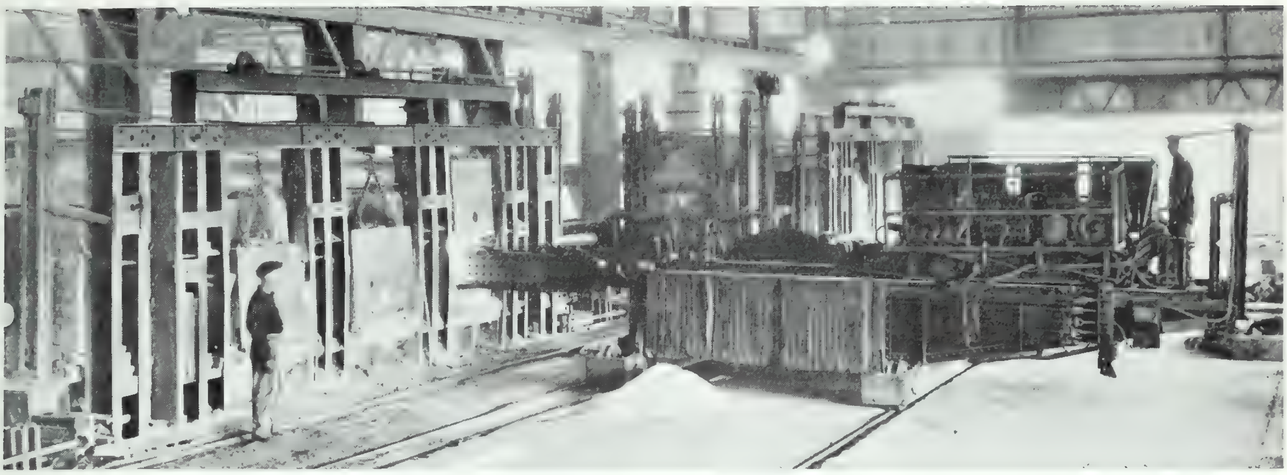
The general office is located on a separate piece of ground, but closely adjacent to the main property. A representative of Pacific Marine Review recently had the pleasure of making an inspection of this very interesting plant and from notes made at that time has compiled the following description:

All incoming and outgoing material is handled over a complete system of trackage within the property, consisting of about three miles of standard gauge track, material yards and different departments are served by small steam locomotives and locomotive cranes.

In addition to the locomotive cranes, the material yards are covered with one hundred feet of span monorail cranes equipped with magnets for handling the materials. Electric conduits are carried alongside all trackage within the yard with suitable outlets at regular intervals. With this



The twenty-two-inch breaking and finishing mill at the Llewellyn plant



Llewellyn-made charging machine for open-hearth furnace

equipment it is possible to transfer shears from one point to another and they are ready for use by simply blocking into outlets. It is also possible for the steam locomotive cranes to use these outlets for their source of current for the unloading of magnets. The advantage of standard gauge industrial trackage is very obvious, as standard carloads of material may be spotted anywhere in the yard, or charge cars may be loaded at any point within the yard for the open hearth floor.

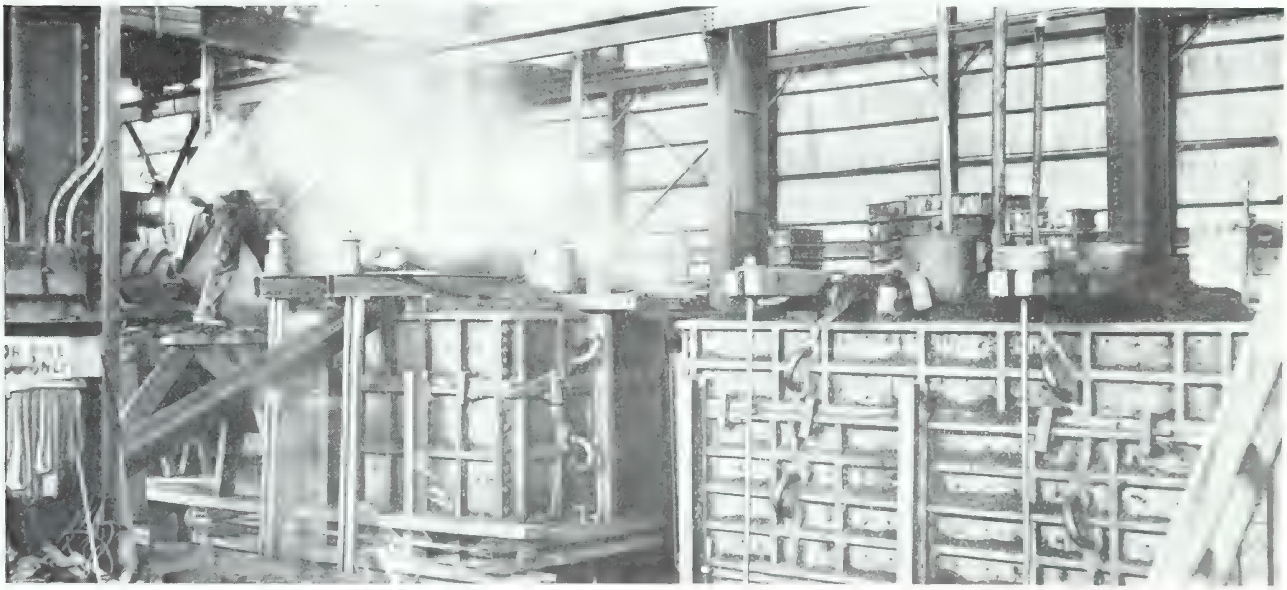
All of the buildings throughout the plant are of structural steel construction, covered with corrugated iron.

The open hearth building is 110 by 180 feet and immediately adjacent to this building is the main raw material yard, 100 feet in width by 600 feet long, equipped with overhead cranes.

The open hearth building contains two 40-ton furnaces, using natural gas as fuel. These furnaces are served by an electric charging machine, which handles the material from the time it is placed at the entrance of the open hearth building, handling the charging boxes from the cars, which boxes are filled with raw materials ready for charging into the furnace. The charging machine, built by the Llewellyn Iron Works, is of very ingenious design and makes it possible to handle very large tonnages of material in a short time with an extremely small amount of labor.

A very interesting arrangement in connection

One of the ladles for open-hearth steel, capacity 60 tons



Pouring gray cast iron into molds for large marine engine cylinders with the operation of these furnaces is the automatic recording devices which insure that the attendants will report the fire at proper intervals, and also show time of tap pressure of gas and all other necessary facts. This is only one of the many instances throughout the plant whereby the Llewellyn policy of "Safety Always" is maintained by practical mechanical devices. There is a large hydraulic elevator for service to the open hearth charging floor, to be used in case of emergency, and the building is equipped with all necessary Llewellyn designed cranes.

The foundry building is 150 feet by 240 feet, and includes two cupolas for the cast iron work and one 3-ton Herault electric furnace. The layout of the foundry building is such that the open hearth furnaces and electric furnace can be worked in conjunction, giving a very large capacity for steel castings.

There are large casting pits between the open hearth and foundry buildings, in which extremely large steel castings or ingots can be made. When pouring standard ingots from the open hearth, the pouring is made through the master mold. The molten metal passes from the master mold through special vitrified clay pipes to the under side of forty-eight large ingot molds and the metal rises in these molds as it is poured into the master mold. When slightly cold, the ingot molds are stripped by an ingot stripping crane.

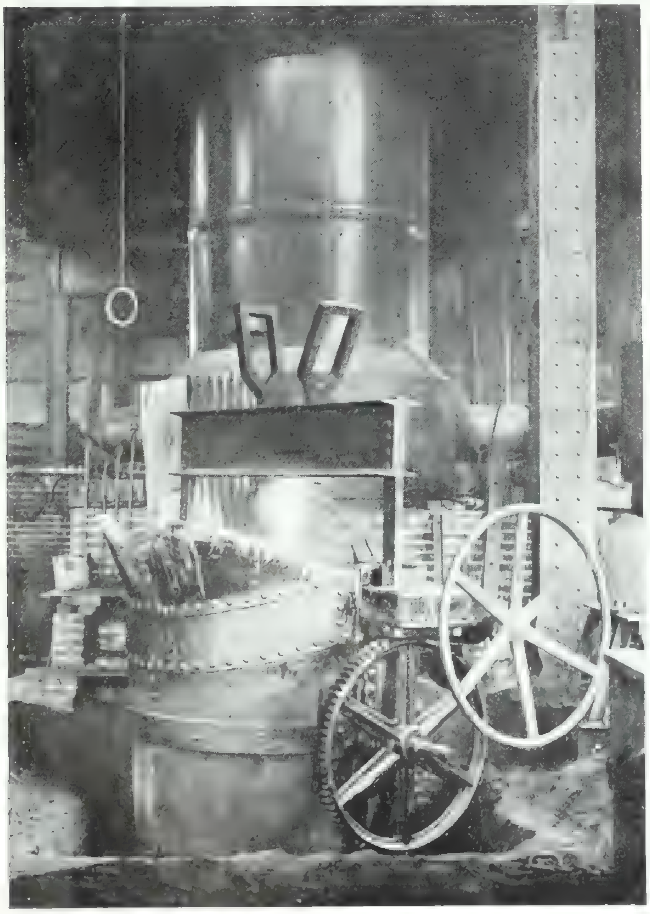
Passing now to the mill itself, we find a building 150 feet by 500 feet, as mentioned, of all structural steel construction, and having as its equipment one 22-inch, 4-stand, break-down and finishing mill; one 14-inch break-down for 12-inch, 5-stand bar mill; and one 8-inch, 5-stand bar mill. The mills are all driven by electric motors, directly connected through Falk reduction gears, and for the information of the mill operator and safety of the mill, electrical automatic signalling devices have been put at each mill, so designed that they show the red light and blow a warning signal when the motor has been overloaded to the danger point, signifying that further overloading would cause a circuit breaker to be thrown out. When this signal shows red, the operator waits until the white light again appears, at which time he knows it is safe to go ahead.

The 22-inch mill is served by four electric tilting tables, so placed that billets can be transferred from one to the other. The fuel used in the reheating furnace is natural gas with auxiliary oil burners for use in the event of low gas pressure.

The warehouse building is 70 feet by 400 feet and is equipped with overhead electric cranes, shears, straightening machines, etc.

The furnaces and mills have a monthly capacity of, approximately, 4000 tons of finished material and a size capacity up to 8-inch I beams. A complete roll-turning shop has been installed and nearly all of the rolls are cast turned at the plant.

The plant is supplied with a complete water system, including fire connections and a thorough distribution of water to all parts. This system may be connected either with the outside source of supply or with the plant's own water system.



One of the ladles for gray cast iron, capacity 5 tons

Pouring a heat from the three-ton Electric Furnace

PACIFIC MACHINERY

A Successful Internal Grinding Machine

ONE of the great mechanical problems confronting the manufacturer today is how to obtain round holes, straight or taper holes, and duplicate holes, of exactly similar diameter in such parts as bushings, gears, cylinders, gauges, cutters, cones, etc.

There is but one solution of the problem, and that is grinding. To be sure, reaming is more or less successful in soft metals, but this method involves large expense for reamers, which wear under size very quickly, and with adjustable reamers there will always be a certain variation in size of the work when readjusting and regrinding.

One of our illustrations shows an interesting installation of the Heald internal grinding machines at the manufacturing plant of the Axelson Machine Company, Los Angeles, who are producing very high-grade deep-well oil pumping equipment. The grinding department, as well as various other departments, shows the Axelson Machine Company to be well equipped for modern manufacturing methods.

The manufacturers of the Heald internal grinding machine have found by experience that grinding machines should be built as stiff and rigid as it is possible to build them. Many people have the idea that, because the grinding wheel makes comparatively light cuts, grinding is light work and only needs a light machine to handle it successfully. This, however, has proved to be a great mistake. A most rigid machine is essential because the speed at which the wheel must rotate eventually tends to set up more or less vibration in the machine, and this, if not resisted by iron properly disposed, will make it impossible to rapidly produce accurate work.

The grinding spindle on the Heald internal grinding machine is directly on the main table of the machine, where it is rigidly supported and given every facility for rapid and accurate cutting.

Many of the older types of machines have also been lacking with regard to the ability to change the speeds and feeds readily. By designing the machine from the ground up for this particular line of work, the Heald machine incorporates all the features that are desirable in such a tool.

The Heald machine has not been limited by the necessity of arranging it for doing work of some other character, as, of course, has been the case where the machine was planned to do plain grinding or face grinding as well as internal grinding, and this doubtless explains the remarkable success of this machine.

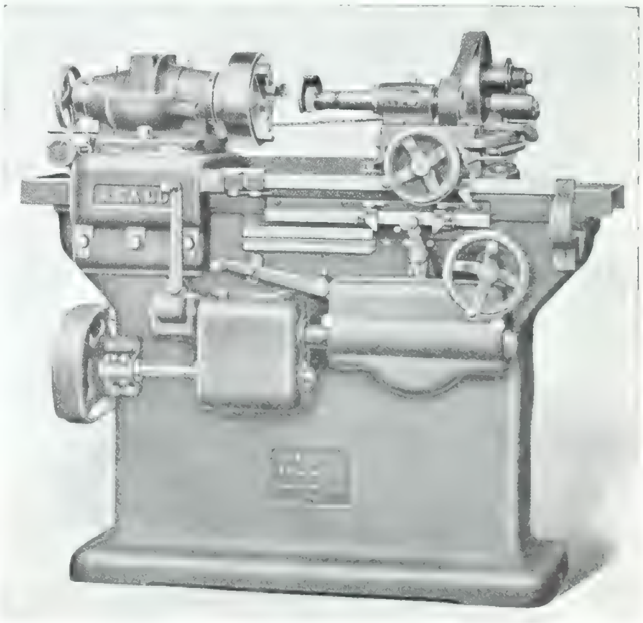
On the front of the base is mounted the automatic table reversing gear box and at the left the three-speed quick-change gear box for giving the table three different rates of travel for each work speed. A fast travel for roughing out stock, and slower speeds for truing and finishing the holes, are thereby always at hand. The different speeds are controlled by the vertical lever at the left end of this gear box and all are instantly available.

The headstock is massive and has swivel adjustment. It is fitted with phosphor bronze bearings, made dust proof and adjustable for wear. The chuck spindle is made of high carbon steel, ground and lapped, and is of large diameter in the bearings (front 2¾-inch diameter, rear 2¼-inch diameter) to give stiffness for supporting work.

The construction of the cross slide, the wheel head and idler pulley is such as to give firm and rigid support to the grinding spindle. The idler pulley is fitted with radial ball bearings of silent type, and is not only adjustable on the cross slide, but is of flexible design, so as to maintain the proper belt tension at all times.

The machine is guarded to protect the operator. Attention is especially called to the new automatic wheel guard, which covers the grinding wheel when withdrawn from the work.

The Heald internal grinder, while a manufacturing machine, is so designed that it is capable of covering a very wide range of work. It will grind



The Heald internal grinding machine

small holes or large equally well. The grinding wheel heads are made up in units complete in themselves and only a moment is required to remove one from the machine and put another in place. The correct spindle speed is always secured, as the proper sized spindle pulley is furnished as part of the wheel head unit.

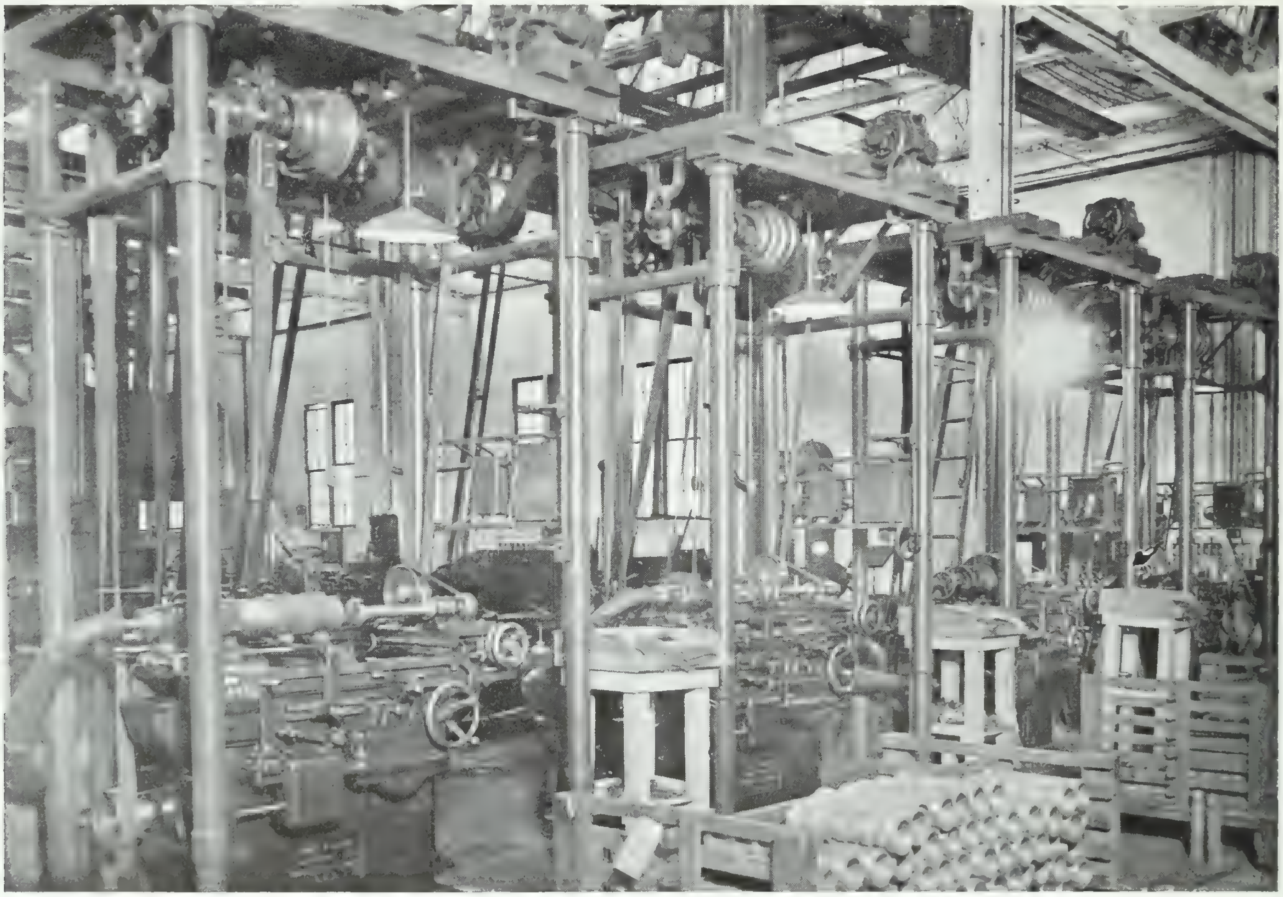
The Eccles & Smith Company are selling agents for the Heald grinding machines. This progressive machine tool selling organization is to be congratulated upon the many Heald installations which they have made on the Pacific Coast. And this in view of the fact that grinding machines are a comparatively new departure in Western manufacturing plants. The Eccles & Smith Company have salesrooms and stocks in San Francisco, Los Angeles, Portland and Seattle.

ASSISTANT MARINE MANAGER FOR DIAMOND SPECIALTIES

THE Diamond Power Specialty Company, Detroit, Michigan, announces the appointment of Michael J. Stack as assistant marine manager. Mr. Stack's headquarters will be in the office of the company's marine manager, F. W. Leahy, 32 Broadway, Room 1611, New York City.

Mr. Stack was born in San Francisco, February 20, 1878. After serving an apprenticeship at the machinist trade, he went to sea as marine engineer, first in the army transport service and later with the Pacific Mail Steamship Company.

Mr. Stack is a member of the Society of Naval Engineers and the Marine Engineers' Beneficial Association.



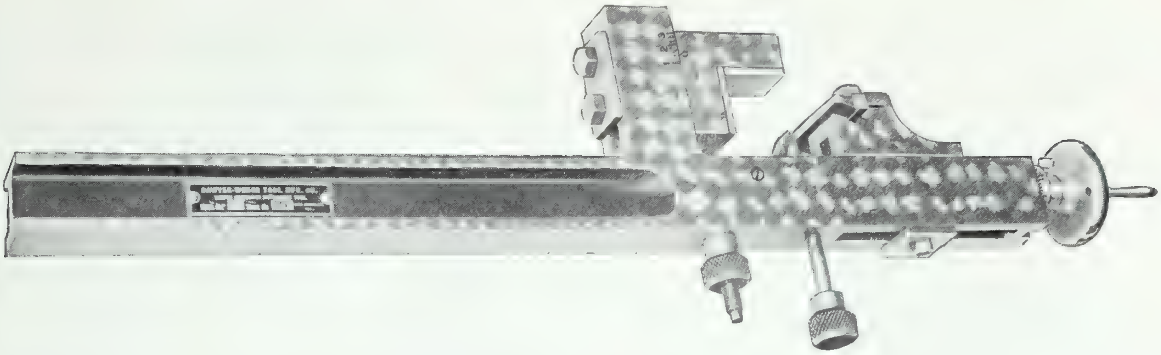
Group of Heald internal grinding machines in the manufacturing plant of the Axelson Machine Company, Los Angeles

A New Crank Pin Re-turning Tool

MR. ALEX WEBER, formerly with the Cushman Motor Works of Lincoln, Nebraska, came to the coast a few years ago and started a machine job shop with his brother in Los Angeles. Their work in overhauling truck and tractor gas engines called for the trueing up of many crankshafts. To fill this need Mr. Weber designed and patented the Weber crank pin returning tool. This tool is used in conjunction with any ordinary engine lathe and has proved a very quick and practical method of trueing up the pins of a crankshaft.

In using this tool the crankshaft is placed on centers on the lathe. The tool is then clamped on to the pin and rides around with the pin. It is not necessary to offset the crankshaft. The Weber tool uses a forming cutter the width of the pin to be turned. The ends of the cutters are rounded in order to cut the desired fillet.

It will readily be seen that this kind of cutter leaves no tool marks, so that very little polishing is necessary to secure a smooth pin. The Weber tool is so designed that it must turn a round pin. The pin is held into a V-block against two hardened steel plates by means of an adjustable brass shoe. The cutter is independent of the pin at all times, and can only remove the high spots from the pin. This gives a true, round pin, and at the same time removes the least possible amount of metal. This can be proved by filing a low spot in


The Sawyer-Weber crank pin re-turning tool

a pin and then re-turning it. The filed place will be the last spot to clean up. It will also be found that all the pins when finished with the Weber tool will be parallel to a line between the centers of the lathe; or, in other words, parallel to the main bearings.

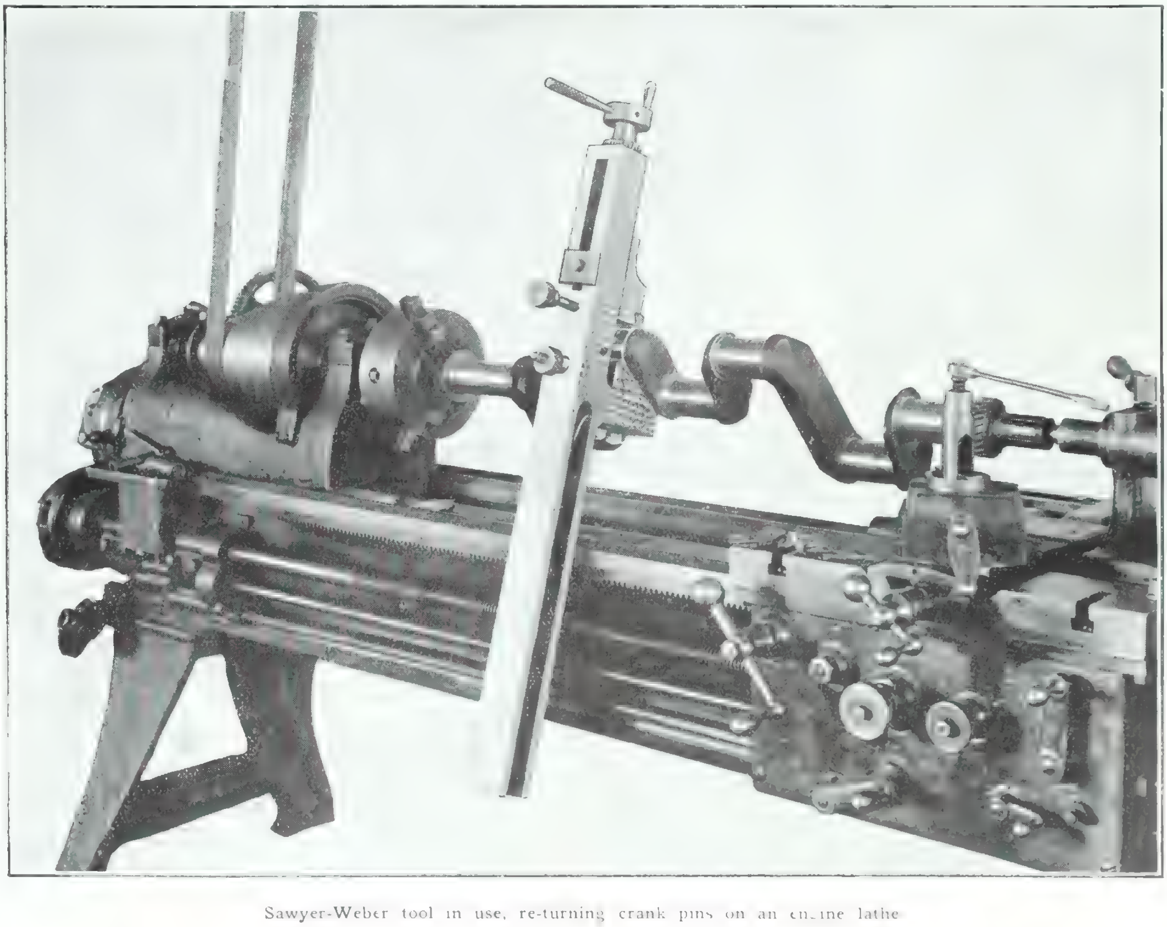
The advantages of this tool will readily be seen. Many crankshafts are extremely hard to offset. They often have gears on one end that are hard to remove, so that it is difficult to get hold of them. Many a machinist who has turned crank pins by offsetting the shaft knows too that it is hard to turn them exactly round. The shaft will spring away from the tool just enough so that it is almost impossible to turn them exactly round. The Weber tool puts no strain on the rest of the crankshaft, being self-contained and entirely fastened to the pin it is working on.

In making such a wide cut, the lathe is put in its lowest back gear and the shaft should revolve about eight or ten revolutions a minute. If the shaft being turned is a long, slender one, a steady rest should be used on the middle main bearing to keep the shaft from vibrating. If this is done, there is absolutely no chatter.

For a cutter compound, use a mixture of about two-thirds distillate and one-third lubricating oil. This makes the cutters work freely and seems to help retain a clean edge.

There is no other method by which a crank pin can be turned up as quickl as with the Weber tool. This, of course, is obvious. A micrometer dial makes it easy to duplicate all pins. Cutters are made for different length pins, and the tool is adjustable to different diameters. The size of the lathe to be used depends, of course, on the dimensions of the crankshaft. The swing must be big enough to swing the crankshaft with the tool on the pin.

It has been found that the cutters used will turn a large number of pins before regrinding is necessary. Of course, it usually takes only a few thousandths to clean up a pin, so that the cutter is really not doing much work. One cutter was used on 200 pins before it had to be ground. It is necessary to hone it about every four to eight


Sawyer-Weber tool in use, re-turning crank pins on an engine lathe

pins in order to keep the edge keen. The cutter is ground against one side of a cup wheel, so that it will not be hollow ground. There is a twenty-degree top rake on the cutter, but no clearance, as the curvature of the crank pin surface gives ample clearance for any cuts made with this tool.

This tool, properly used, should last a life-time, as the cutters work very freely. In fact, the handle of the tool can be held away from the ways of the lathe easily when it is cutting.

The Weber re-turning tool is manufactured by the Sawyer-Weber Tool Manufacturing Company of Los Angeles in four sizes, covering pins from 1⅛ inches to 6 inches in diameter and from 1½ inches to 7 inches in length. Only the highest class of material and the finest workmanship are used, and each tool is thoroughly tested before leaving the plant.

The field for this tool is very wide. It is well known that crankshaft work is being sadly negletced in most repair shops. Indeed, it is a fact that many gas engines have been thoroughly overhauled with the exception of the crankshaft and then reassembled. It is absolutely impossible to fit a bearing to a pin that is not round. There have been so few shops able to handle crankshaft work, and it has been such expensive work that the average repair man has ignored them. With the Weber tool there should be no need of this. As a matter of fact, more time will be saved in fitting the bearings to the round pins than was taken to return them. Thus it is a saving to the individual who is having the work done, and at the same time gives the repair man a nice profit for his work, together with a more satisfactory job to all concerned.

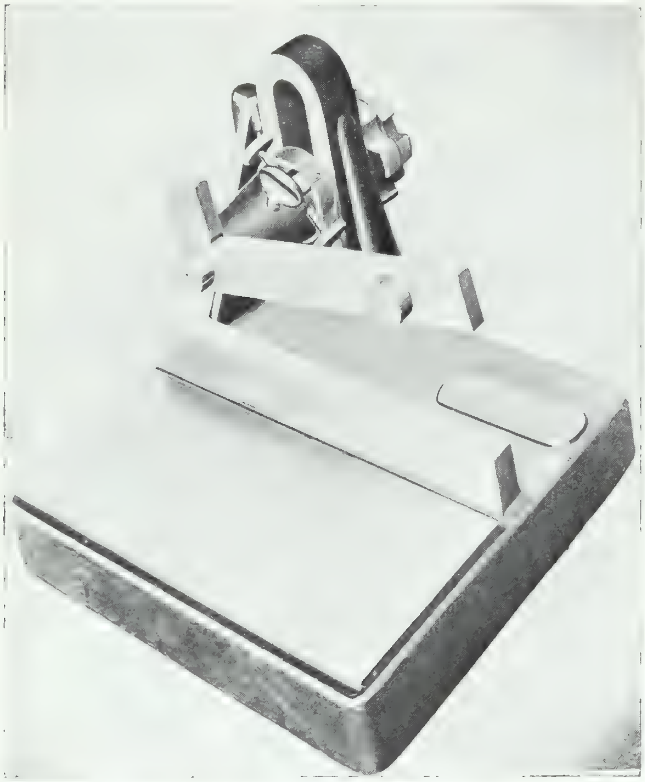


Figure 1

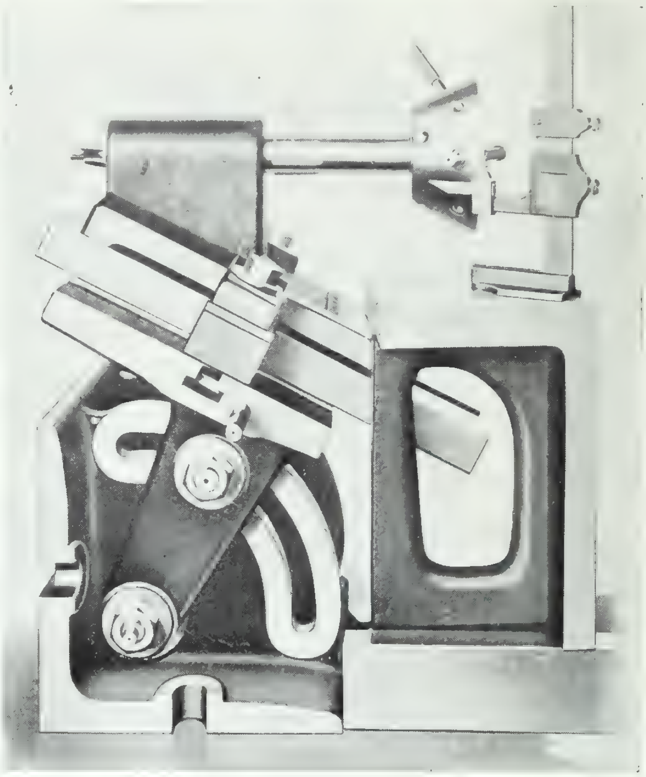


Figure 3

Standardized Inspection Tools

IN this article it is proposed to call attention to a few of the inspection tools and gages manufactured by the Taft-Peirce Manufacturing Company which are of special interest on account of certain unusual characteristics that distinguish them from the ordinary inspection tools.

Sine Bar Fixture

Although the sine bar as an instrument for the accurate measurement of angles has been known to tool-makers for a long time, it is only now beginning to take the place it is entitled to for this kind of work. Probably the principal reason for the slowness of inspectors in taking up the use of the sine bar is the difficulty of manipulating it. The plain sine bar must be clamped to the article to be measured before it can be used, and the setting up of the bar in accurate position sometimes involves much tedious work.

In order to promote the use of the sine bar in commercial work, the tool-room of the Taft-Peirce Manufacturing Company developed the sine bar fixture, shown in Figure 1. This fixture is a self-contained tool—it is equipped with a special sine bar so mounted that it can be quickly and accurately adjusted to any desired angle, and applied to the measurement of angles on any given device.

This tool can be used to establish different angles, the base giving one side of the angle and the bar the other. Its adjusting features permit the raising and lowering of the pivot end of the bar through a certain range and the rotation of the bar through an angle somewhat greater than 180 degrees. The bar which is used with this fixture is provided with a short projection or horn on one end, finished accurately to form a right angle with the long edge of the bar. The short projection is a great convenience in cases where the bar is set for the complement of the angle that is to be meas-

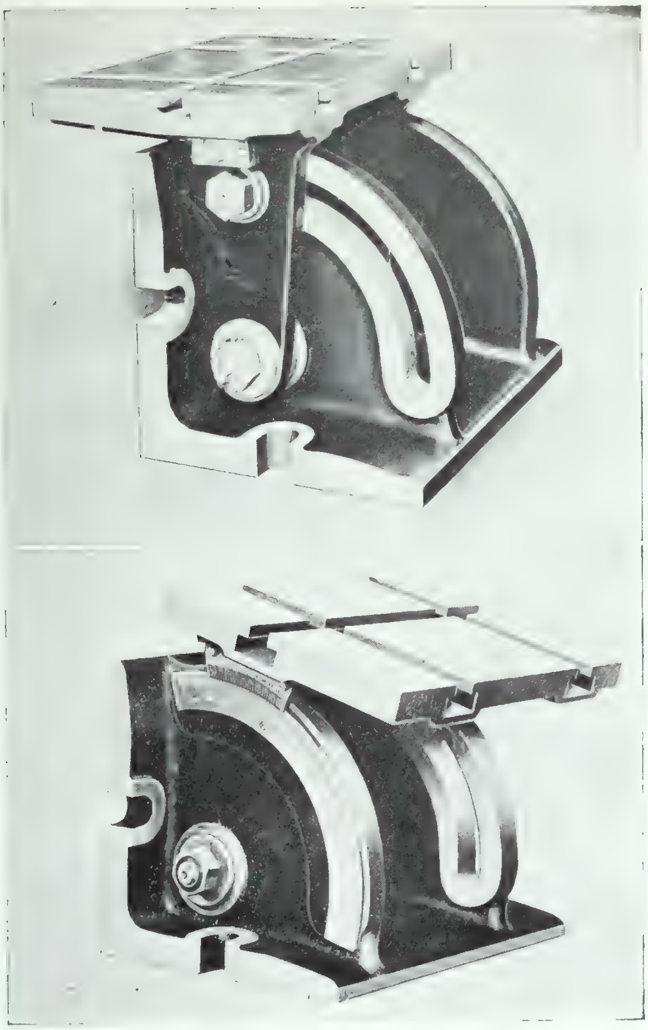


Figure 2

ured. Referring to Figure 1, the approximate setting of the bar is made with the hand nuts at the back of the fixture, and the final accurate adjustment is made by means of two thumb screws attached to the projection which holds the pivot shank.

The fixture also provides means of holding certain classes of work and in some instances a series of measurements can be greatly facilitated on account of this characteristic.

Toolmaker's Adjustable Knee

The toolmaker's adjustable knee is another device designed to save time in the measurement of angles. It consists of an angle base finished on two surfaces and both ends, which carries two web sectors, at the center of which is pivoted a work table. The work table is so constructed and pivoted that it can be swung a full 90 degrees. One sector is provided with a graduated scale with a vernier, reading to five minutes, which permits the rapid rough adjustment of the two. Accurate adjustment is accomplished by means of a sine bar feature in the opposite end of the work table.

One button of the sine bar is coincident with the axis of rotation of the table, so that its position is not changed when the angle of the table is varied. The other button is located five inches away and on a special support underneath the ledge of the table. Both buttons are protected from damage by the overhanging of the massive parts.

This fixture serves to handle pieces too large to be measured to best advantage by the sine bar fixture. It also saves a great deal of time by permitting a series of measurements to be made from one set-up—simply moving the tool from one surface to the other on one bench and adjusting the angle. The application of this tool to the measurement of difficult angles on a drill jig is shown in Figure 3.

Universal "V" Block

The Taft-Peirce Universal "V" block is built to facilitate the accurate clamping of certain kinds of work in a rotating workhead. The "V" block itself is a well-known tool. This one differs from the ordinary block in the design of the clamping fixtures, in that a hole is provided perpendicular to the base of the block, passing through the middle of the "V." By means of this hole it is a very simple matter accurately to center the block on any rotating work-head. An illustration of the block in use for the accurate boring of a hole through a stud is shown in Figure 4. The clamping screw holes go all the way through the block so that they may be used for both ends. In Figure 4 the block is held on the face plate by means of cap screws. A clamping groove which extends entirely around the block takes care of cases where it is impossible to use screws. The clamps themselves are designed to be used either side up so as to accommodate different diameters of work, and the slots in the clamps are so located that they can be removed without taking out the screws.

Plug Gages

The Taft-Peirce Manufacturing Company has developed a line of plug gages known as the Economy type. The basic idea of the Economy type is the separation of the gage proper from the handle with all plugs interchangeable so far as the handle is concerned. There are several types of Economy gages, namely: Double-end limit plug, in which the maximum plug is on one end and the minimum on the other of the same handle; single-end plug, in which there is only one plug on each handle; and single-end limit plug, in which a plug having two diameters is mounted on one end of a handle. In the first two types, the useful life of the plugs is double that for solid gages, because when one end is worn down, the plug can be reversed, and is then as good as new. Furthermore, the minimum end of the gage which receives practically all the wear can be replaced without changing the maximum plug, which means a new gage at a fraction of the usual cost.

The single-end gage is of special importance in many production jobs, on account of the fact that

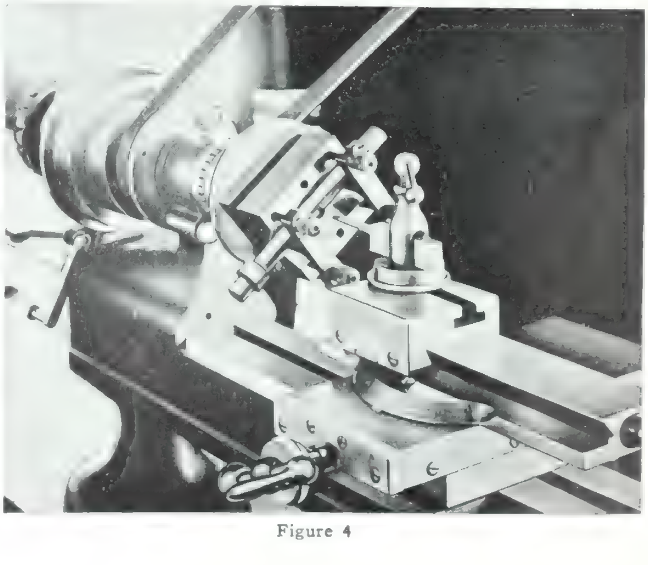


Figure 4

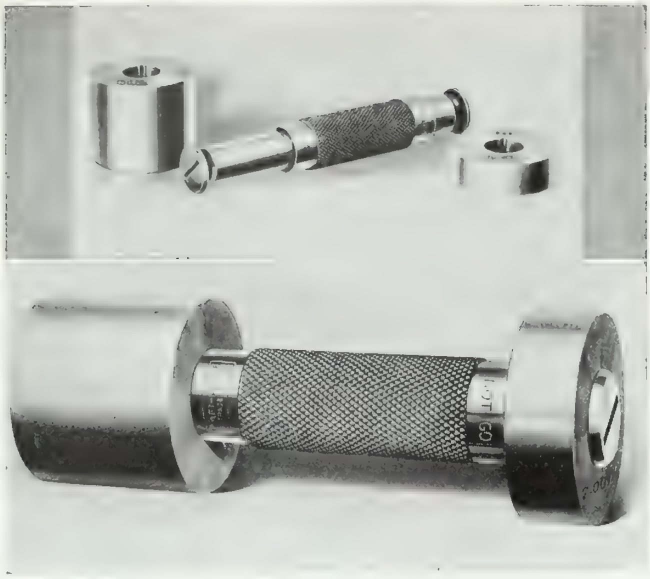


Figure 5

many operations are so constituted that this type of gage is easier to handle—specially is this true of grinding operations. In production grinding, the output can usually be considerably increased by providing the operator with a gage that is slightly smaller than the required minimum. In this way he can do the preliminary grinding at a higher speed without risk of spoiling the work.

In many cases the inspection work is expedited by using the single-end limit plug, since both maximum and minimum limits can be tested with the one insertion of the plug.

Snap Gages

The Taft-Peirce adjustable snap gage is an excellent example of the application to a measuring device of carefully worked-out scientific principles. The adjustable snap gage is no novelty, but heretofore gages of this type have had the disadvantage of imperfectly designed clamping mechanism. There are always possibilities of errors creeping in. With the Taft-Peirce adjustable gage the possibility of such errors has been eliminated by clever design.

Referring to Figure 6, the measuring studs (1) are made of one piece of metal threaded as shown. The hole which carries the clamping ring (2) is so located that one edge of the ring enters the wall of the threaded portion of the gage and comes into contact with the measuring stud. When the thread is cut in the gage, the ring is in place, so that threads are cut in the ring at the same time that they are cut in the wall in the gage. These threads can be seen in one of the illustrations. Tightening the clamping screw (3) draws the clamping ring into the threads of the measuring stud and thus prevents positively the turning of the measuring stud and yet does not exert appreciable force on the clamping ring. The forces here involved are frictional forces exerted locally on the threads and directed in such a way as to compensate one another. One-twelfth of a turn of the clamping screw is enough to release or clamp the measuring stud.

Each measuring stud is equipped with a similar clamping device, one inserted from each side. This gage can be sealed effectively because the measuring stud is all in one piece. The sealing of gages is desirable because it makes the inspector definitely responsible for the accuracy of the gage, once he has sealed and marked it.

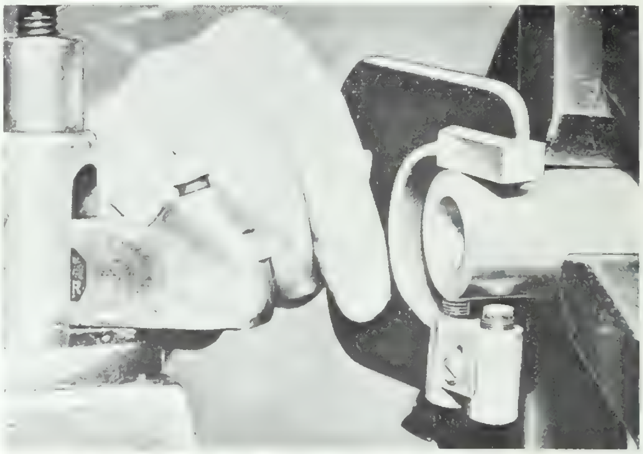
The construction of the clamping device in two parts—the screws (3) and the sleeve (2)—results in distinct advantages. First of all, the clamping member does not rotate against the measuring stud. Secondly, the pressure of the clamping screw is exerted at the head and uniformly over the whole top surface of the clamping ring, and not exerted eccentrically at one point, as would necessarily be the case if only one part were employed. No matter how rigid an accurate gaging device is made, the application of force will distort it. It was to avoid such force that the above described mechanism was invented, and it is proper to say that this is the only adjustable gage on the market today that can be set in such a way that disturbance of the setting cannot possibly be brought about by setting up the clamping device too hard.

External Thread Gages

Actual experience in the application of external thread gages in production work demonstrated that the rectangular type of gage was clumsy and slow to handle, and that a change to the round type of suitable diameter caused a notable increase in the output of the inspectors.

In order to keep down the diameter of the round gage, a single-unit type of adjustment was devised which incidentally gives better and more accurate results than any previous type of thread gage adjustment.

Figure 7 shows clearly the construction of the



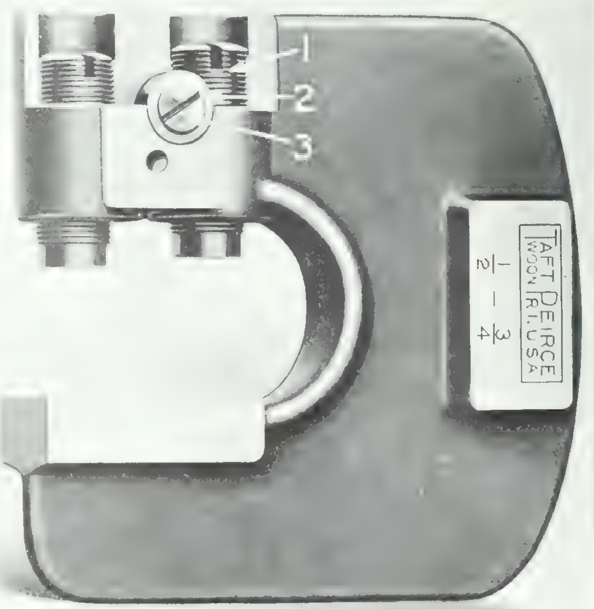


Figure 6

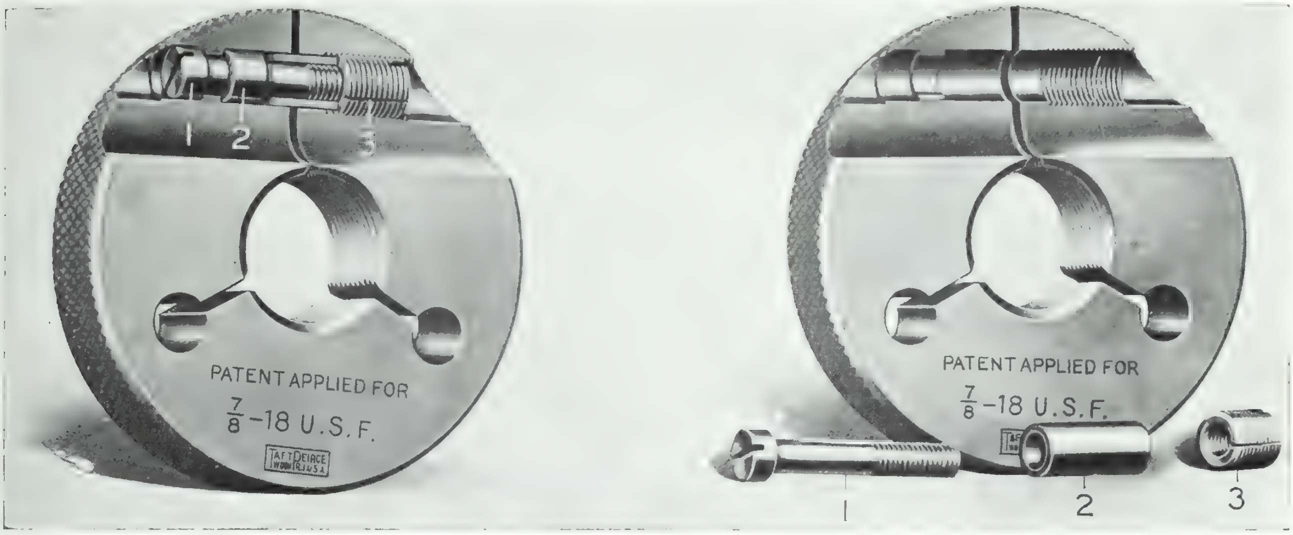


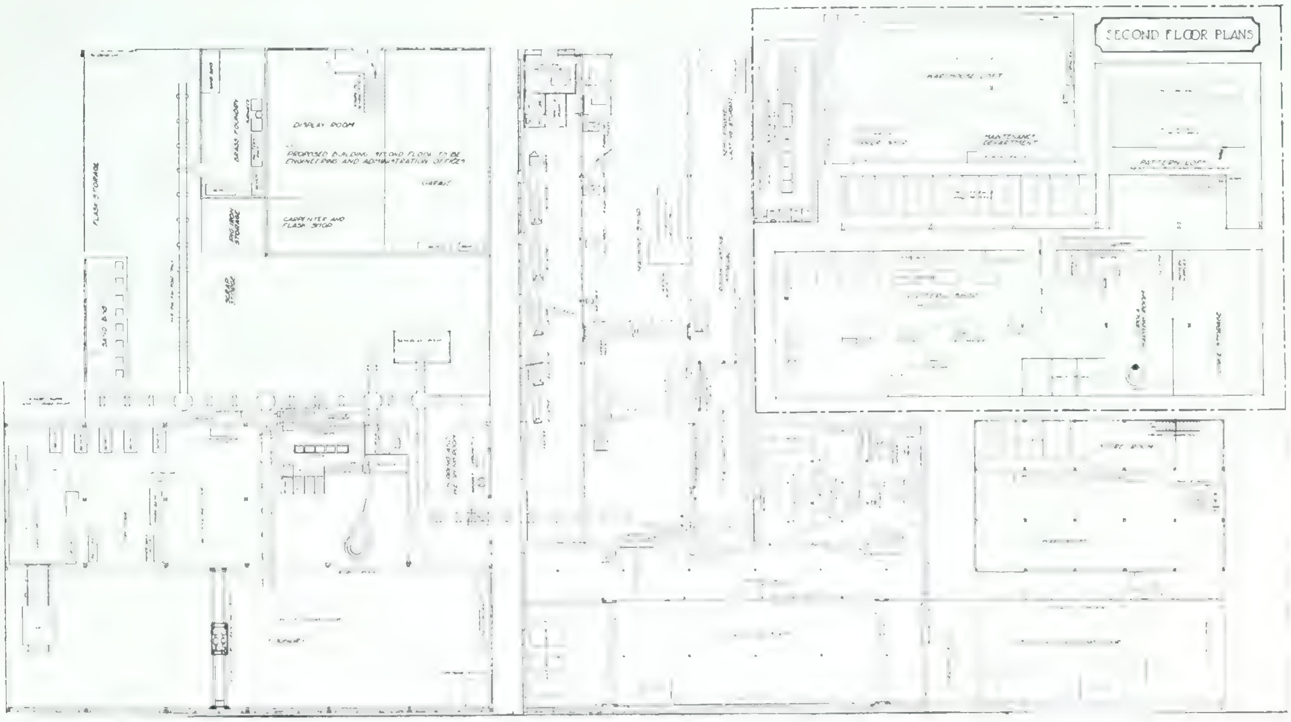
Figure 7

single-unit adjustment device. The sleeve (2) has been partially cut away so as to show the inside. The operation of the device is as follows:

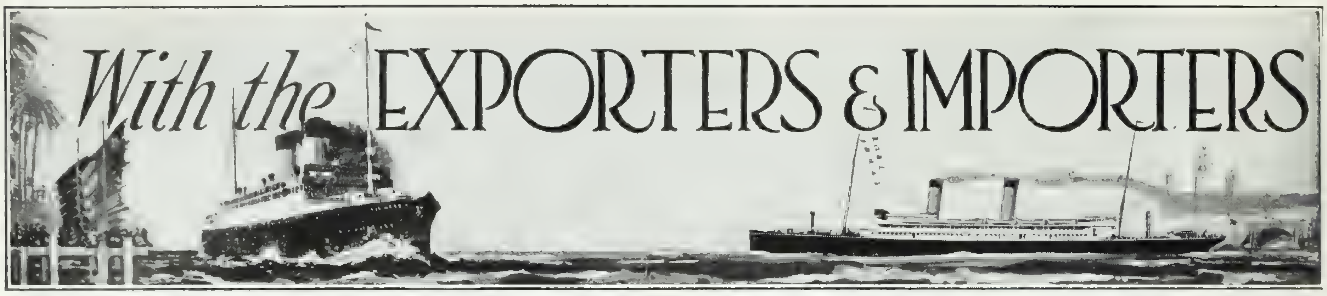
The adjusting nut (3) is threaded externally and internally and split longitudinally. Turning this nut to the right exerts pressure on the sleeve (2) against the shoulder in the left-hand side of the gage here shown, thus spreading the ring. Once the ring is in proper adjustment the clamping is done by tightening screw (1). The tightening of this screw exerts a pull between the shoulder immediately under its head and the internal threads of the nut, which causes the nut to expand into the threads in the wall of the gage without exerting any extra pressure on the sleeve. Therefore, the clamping is accomplished by expansion of the adjusting nut equally in all directions and not by the application of any eccentric forces that tend to distort the gage or upset the adjustment. The clamping pressure, it is seen, is taken up centrally in the clamping screw itself, as the reacting support is directly under the head of the clamping screw in the form of a shoulder in the gage. The sleeve serves as a dowel to regain the alignment of the gage.

A further advantage of the single-unit adjustment device is that it permits the making of smaller round gages than would otherwise be possible, so that the size of the gage can be chosen more nearly to correspond with the convenience of the operator than otherwise would be the case.

Wherever inspection devices are employed, it is important that the operation be so simplified that the inspectors can get accurate results without tedious adjustments. In fact, the easier the attainment of a high degree of accuracy is made, the less important will become the error represented by the human element.



Plans of the shop of C. F. Braun & Company at San Francisco. This shop is a model of compact, convenient arrangement



With the EXPORTERS & IMPORTERS

THE World Traders of Los Angeles have recently organized to encourage world trade by promoting friendly relations with, and the business interests of, various foreign countries, and to acquire and give to members available business information relative to the markets of the world.

At a meeting of the World Traders of Los Angeles on December 11, a very interesting program was arranged, and several prominent speakers gave the members information of great value in furthering overseas commerce from Los Angeles. The following is a list of some of the members and guests attending the meeting:

Officers

President—George B. Carpenter, Merchants National Bank.

Vice-President—G. W. Saurret, Llewellyn Iron Works.

Secretary—W. W. Wilmot, Pan Pacific Corporation.

Directors

R. R. Sweitzer, Western Machinery Company.
R. C. Meade, Western Wholesale Drug Company.
H. S. McKee, Merchants National Bank.
C. H. Matson, Board of Harbor Commissioners.
S. L. Kreider, Shipping and Insurance.
R. D. Kaufman, Judson Freight Forwarding Company.

Members and Guests

D. M. Mills, Kingsbury & Company.
E. G. Pollak, Kingsbury & Company.
William Dunkerley, Chamber of Commerce of Los Angeles.

Robert E. Tracey, Cooper, Coate & Casey.

E. L. McDonough, Los Angeles-Pacific Navigation Company.

A. Claude Braden, Braden Preserving Company.
E. P. Adney, E. Naumberg & Company.
C. E. Yenney, S. L Kreider.
Maurice Carasso, Union Trading Company.
James Loudon, Harrison Direct Line.
J. G. Bray, Pacific Marine Review.
R. S. Robinson, E. Naumburg & Company.
G. A. Smith, Universal Sales Company.
Paul W. Lownsbry, Braden Preserving Company.
W. Pratt, Llewellyn Iron Works.
B. H. Carmichael, Bishop & Bahler Company.
J. E. Freeney, C. E. Van Landingham Company.
O. W. Holmes, Latin-American Advertising Co.
H. H. Hallowell, Western Machinery Company.
F. B. Cramer, Bishop & Bahler Company.
W. D. Webb, Collins & Webb, Inc.
John Hisserich, Collins & Webb, Inc.
W. B. Marsh, Western Machinery Company.
W. J. McPherson, McCormick & McPherson.
James E. Helpling, Western Traffic Service.
J. H. Ramboz, Merchants National Bank.
Karl R. Levy, Attorney.
E. J. Armer, Cohn-Goldwater Company
C. E. Bobertz, Costa Rican Consul.

The World Traders of Los Angeles at dinner, December 11, 1919

FREIGHT REPORT

December 19, 1919.

SINCE our last circular of November 20, the wooden steamer Bellata, which we then reported chartered at $90,000, lump sum, for barley to the United Kingdom to Messrs. Westrope & Company, and which had a cancelling date for non-readiness which she failed to make, was consequently cancelled by them. The owners have since offered to accept $85,000, but owing to the deal going on in barley in San Francisco, enhancing the price, and also to the depression in the English market caused by the continued drop in exchange, we doubt whether this steamer could get over $60,000 or $65,000, lump sum.

Lumber freights continue steady, we might say even firm, due principally to the fact that most of the sail tonnage for the next three months is chartered. J. J. Moore & Company, Inc., chartered the Mindoro from the North to Melbourne at $42.50, also the steamer Circinus at the same rate from Columbia River to Melbourne and Adelaide. The Koosawin was taken at $40, lumber to Australia, by the same company.

The motorboat Sierra was taken by Mohns Commercial Company from the North to Callao at $35.

Comyn's barkentine Rosamond was chartered, for owner's account, from the North to Africa, also one other of Comyn's barkentines was taken, owner's account, from the North to Sydney-Melbourne.

Hind, Rolph & Company have taken the motorboat Admiral Mayo, lumber to Sydney, at $37.50, option Melbourne $42.50. They have also taken the schooner Snow & Burgess at $45, lumber to Melbourne.

The Cameron Lumber Company chartered the Norwegian schooner Blaatind from British Columbia to Cape Town and Durban at $56.

Wolff - Kirchmann & Company chartered the schooner Defender for lumber to Suva at $32.50.

The steamers Robin Hood and Robin Adair, both owned by the Skinner & Eddy Corporation, took parcel lots, $30 lumber, etc., from the North to South America.

The Columbia was taken for lumber to Valparaiso by Balfour, Guthrie & Company at $35.

For lumber to China the Robert Dollar Company chartered the Jane L. Stanford from Vancouver. The same company chartered a United States Shipping Board steamer to Taku Bar at $35.

The steamer Centaurus was placed on the berth by Comyn, Mackall & Company from Portland and San Francisco to the West Coast, $32 lumber, and $12 to $15 general merchandise.

The motorboat Balcatta was taken for coal from Newcastle to Callao at 97s. 6d., also 400 tons of coke at 160s.

In copra to San Francisco the following charters were made: Burns-Philip & Company took the barkentine Kohala at $19, schooner Forest Home at $18, schooners Edward R. West and Meteor, both at $17. Wolff-Kirchmann & Company chartered the Defender at $16.50.

Messrs. Wightman & Crane chartered the Ottilie Fjord to Samoa and return for a lump sum of $15,000.

G. W. McNear & Company chartered the British barkentines Manurewa and Raupo, both on private terms, for case oil, hence New Zealand.

The motorboat Malahat was taken by the Bank Line Transport & Trading Company for nitrate to the Hawaiian Islands or the North, at a rate of $20. The schooner Oakland was also taken by the same company, at the same rate, to Honolulu.

In the way of sales, we have the following to report: Steamer Nippo Maru, on private terms, to Valparaiso buyers; the steamer Sierra was bought by the Green Star Line for $850,000; the Scott Ship Agency Company bought the Planter at the reported rate of $50,000; The Lucy was sold to New Zealand buyers for $22,500; Walter Scammel purchased the Mindoro at a price of $65,000; the hull Koosawin and steamer Mayfair were purchased by the Charles Nelson Company at the reported rates of $40,000 and $90,000 respectively; Levy & Company purchased the schooner Allen A on private terms.

A great deal of interest is evinced in this market in the five United States Shipping Board steel clippers, formerly owned by Germans, which are now for sale. Different firms are now making firm offers for them.

The Shipping Board has indicated that the would-be buyers must bid at least $55 a ton on the deadweight, they to assume any charters already made in advance on said ships.

PAGE BROTHERS, Brokers.

EXPORTING MOTOR TRUCKS

THE Reliance Truck & Trailer Company, with a factory in San Francisco, are to be congratulated upon the fine overseas business which they have begun recently to enjoy in the Dutch East Indies for their high-grade steel truck trailers. On November 22, the Dutch Steamship Arakan sailed to Bandoeng in Java with a shipment of seven Reliance trailers. Four of these trailers were of the two-ton type and three of the three-ton type with roller bearings, of cast steel wheels and solid tires, friction drum brakes, spring draw-bar and other modern equipment. The Reliance trailer is particularly well suited for the severe service in East India.

During the last four months, twenty-five Reliance trailers have been shipped to Java and the manufacturers are certain that this is the commencement for a tremendous business with the East Indies for freight-handling equipment.

TRADE ADVISORS OF OTHER NATIONS COMING TO SAN FRANCISCO

AMERICA'S first world conference of American Foreign Traders," with special trade advisors from the Far East, Australasia, and South America, appointed by the various foreign governments, will be one of the important features of the Seventh National Trade Convention to be held at San Francisco, May 12-15, 1920, according to the preliminary plans of the convention just announced at the annual meeting of the National Foreign Trade Council.

"The bringing of special trade representatives from the foreign nations to San Francisco so that they may be consulted by American business men, is something that should appeal to every manufacturer, merchant and trade organization of the country," says Secretary O. K. Davis, in commenting on this feature of the program. "For the purpose of meeting these foreign trade advisors as well as the large number of Americans now doing business in foreign countries, who have been invited to attend, the council is taking steps to have the San Francisco convention one of the largest ever held in this country.

"Chairman Frederick J. Koster, of the Pacific Coast Committee, announces that elaborate preparations for the convention are being made on the Pacific Coast. The Seattle, Portland, San Francisco and Los Angeles chambers of commerce are co-operating in plans to make the journey to the Pacific Coast attractive for those who attend the convention. Seattle is arranging an exhibition of products of the Far East, San Francisco an exhibition of Pacific Coast products, and Los Angeles an exhibition of the products of South America and Australasia.

J. J. Wilson, Purchasing Agent, Southwestern Shipbuilding Company East San Pedro

"Arrangements have been completed for two special steamers from the Far East and one from Valparaiso up to the west coast of South America to bring the delegates to the convention. A special steamer will be provided to take delegates from the East through the Panama Canal to San Francisco. This ship will sail from New York about April 20.

"The convention program will consider chiefly the effect upon American foreign trade of the fact that the United States has become a creditor nation during the war.

NEW LINES FOR HERBERTS MACHINERY & SUPPLY COMPANY

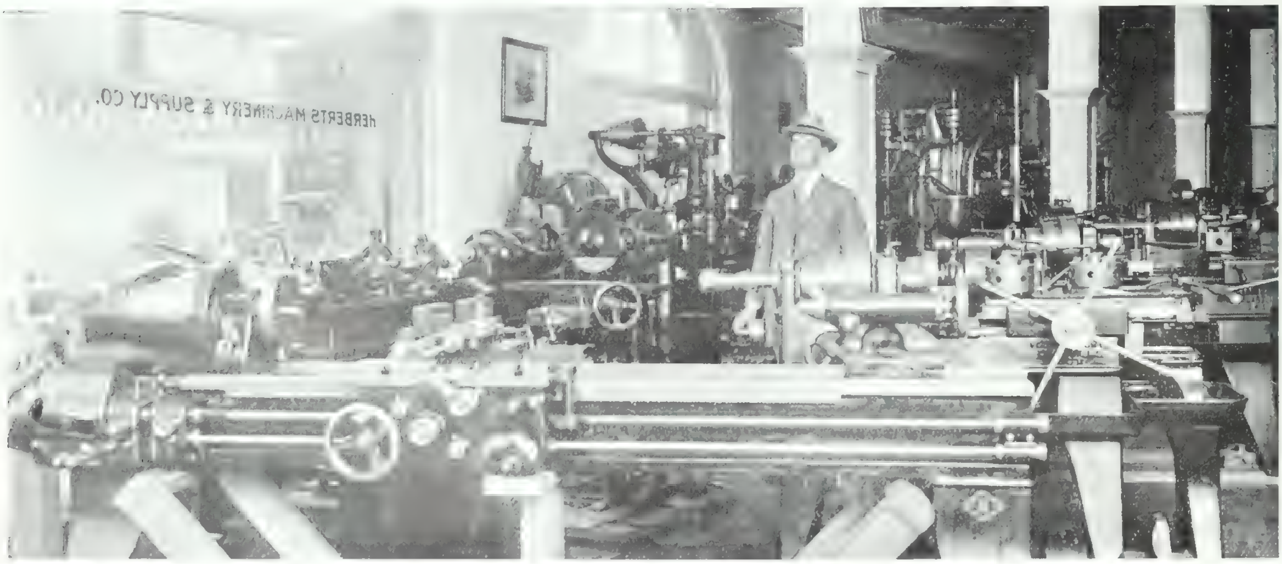
K. L. SWENSON, secretary of the Rockford Lathe & Drill Company, recently visited the Pacific Coast, and C. A. Herberts, president of the Herberts Machinery & Supply Company, with sales offices in Los Angeles and San Francisco, did everything to make Mr. Swenson's visit enjoyable. An airplane voyage to Catalina Island was one of the entertainments provided.

This is Mr. Swenson's first trip to the Pacific Coast and he was very much surprised to see the extensive manufacturing industries which have developed here.

The Rockford Lathe & Drill Company, at one time, considered the sale of a few machines a year on the Pacific Coast as very good business, but the sale of the Rockford lathes has been greatly stimulated through the efforts of their representatives, the Herberts Machinery & Supply Company.

The Wilmarth & Morman Company are well known for the high grade precision grinding machinery that they manufacture; also the well-known new Yankee drill grinders. A stock of drill grinders, surface grinders and tool and cutter grinders, all manufactured by Wilmarth & Morman Company, are carried in stock at the Los Angeles and San Francisco stores of the Herberts Machinery & Supply Company.

Herberts Machinery & Supply Company has taken over the exclusive selling rights for the entire State of California of the Wilmarth & Morman Company of Grand Rapids, Michigan.



The Los Angeles showrooms of the Herberts Machinery & Supply Company, showing C. A. Herberts, president of the company, and part of their stock of Rockford lathes

Pacific Port Notes

During the month the most outstanding feature of maritime life on the Pacific Coast has been exceedingly bad weather. Great gales have swept up and down the coast, causing much delay to shipping and many marine casualties. The small craft engaged in the fishing business on the coast routes have suffered most severely, especially in the open roadsteads like the Bay of Monterey.

The most disastrous wreck is that of the Associated Oil Company's tanker, the Chanslor, which ran on a reef off Cape Blanco and broke in two almost immediately, with the loss of thirty-seven of the crew.

Another wreck of general interest was that of the Girlie Mahoney, a steam schooner belonging to Andy Mahoney, San Francisco, which went ashore about 100 miles northwest of San Francisco on the Mendocino coast. The vessel was a complete wreck, though all the crew were saved.

The united Pacific Coast delegation at Washington has been doing some very good work during the month, and with the assistance of Dr. Paul Reinsch, they have presented the matter of the need of ships for Pacific-Oriental service in such a way that the Shipping Board has been very much impressed and has definitely promised that the Pacific Coast shall have more ships allotted to its use as soon as possible.

Another matter in which the entire coast is interested and which has been consummated during the past month is the reorganization of the Pacific Steamship Company. In order to finance its new Oriental service and take care of extensions of the coast service, the company has been contemplating the issue of $25,000,000 in bonds. In the meantime Stanley Dollar of the Robert Dollar Company had acquired a considerable interest in the stock of the Pacific Steamship Company through the purchase of the holdings of some of the stockholders who wished to retire, and at a recent meeting of the directors, Stanley Dollar was elected vice-president of the Pacific Steamship Company and Melville Dollar of Vancouver, B. C., was elected to the treasurership.

While it is alleged that this is simply an investment of some of their surplus funds by the Dollar Company, nevertheless shipping men all up and down the coast are busily engaged in conjecture as to what effect this change will have on the future plans of the Pacific Steamship Company, especially in relation to their Oriental service.

Although strikes are still technically in force on several waterfronts, and in many yards, the labor troubles in general seem to have taken a trend toward satisfactory settlement, and the Pacific Coast as a whole is entering upon the year 1920 with every prospect that this year will be the most prosperous foreign trade and general shipping and shipbuilding year in its history.

Victoria

A delegation of shipbuilders and representatives of the city, returned service men and organized labor left on December 12 for Ottawa to obtain from the government contracts for building steel or wooden ships, or government backing for any shipbuilding done at Victoria in the future. Through the completion of wartime contracts, there are between four and five thousand men out of work in Victoria and shipbuilding seems to be the only solution of the unemployment problem.

The big ship outfitting plant operated by the Foundation Company at Victoria for the completion of twenty wooden steamers for the French government was shut down at the end of November. The last of the twenty ships ran her trials successfully during the first week in December. Superintendent George Wayland, in charge of the outfitting plant, stated that every one of the twenty trials had been carried out without a hitch and the vessels had all made good, with a knot or so above the required speed average.

The last of the three wooden schooners built at the Cholberg Shipyard at Victoria got away for her loading port, Everett, the same day that the last Foundation steamer was out on her trials. She took on poles for South America.

The schooner Gunn, first of the vessels to be completed by the Cholberg yard, reached Greenock, Scotland, safely during the second week in December. She is owned by the Porsgrund Damp & Seil Company, Norway, and loaded lumber at the Hastings Mills, Vancouver, B. C.

Captain J. W. Troup, manager of the British Columbia Coast Steamship Company, is now in England investigating costs with a view to having further vessels built for the C. P. R. service. Victoria yards have already tendered on a new steamer and a steel car barge. Mr. H. W. Brodie, general passenger agent of the C. P. R., stated recently at Victoria that the C. P. R. might build another Princess Sophia to replace in the Alaskan trade the ill-fated steamer that sank in 1918 with the loss of over 300 lives.

A statement by Mr. Brodie showed that his company was well aware of the trend of events and determined to be in the van of progress. "Transportation companies are chary," he said, "of doing much in the way of new building because it is generally believed that within the next few years the seaplane will replace the present method of travel. The C. P. R. obtained a charter for the erection and operation of aeroplanes and seaplanes about seven months ago, and it is quite within the realms of possibility that five years hence we may be running them across the Straits."

The Canadian government has provided a course in navigation which returned soldiers may take at the country's expense under the soldiers' civil reestablishment system. The course lasts from six to eight months. Captain H. G. Jarvis, well known as a compass adjuster, marine surveyor and navigation instructor, is in charge of this course at Victoria.

Captain J. M. Hewison, master of the Pacific Salvage Company's salvage boat Algerine at Victoria, returned from a four months' trip to the old country during December. He visited his old home on Scapa Flow, the great British naval base in the Orkney Islands. When he left there nine years ago, a small town and a wild coastline were all that could be seen. Going back on his last trip he found

Scapa Flow the home of the Grand Fleet, and saw the sunken German war vessels there. Captain Hewison says that outside of the new flexible canvas pontoon and the electric submersible pump, the old country salvors could show him nothing that the Pacific Salvage Company did not have. He saw nothing that was finer than the Algerine, which is an old sloop-of-war rebuilt for her new work.

The unusually intense cold encountered at Victoria during December caused vessels to enter the harbor coated with ice, a sight seldom seen in the Vancouver Island port.

The Victoria branch of the Canadian Merchant Service Guild recently passed a resolution requesting the Canadian government to operate a line of steamships from British Columbia to California as the Pacific Coast Steamship Line was not giving adequate service. The Vancouver branch of the Guild followed this up by passing a resolution along the same lines.

Vancouver, B. C.

THE Vancouver Harbor Commissioners have, during the last month, been negotiating with C. C. Ballantyne, Minister of Marine, for extensive harbor development in connection with the new Dominion government lines which are to ply on the Pacific. The first unit of this line will be established between Vancouver and Sydney with four freighters of 9000 deadweight tons each. The first boat on this route was to leave Vancouver on Christmas day.

The new piers to be constructed will be of the most modern character; they will be fitted with up-to-date general cargo handling machinery and extensive elevator facilities for the handling of bulk grain. The construction work is to be started with an initial appropriation of $5,000,000.

Vancouver and Victoria shipping men have united in a petition to the Dominion government asking that a line of steamers also be established between Vancouver and San Francisco. Since the discontinuance of the Victoria and Vancouver service by the Pacific Steamship Company, there has been a very considerable demand for direct connection with the metropolis of California.

Sailors on the Canadian coast steamers have had their wages advanced and their working hours reduced. The new wage will be $75 a month for a forty-eight hour week. The Canadian Pacific liners are all running with full passenger lists and very valuable cargoes. The Empress of Japan arrived on December 9 with 130 cabin passengers, 350 steerage and over $2,000,000 worth of silk.

Considerable adverse criticism has been heard among shipping men on the regulations of the local revenue department. The principal objection to the present arrangement is that officers of the revenue department receive 50 per cent of the penalties imposed where declarations are made erroneously and shipping men maintain that in the interest of fair dealing the entire amount should go into the Federal treasury.

There has also been a very decided formal protest made by returned soldiers against the suggestion from the Department of Fisheries at Ottawa that all cannery, purse seine, and trap licenses for catching fish in British Columbia waters be thrown open to everybody. The cannery men are joining the returned soldiers in this protest because they feel that if this step were taken, the Japanese would in a very short time control all British Columbia fisheries.

Seattle

DURING the year 1919, up to December 31, Seattle shipyards, steel and wood, had delivered eighty-one ocean-going carriers of an aggregate deadweight tonnage of 600,400. This is said to be about 11 per cent of all the ocean tonnage built and delivered to the Shipping Board during the year.

All the steel shipbuilding yards are very busy and there have been a considerable number of launchings. On December 20 three big steel steamships were launched in half an hour. The Skinner & Eddy Corporation launched the Robin Gray, a 10,400-tonner, and the third of the four freighters that this company is building for its own account. J. F. Duthie & Company launched the 8800-tonner West Ivan, and Ames Shipbuilding & Dry Dock Company launched the West Jessup, both ships for the United States Shipping Board.

Seattle Port Commission and the Chamber of Commerce have sent C. J. France, executive secretary of the Port Commission, and Gordon C. Corbaley, secretary of the chamber, to join the Pacific Coast delegation to urge the allocation of trans-Pacific routes of freighters and big passenger liners. France will also attend the National River & Harbor Congress at Washington and later proceed to New York to gather data and statistics for Seattle's Port Commission. The Port Commission has let the contract for the construction of its big pier B transit shed at Smith Cove, and has awarded to the Seattle Boiler Works a contract for construction of four 50,000-gallon oil tanks.

During the last four years the export of lumber from Washington ports has gradually decreased, but according to advices received by the Department of Commerce, there is every reason to believe that the greatest demand of former years will be largely exceeded in 1920.

The construction of homes under the repatriation plan recently adopted by Australia and New Zealand will require an immense amount of soft wood which the Australian forests are unable to supply, and it is confidently expected that in the near future there will be a great number of lumber schooners engaged in the trade between Puget Sound and Australia. It is estimated that 25,000 houses must be built in the three Eastern states of Australia to relieve the present congestion due to the lack of housing.

During the first five days of December, silk shipments aggregating $15,000,000 in value were discharged at Seattle.

The National Trading Company of Seattle has purchased 178 standard water-tube steamship boilers from the United States Shipping Board. This deal involved the payment of more than $500,000 in cash, and is the largest of its kind ever closed on the Pacific Coast. The boilers were those intended for the Ferris type wooden steamships, and were all complete, ready for installation. It is understood that eighty-nine of these boilers will be shipped to the Orient, and the balance disposed of to different interests on the coast.

Schooners from the fishing banks off the west coast of Vancouver Island have been reporting terrific storms, and, in consequence, the catch of halibut and cod has been rather light and the price of fish exceedingly high.

On December 10 the schooner Republic, Captain John Iverson, arrived with her house and rigging sheathed in a mass of ice, having been beset by terrific gales while homeward bound. The Republic had a very large catch for this year, consisting of 85,000 pounds of halibut.

There has been a readjustment of handling charges for freight on the Seattle waterfront effected by an agreement entered into between the Port Commission, the steamship companies, private pier operators, and the United States Railroad Administration. This agreement fixed a rate of 65 cents a ton to be enforced for a period of ninety days, following November 10.

Tacoma

MR. H. F. ALEXANDER, president of the Pacific Steamship Company, has issued an announcement refuting the rumors current for some time that the headquarters of this big company would be transferred from Tacoma to some other Pacific Coast point.

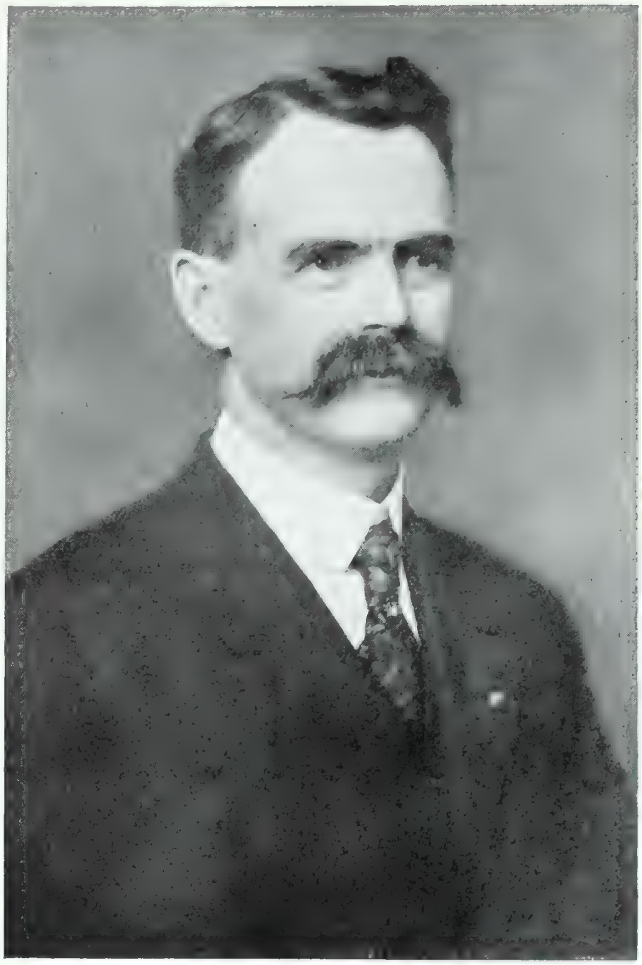
During the month of November, 115 deep-sea vessels arrived at the port of Tacoma with a tonnage of 127,434. There were also eleven foreign tugs of 376 gross tons and sixteen barges of 5748 tons. The deep-sea departures included 121 vessels of 134,787 gross tons, sixteen barges of 5574 gross tons, and eleven tugs.

Mr. James H. Davis, president of the Tacoma Chamber of Commerce, represented Tacoma at Washington, together with other representatives of the Pacific Coast ports, in presenting the claims of these ports to the Shipping Board. Mr. Davis reports that Tacoma stands an excellent chance of getting its share of the ships allocated to the Pacific Coast by the Shipping Board.

On December 10 the local yards of the Todd Shipbuilding & Dry Dock Company reopened. Some 300 men had been working at the yard from Saturday, the 6th, getting things ready for the resumption of work on the ships, and about 400 men went to work on the morning of the 10th, making a total of 700. Additional men have been hired each morning since, and now the yard is running a full crew. The men are going back to work on the same scale as prevailed before they went on strike, October 1, and the yard is to be run on an open-shop basis.

Babare Brothers, Tacoma shipbuilders, have just closed a deal for the purchase of a site on the Hylebos waterway. The new site embraces about two and a half acres and was purchased for a price said to be around $8000 an acre. A modern shipbuilding plant will be erected there. The old plant will be used for repair purposes.

Heavy shipments of flour have been leaving Tacoma during the last month. Three to four ships of from 8000 to 9000 tons' capacity each are being loaded weekly.



Captain R. E. Peasley

Grays Harbor

CAPTAIN R. E. PEASLEY, of Saturday Evening Post fame as Matt Peasley, the hero of Peter B. Kyne's popular sea stories, is to command the new five-masted schooner Vigilant, built at the G. Frazier Matthews shipyards in Hoquiam. For almost two score years Captain Peasley has followed the sea, and during this time has never had a serious accident. In 1890, when a boy fourteen years of age, he signed for the first time, going as a sailor on the Nettie B. Dobbin, a small vessel then operating off the coast of Maine. Since that time he has traveled the seven seas on vessels of every kind and description. For the last four and a half years he has been master of the schooner Fred J. Wood, operated in the foreign lumber trade by the E. K. Wood Company. Captain Peasley is succeeded on the Fred J. Wood by Captain Harry Ashbury of San Francisco.

The Vigilant, which will be ready for service about February 1, is the latest addition to the E. K. Wood fleet. She is the largest lumber schooner ever built on Grays Harbor, and, in fact, is one of the largest on the Pacific Coast, having a carrying capacity of 1,700,000 feet. From stem to stern, the Vigilant is declared to be a model of workmanship, staunch and strong in every detail. The best fittings obtainable have been used. The vessel has 25 per cent heavier irons than the ordinary lumber schooner, and 25 per cent more than the usual amount of tree nails have been used.

Built entirely of native wood, the schooner is a Grays Harbor product in every sense. No pains have been spared to provide for the comfort of both officers and crew. The master's cabin is 14 feet square and will be as home-like in appearance and design as it is possible to make it. The crew's quarters are as modern as any first-class hotel. There will be two men to a room, and the lighting and heating facilities, air space and other features are far better than are ordinarily found on a lumber carrier. The men have a fine, large mess hall. Lockers have been provided, and shower baths and other modern conveniences are installed. These are all under the same roof as the quarters, so that the effect of bad weather will be felt as little as possible.

The launching in December of two 700-ton barges by the Grays Harbor Motorship Corporation yard in Aberdeen may be the forerunner of considerable business of this kind for the Harbor yard. These scows are the largest ever built in Southwestern Washington, and measure 100 feet in length, 36 feet in width, and 10 feet in depth. The cost of each scow is estimated at $15,000. They have been built for service in Puget Sound waters, but will be used temporarily on Grays Harbor. The lumber used in their construction was purchased from the Emergency Fleet Corporation and is well adapted for the purpose. The two barges will be known as Forest No. 1 and Forest No. 2, respectively.

Cargo lumber shipments for November from Grays Harbor and Willapa Harbor totaled 24,806,000 feet. These were carried in twenty-four bottoms, of which all but three sailed from Grays Harbor. Of the vessels clearing Grays Harbor, sixteen went coastwise with 15,580,000 feet of lumber, while five went abroad with 5,446,000 feet of lumber.

Preliminary steps have been taken by the Grays Harbor Port Commission toward a comprehensive program of harbor improvement, including the purchase or construction of a 20-inch suction dredge for use in the inner harbor, the dredging of the channel all the way from the bar to Cosmopolis, and the building of terminal wharfage. For the carrying out of this program the port commissioners have adopted a resolution calling for $1,000,000 bond issue, and a special bond election was set for January 10. This date, however, had to be cancelled because of conflict with the state registration laws, but the election will be held early in the new year. It is the present plan of the commission to continue dredging of the inner channel to afford fully 400 feet in width and a 30-foot depth at low tide. The terminal wharfage facilities will be constructed on what is known as Cow Point, a tract of land midway between Hoquiam and Aberdeen. The docks will be equipped for handling both import cargoes and general export business, with particular attention given to an assembling dock for lumber.

Astoria

DURING the latter part of November and the first of December, much trouble was experienced with ice in the lower Columbia River, there having been quite a number of days during which the thermometer dropped well below zero. The coast guard cutter Algonquin had a busy time breaking up the ice to release steamers and steam schooners which were imprisoned at various points along the river.

Notwithstanding the fuel embargo, the local coaling wharf has been kept busy filling the bunkers of outgoing steamers.

At the Standard Oil dock, on the evening of November 29, the steamer Nishamaha collided with the Reuce, a cannery ship that was moored at the Kinney Cannery wharf. The stern of the Reuce was crushed and a portion of the wharf and warehouse badly damaged. A survey made for the underwriters and the insurance companies shows that the damage will amount to in the neighborhood of several thousand dollars.

Construction work is progressing satisfactorily on pier 3 of the municipal unit on Astoria's waterfront, and the suction dredge Latona is making good headway on the Youngs River channel. The sea wall is being rapidly pushed to completion and Astoria is using every energy to make her port complete in every way for the rapid turn over of ships' cargoes.

While there is no definite end in sight to the negotiations, the Chamber of Commerce and the port authorities are very optimistic in their belief that Astoria will be chosen as the site for the naval base which the United States government proposes to establish on the Oregon coast.

Portland

FOR the first time in many years, cold weather, snow and ice compelled the virtual closing down of all navigation on the Willamette River, and a cessation of practically all activities on the Portland waterfront and in the local shipyards and shops. For several days in the first week of December, the Wilamette River was completely frozen over and in the break-up of this ice much of the channel in the lower Columbia was so blocked with ice as seriously to delay all outbound and inbound traffic.

The prospects for great increase in lumber business were never better. During the six weeks ended December 14, lumber orders totalling over 75,000,000 board feet were placed in the Pacific Northwest and some 30,000,000 feet additional in British Columbia. Portland and the Columbia River district will certainly get its share of this business, especially as the situation in regard to the scarcity of bottoms for overseas shipment is getting very much better.

San Francisco ship operators are now negotiating for the purchase of the six-masted schooners, Cossa and Cotys, now being constructed by the Peninsula Shipbuilding Company, Portland. The hull of the steamer Abercos, eighth of the government contract ships under construction at the Standifer yards in Vancouver, was launched on December 8. On December 12 the Northwest Shipbuilding Company's plant launched the last hull of its present shipbuilding program for the United States Shipping Board. It is expected that this will be completed by the first of the year and that the big plant will then close down and its organization be disbanded. The steamer Diana was refloated from the Port of Portland dry dock on December 3 and proceeded to the Columbia Dock No. 1 for outfitting. The Diana is the last of the Supple & Ballin United States Shipping Board contract ships. She is now loading ties for the United Kingdom.

The Green Star liner Centaurus took 1,000,000 feet of lumber and 100,000 feet of box shooks from Portland for Chilean ports, stopping en route at San Francisco for a consignment of general freight. The Green Star line has purchased the steamer Circenus, a Portland-built freighter, now under charter to J. J. Moore & Company, San Francisco. This steamer is now loading a cargo of lumber for Australia and will take in the neighborhood of 4,500,000 feet. This will be the first large lumber cargo from the Pacific Northwest to the Antipodes since the beginning of the European war.

Captain J. Howard Payne, superintendent of the Shipping Board sea service work in the Northwest, visited Portland December 6 to inspect the Portland nautical school and sea-service training bureau.

The tanker sailing vessel Falls of Clyde brought 2500 tons of crude molasses imported from Honolulu by Parrott & Company, which will be distributed here as stock feed. This is the first bulk cargo of molasses to be brought direct into Portland.

A company is being organized in Portland to buy and equip one of the Shipping Board hulls lying in the harbor as the first unit of a Portland-owned fleet. A total of $175,000 has already been subscribed by Portland business men.

San Francisco

DURING the eleven months ending December 1, the gross revenue from dock charges at San Francisco docks was $1,731,154.45. The tonnage handled over the wharves amounted to 7,533,616 tons. These figures show an increase of $25,389.51 over the same period for 1918. The Board of Harbor Commissioners reports that the cost of operation and repairs since January 1, 1919, has increased very largely, the cost in labor alone, in handling this amount of freight, being $200,000 greater, and materials having advanced over 100 per cent in comparison with the figures of 1918.

Captain I. N. Hibberd, general supervisor of the sea-training service of the United States Shipping Board, is home in San Francisco for the holidays and expects to remain until January 6. He brings with him the assurance that most of the sailing fleet of the United States Shipping Board will be retained for training service, and that these ships have been withdrawn from the market. The Shipping Board has now on the Pacific Coast the training ship Iris with 250 apprentices on board, and the wooden steamer Brookdale with 200 apprentices. It is proposed to fit out the two ships Monongahela and Moshula, square riggers, with quarters for 150 apprentices each and use them as regular training ships.

The Kerr Steamship Company of New York has opened local offices in the Merchants Exchange Building. Mr. B. M. Smith, formerly established with F. S. Booth and H E. Jarman in railroad agency work, who is well known in San Francisco, is taking charge of this new steamship office.

The Kerr Steamship Company operates a large fleet of sail steamers from New York, Philadelphia, Baltimore and New Orleans to European and South American ports. Although this is one of the youngest of our large steamship companies, it is now one of the largest privately owned fleets flying the American flag. During the month of November they operated eighty-three steamers. San Francisco foreign traders will be glad to welcome the facilities of this line to the port.

Christmas morning brought a record passage of steam vessels through the Golden Gate inbound. For three days the entrance to the harbor had been practically blocked by one of the densest fogs in the history of the coast, and as a consequence, when Christmas morning showed rather clear, some twenty-three steamers lined in through the Gate inside of three hours. Among these, all San Franciscans were glad to see and welcome the Matson liner Matsonia, that will now take her regular place in the Honolulu run, after a war service of over two years.

On December 20 there was staged at the yard of the Moore Shipbuilding Corporation, on San Francisco Bay, what was probably the world's record for ship launching. On that day six freighters and tankers, averaging nearly 10,000 deadweight tons each, were launched in less than fifty minutes. The details of this launching and pictures are shown elsewhere in this issue of Pacific Marine Review.

The Japanese-built steamer Eastern Breeze sailed during the month for New York, under the operation of McCormick & McPherson. It is rather amusing that on her arrival here it was discovered by local inspectors that the bunks installed had been built to Japanese specifications and were too short for the ordinary American seaman.

The Japanese cruiser Yakumo, with forty-eight naval engineer cadets aboard, arrived in San Francisco about the middle of December and will stay over the holidays.

The Danish and Scandinavian motorships of the East Asiatic and Johnson lines continue to arrive regularly, among the more prominent coming in during December being the Siam and the George Washington.

It has been definitely decided by the Navy Department that a naval base will be established on San Francisco Bay, and an appropriation of $51,000,000 has been recommended for this purpose. The choice of site lies between Hunters Point and Alameda. The report of the investigation committee sent out by the Navy Department favored the Alameda site, but recommends a further survey of the available foundation there before making final decision. Hunters Point is considered to be ideal with the one exception of lack of available acreage of level ground for shops and other facilities. Alameda presents a very serious problem as to foundation and the question between the two sites is an open one for competent civil engineers to decide. Whichever way it is decided, San Francisco Bay will be immensely benefited and the trade of the port greatly increased by the enlarged naval establishment.

During the month there has been considerable progress made along the waterfront in the settlement of the labor difficulties. The more conservative of the members of the Stevedores and Riggers Union have combined with other workers in forming a Stevedores and Riggers Association. This new association has signed up with the employers a five-year contract which includes an arrangement for adjustment of wages up or down every year, according to conditions.

During this month the shipyards have all resumed work on practically an open-shop basis, notifying the men to sign up on the same conditions under which they struck on the first of October. While none of the yards are at the present writing working to full capacity, there has been a steady growth in the volume of applications at the employment department.

Many rumors are in the air of contracts closed by local shipbuilding yards for the construction of vessels on private account, although it is stated that much of this work is dependent for its allocation on the attitude of labor. (For details of these contracts, see article in this issue entitled "A Birdseye View of American Shipbuilding.")

Since the State Harbor Board has freed vessels engaged in foreign trade from certain port charges, a separate account has been kept of export and import tonnage. This tonnage, exclusive of that passing over the Army and Navy transport docks and all privately owned wharves, is as follows:

April, tons	213,750
May, tons	218,944
June, tons	209,223
July, tons	240,159
August, tons	261,330
September, tons	187,075
October, tons	265,105

With the exception of June and September, this report shows a steady increase in exports and imports. The decrease in September was probably due to strike conditions on the waterfront. When it is considered that in practically all Pacific Coast ports there has been a falling off in total tonnage for the year of between 15 and 20 per cent, this increase in San Francisco's foreign trade is very notable.

Friends of Captain Charles F. Saunders, for many years port captain of the Matson Navigation Company's line, will be glad to hear that he has been promoted to the position of operating manager for the Matson Navigation Company. Captain Frances Edwards has been named general superintendent, which position includes many of the duties formerly falling to the port captain.

The Matson Navigation Company has definitely announced that it will build a very palatial 24-knot speed liner for the Honolulu trade, which will be equipped exclusively for 750 first cabin passengers.

In connection with the proposed naval base on San Francisco Bay, the Secretary of the Navy has recommended that the Golden Gate channels be deepened and widened, and certainly every interest connected with shipping in and out of San Francisco Bay will be glad to see this accomplished—not because there is insufficient water at the harbor entrance for the passage of large ships, but because anything that makes for ease of entrance without sacrificing safe anchorage inside will always tend to make the harbor more popular with ship masters.

Los Angeles

THE 12-inch mortars and 14-inch naval coast defense guns of the batteries on Point Firmin that protect the entrance to Los Angeles harbor, made some very good scores in the two-day target practice on December 16 and 17. A target towed past the range several miles out at sea was used. Much care had to be exercised in guarding against danger to the ships entering and leaving the harbor.

On December 16 the steamer West Mingo, built and equipped at the yards of the Los Angeles Shipbuilding Company, left Los Angeles harbor for the Orient with a full cargo of cotton and other Southern California products. Three steamers of the Gulf Mail Steamship Company cleared for Mexico and Central American ports during the month.

On Christmas Day many of the boys and girls around the harbor of Los Angeles were made glad by bountiful Christmas dinners served by the officers of Uncle Sam's warships now lying in the Outer Harbor.

Christmas week was a very busy one for the Outer Harbor docks, seven steamers in the offshore trade were loading or discharging at the big piers.

In the special articles in this issue will be found descriptions and illustrations of many of the Los Angeles industries and harbor facilities.

Motorship Tisnaren built by the Gotaberken of Gothenburg, Sweden. One of the latest of the Scandinavian motorships. This vessel on her first voyage made 23,887 knots at an average of 11.5 knots an hour consuming in this entire distance only 2612 tons of heavy-oil fuel. She is 9400 tons deadweight capacity and is driven by two Burmeister & Wain type, 2000 indicated horse-power Diesel engines.

Marine Insurance

A STEADY run of marine casualties is involving the insurance companies in a total of claims that threatens to reach formidable dimensions before the tide turns. These are of almost daily frequency, and arise from the sub-standard condition into which vessels have been permitted to fall after the hard usage they have sustained in war work. Many of the steamers and sailing ships now engaged in ocean service were originally built for work on the lakes or coastwise, and are not strong enough to stand up under the rough wear and tear of the open sea. Defective machinery and leaking hulls are the causes of most of these minor claims, while lost or broken propeller blades, boiler explosions and rudder damage contribute their full quota. It is a serious problem for the marine underwriter, in view of the soaring costs of repairs and labor; but what puzzles many a spectator of the business is the cheerful readiness with which the newer offices accept such risks as these and shade the rates a trifle to get them on their books.

Inland Marine

It is now safe to predict that the premium volume for inland marine business for 1919 will not exceed, if it equals, that of last year. Conditions in this line are closely on a parallel, as regards results, with ocean marine; that is to say, the hull business is comparatively profitless, while a slender margin of gain is still in sight from cargo writings. The unsatisfactory state of the hull end arises from the enormous increase in the cost of repairs to all shipping property and the retention of pre-war valuations. It costs fully 300 per cent more to effect repairs today than it did a half dozen years ago, but, at the same time, the hull premiums have had a rate advance of but 60 per cent. There is, therefore, a 240 per cent reversal in conditions, adverse to the interests of the underwriters. It is certainly an injustice to the insurance companies to have the old valuations continue for insurance purposes. Barges and lighters still carry a valuation in the neighborhood of $6000, whereas they could not possibly be replaced in the present market for less than twice that sum. Tugs are entered at $8000 and $10,000, that would cost at least $40,000 under prevailing prices for labor and materials. It will be seen that, in consequence, a partial loss can easily exceed even a total loss. Cargo profits in inland marine continue small but fairly dependable; because the rates automatically go up with the increase in values. Even so, there is no appreciable increase in cargo premiums. There is a good profit from the railroad transportation business. This latter line is a puzzler to the layman; it frequently carries no proper marine hazard whatever, goods being conveyed entirely by rail, and yet it is underwritten by marine companies.

Marine Institute Election

The election of officers of the American Institute of Marine Underwriters resulted as follows: President, Hendon Chubb; vice-president, William H. McGee; secretary and treasurer, Louis F. Burke; assistant secretary, E. G. Driver. All the old directors were re-elected; there are nine directors in all, three of whom are chosen every three years. The membership of the institute consists at present of thirty-four New York companies and five out-of-town companies, and also of thirty-three individual members. Active members are divided into two classes, resident and non-resident, the latter being those who reside more than fifty miles from New York.

American Handicaps

Replying to the rather severe criticisms on American marine insurance recently made by George A. Kurz, an officer of the National City Bank of New York, President Benjamin Rush, of the Insurance Company of North America, has written the Weekly Underwriter a long and most interesting letter, in the course of which he observes:

> "Foreign merchants and underwriters for many years have been allowed the benefit of combination in their foreign trade, which of course results in lower cost and greater efficiency. That privilege has been denied the American merchants until the very recent passage of the Webb Bill, and is still denied to American underwriters. Taxation of foreign marine underwriters, at least prior to the war, has been on the basis of net profits; the taxation of American marine underwriters has been on the basis of gross premiums written. This has resulted in a heavy handicap to American underwriters in additional percentage of tax cost to premium dollar written. Deposits made by foreign marine insurance companies, in order to comply with the laws of other foreign countries, in which they have established agencies, have not been deducted from their assets by the insurance authorities of their own countries. In the United States these deposits are so deducted, which acts as a severe deterrent to any American insurance company desiring to establish agencies abroad, as only the strongest insurance companies could afford to have these deposits, representing possibly hundreds of thousands of dollars thrown out of their assets by the insurance commissioners of the United States. Business in foreign countries is apt to be done on long-time credits—this includes insurance premiums. Under the ruling of most of the state commissioners, an unsettled balance

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME
JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON
E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.
FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

of three months' standing is also deducted from the assets of the American company; it is not so deducted from the assets of its foreign competitor. Last, but not least, any attempt at combination on the part of American underwriters to reduce their expenses by doing collectively what it would be impossible for them to do individually, has been looked upon with grave suspicion by the American insuring public, and by the various state authorities. As a result of these various conditions, which I recite, American marine underwriters have not hitherto seen their way clear to establish agencies in foreign countries, and consequently are in ignorance of the details of underwriting conditions in those countries, while their competitors, not being so handicapped, have had agencies in the countries in which their citizens trade, and consequently have been as familiar with insurance conditions of such foreign countries as they were with their own."

New French Policy

Definite information is now obtainable of the results of the deliberations of the French marine insurance syndicate that has been developing an improved marine policy. It proves to be an admirable contract, and one that possesses several points of improvement over anything now issued by underwriters of other nationalities. In the first place, it devotes a clause to a comprehensive description of exactly what the policy covers, and another to what it does not cover. As was anticipated, theft and pilferage are excluded; they can only be written under a separate and distinct policy. It will be recalled that French marine underwriters placed the ban on these two hazards a couple of years ago, and by so doing saved hundreds of thousands of francs in losses. English comment on the new French policy is unanimously in approval of the banning of theft and pilferage in England's underwriting, as well, and action to this end may be looked for in London at any moment. There is not wanting a flourishing group of prophets who foretell a like passing into limbo of the prevailing disastrous coverage of leakage and breakage, which, they insist, are not properly marine hazards at all.

Lake Marine Losses

A chapter of marine insurance disasters ended on December 1, when Lake navigation closed for 1919-1920. The results of the season's writings were far from being in doubt. Hull underwriters had resigned themselves to a substantial loss months ago, and it is equally certain that the cargo business will show but the slightest of profits. The actual situation will not be known until the last of delayed claims have come tardily to hand. A final shot at the underwriters was taken just before the closing of the season, when the steamer Tioga went ashore in Lake Superior and was pounded into a total loss. With her disbursements, she was insured for about $450,000. She carried 110,000 bushels of grain, all of which was insured in the American market, and most of it in one office. There had been very little activity in Lake navigation for some few weeks prior to the closing of the season. Few boats had been moving. At the upper dock ports the ore was frozen and could not be handled, and its shipment was further obstructed by the coal strike. There was scarcely any grain movement, steamers being laid up on account of the congestion at such important Eastern ports as New York through the longshoremen's strike. Thus 1919 joins so many preceding years of next-to-profitless Lake marine insurance operations.

A Boost for the American Bureau

Friends of the American Bureau of Shipping were tremendously encouraged and delighted by the significant action of the closing hours of the last congressional session when the Edmonds' bill was introduced and sent along to the Committee of Merchant Marine and Fisheries. This measure forces a door to the most authoritative and important recognition of the American Classification Society. It put a sudden stop to the foreign sneers at our bureau, and placed the latter in a position of commanding influence. It is universally believed that the bill will be speedily passed by both branches of Congress and receive the signature of the President. A briefer and more explicit resolution could scarcely have been contrived. The full text was as follows:

> "Be it enacted by the Senate and House of Representatives of the United States of America in congress assembled, That for the classification of vessels owned by the United States, and for such other purposes as are the proper functions of a classification bureau, all departments of the government and all commissions created by the government are hereby directed to recognize the American Bureau of Shipping as their agency; provided, that the Secretary of Commerce and the chairman of the Shipping Board shall each appoint one repre-

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA
W. H. WOODRUFF, Special Agent
230 BYRNE BUILDING
LOS ANGELES
F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK
ND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

> sentative who shall represent the government upon the executive committee of the American Bureau of Shipping, and the bureau shall agree that these representatives shall be accepted by them as active members of such committee; provided further, that the representatives of the government shall serve without any compensation, excepting necessary traveling expenses."

Strike Coverage in England

Separation of strike risks from war risks is engaging the attention of British marine underwriters, who are heartily weary of providing this protection for nothing. An extra premium is being demanded for the deletion of the strike clause from policies that have been rid of the "f. c. and s." provision. Heretofore the application of this remedy has resulted in time in the discarding of the separation of the two risks. Capable writers on the other side are favoring the adoption of a rule making it impossible to write strikes and war risks in the same policy.

Prompt Settlements

There is a very proper resentment among American marine underwriters of the criticism occasionally heard in certain quarters to the effect that claims are more tardily settled in this country than by British adjusters. It is emphatically denied that this is true, and it is insisted that when delays have arisen it has been because brokers and shippers have not presented their claims in proper manner. American underwriters do not deny to their British competitors credit for promptness in settlements; they only insist that they themselves give no less excellent a service. The West Arvada loss illustrated this, and its recent occurrence makes it a good example. This vessel was recently sunk by a mine off Bremen. American companies carried the insurance on her hull and cargo to the extent of $4,500,000, of which about $1,500,000 had been placed in the New York market. Within twenty-four hours the American underwriters had begun the payment of the loss after the presentation of the papers, and in four days every claim had been settled, excepting but one. This is a brand of service that cannot be bettered anywhere.

Centralizing Marine Branches

Intense interest is being taken by marine insurance men in the discussions now going on at Washington and the important changes that promise to grow out of them, as regards a concentration of the numerous maritime departments of the government. To the majority of laymen it will come as a ludicrous surprise that under prevailing governmental conditions at Washington it is necessary for a shipowner to resort to no less than seventeen separate and distinct departments in order to comply with all the requirements demanded before his vessel will be permitted to make its virgin trip. This entails a vast loss of time and effort, and cumbers the maritime service with a wholly unnecessary lack of cohesion and co-operation. The present scattering of allied branches has come about through the processes of a slow evolution, as one maritime activity after another came into existence and was arbitrarily assigned to one government department or another. The intention now is to assemble these scattered branches into one large unit. The bill introduced for this purpose by Congressman Walsh of Massachusetts would create a department of marine in which all these allied interests might be collected. Undoubtedly this would be a very desirable arrangement, and all the leading marine underwriters favor it; but, as the chief of navigation has convincingly pointed out, such a movement would draw so particularly from the Department of Commerce as to practically reduce it to insignificance, if not wreck it altogether. This objection can scarcely be disputed, and if the Walsh bill fails of passage, as now appears likely, it is probable that efforts will then be concentrated upon centralizing in the Department of Commerce all these branches that are now scattered between the latter and the war, navy and labor departments. From indications, this result is likely to be consummated shortly.

Still the War Risk

Another mine disaster has been announced, illustrating the necessity for continued coverage against the war risk hazard. They come along every week or so. This time it was the Kerwood, an American freight steamer, bound from New York for Hamburg. She was seriously damaged by coming into contact with a floating mine off the island of Terschelling, in the North Sea, and was towed in by Dutch tugs. She was a former Austrian liner, and carried a large cargo of foodstuffs. The insurance was placed in the New York market, and was for $1,500,000 on hull and cargo. The war risk rate is very low, these days, and this loss will come heavy on the offices writing it.

Government Pushes Marine Plans

The National House, by a final vote of 238 to 8, passed the merchant marine bill to which we have frequently alluded in these columns. It provides for the sale of the government fleet to American citizens, if they want the vessels; and also for the continuance of the Shipping Board with regulatory powers, the insurance arrangements of which are to conform to the policy as already prescribed. The bill now goes to the Senate, and from all indications it will receive as little opposition there as it did in the House. Marine underwriting interests are fostered by this measure, and the profession is watching its rapid progress with satisfaction. Under its provisions, if the sale of a vessel involves conditions that include deferred payments of the purchase price, the Shipping Board is to require the purchaser to keep the ship insured against loss or damage by fire, and covered by protection and indemnity insurance "with insurance companies, associations or underwriters, and under forms of policies, and to an amount approved by the board." An insurance fund is to be created by the board out of net revenue from operations and sales, and to be maintained and administered, in which it may insure in whole or in part against all hazards usually covered by insurance policies, any interest of the United States in any vessel either constructed or in process of construction, and in any plants or materials "heretofore or hereafter acquired" by the board. Adequate surplus and reserves are to be maintained by the board as required by the best actuarial practice, and any net profits realized from the operation of the fund will be paid annually into the United States treasury. A working program of this character leaves full room for the development of marine insurance in this country. The government elides itself from the field of competition, and every preference will be given American underwriters, and for their full limit. It is a significant and highly encouraging milestone of progress.

FIRE ABOARD S. S. DE KALB

WHILE lying in the North River, December 14, 1919, late in the evening, fire broke out in the vicinity of the telephone exchange on the port side of the main deck. Alarm was immediately given and the crew on board the vessel started fire pumps and endeavored to extinguish the flames. Dense smoke prevented complete success on their part, and the strong wind extended the flames beyond their control.

Alarm was immediately given by steam whistle and siren, and a small boat put off from the Jersey shore to inquire if help was needed. The officer in charge of the vessel reported the fire and requested that a party in the small boat go ashore and immediately call the fire department and request assistance from fire patrol boats.

The crew continued to fight the fire, but it increased in its intensity and spread throughout the entire quarters on the main deck, and upon reaching the central stairway, mounted up the stairway and spread out on the decks above to the bridge.

It was, however, prior to the arrival of the fire boats, confined by the steel structure to 'midship port of the vessel, and was quickly extinguished by the boats after their arrival.

The portion of the vessel destroyed was only that which under the proposed alterations would have been torn down and rebuilt to fit the vessel for South American passenger service, and while a certain amount of steel structure which otherwise would have been used in the reconstruction was twisted and distorted by the fire, it will be very easily restored, and the total cost of repairs very slightly increased.

There was no injury to the forward or after sections of the vessel, nor to the engines and boilers, and the reconstruction work required by the damage caused is restricted to a comparatively light structural steel of 'midship structure and deck erections.

J. A. MOORE ENTERTAINS DINNER PARTY IN NEW YORK

ON Friday night, December 12, at the Palais Royal, New York, Mr. J. A. Moore, vice-president of the Moore Shipbuilding Company, Oakland, was the host at a very elaborate and interesting dinner party. Friends from both the Pacific and Atlantic coasts were present.

Mr. Moore was the recipient of many congratulations upon his success in arranging contracts for the Moore Shipbuilding Company with Eastern ship operators.

A very delectable menu was served to the guests, among whom were: Mr. G. M. Standifer, Mr. and Mrs. Daly, Mr. and Mrs. James French, Mr. and Mrs. E. Salmon, Mr. and Mrs. Farish, Mr. and Mrs. J. M. Stewart, Mr. and Mrs. R. L. Hague, Mr. and Mrs. Cox, Mr. Arnold Stewart, Mr. D. C. O'Reilly, Miss Reed, Mr. and Mrs. Morrel, Mr. Craven, Mr. and Mrs. J. S. Hines, Mr. and Mrs. Hutchinson, Mr. Skinner and Mr. Chisholm.

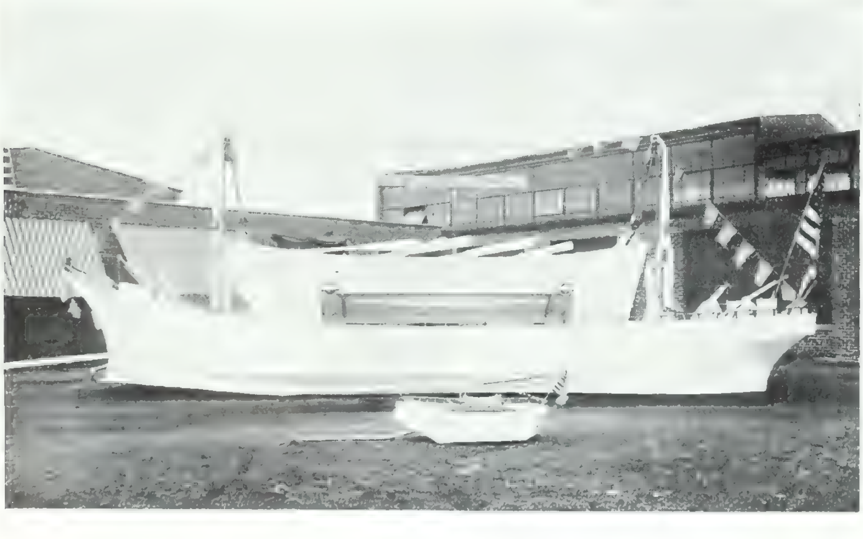
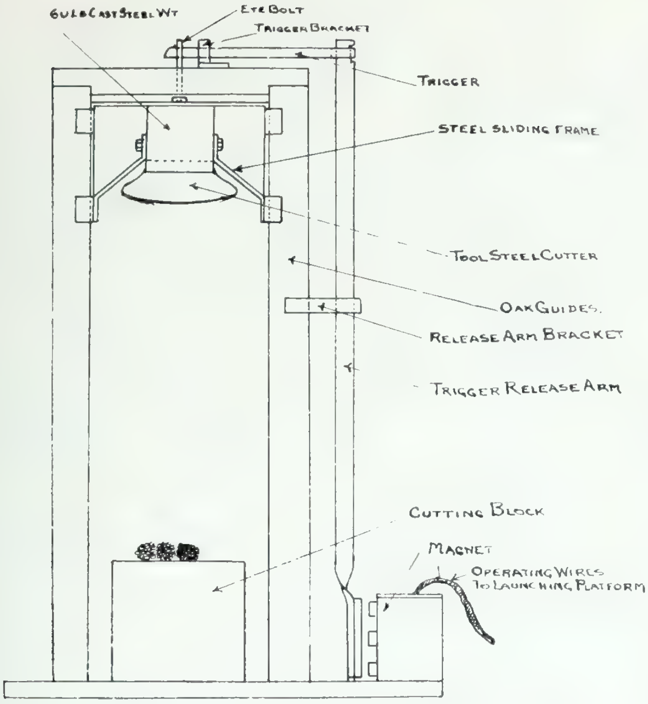


EXHIBIT OF THE STEWARD DAVIT

The accompanying illustration shows a very interesting and instructive float prepared by the employes at the factory of the Steward Davit & Equipment Corporation, Hudson, New York. This float was exhibited in the parade at the home-coming celebration for the boys from across the sea. The float illustrates very graphically the use of the Steward Davit in making launching of life boats at sea less hazardous, and also illustrates the line of life-saving equipment manufactured by this corporation.



Electrically released guillotine for cutting trigger ropes in side launching

A NEW DEVICE FOR RELEASING THE SLIDING WAYS IN SIDE LAUNCHINGS

AT the Schaw-Batcher Shipyard the practice in side launching hos been to hold the ship in side launching has been to hold the ship dogshores, or triggers, held by ropes at each end of the ship. These ropes, when everything is ready, are cut with axes at a given signal by six men.

At the launching of the West Caholia on September 7, a congressman who was present requested the honor of cutting one of the ropes. This request was granted. The congressman being not quite so quick as the ship-carpenters, cut his rope a very small fraction of a second late, with the result that the trigger had upon it an extra strain and was a little canted, and when the rope parted one of the timbers swung around in an unexpected way and knocked the congressman off his feet, badly bruising one of his ankles. One of the ship carpenters also was badly injured.

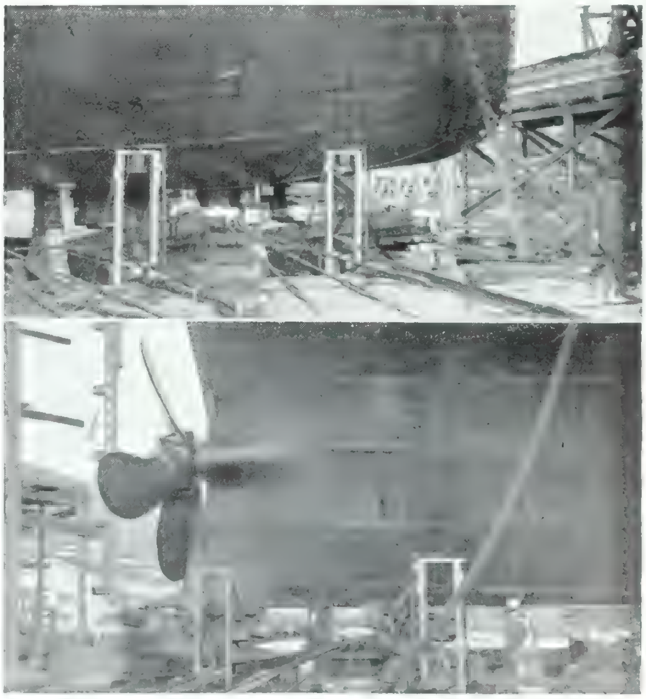
General Superintendent O. B. Kibele, on the following morning, called a conference of the foremen and engineers and asked them to devise some method by which this cutting of the ropes could be done automatically without risk of injury to anyone. In about two hours they had worked out the design of an electrically-controlled guillotine for doing this work. A drawing of this guillotine is shown in our illustration. The device was used at the launching of the West Calera on December 7 and worked perfectly.

It was also determined at this launching to experiment with cutting down the number of triggers used and the naval architect worked out a scheme of leaving two additional key keel blocks and using only two triggers at each end of the ship. This was found to be entirely satisfactory and will now be standard practice at this plant. The halftone reproduction of two photographs shows the guillotine in place at bow and stern of the ship ready for launching.

MOTORCRAFT BUILDING IN FAR EAST INCREASES

A GREAT increase in the development of the construction of commercial motor craft of small and large sizes, not only in India, but in the Federated Malay States and in China and Japan is reported by the special correspondent of Lloyd's List to the London and China Telegraph. During the war there has been a shortage of shipping in the East, and the Indian government urged shipbuilders in India and in Singapore and Rangoon to undertake the construction of vessels of a size of which they were capable, built of Indian teak. As a result several wooden auxiliaries and full-powered motor ships were built, while in Rangoon the first of several craft which are to be turned out has recently been launched. In Singapore two 2500-ton full-powered vessels have lately been built for trade between Singapore and Hongkong, and are owned by the Anglo-Chinese Steamship Company of Singapore.

In China there is now every sign of great development being made in the adoption of motor craft on all the rivers and canals in the country. Some of the rivers, such as the Yangtse, are navigable for several hundred miles, and practically all the transport is carried out by vessels on these rivers. Owing to the excellent organization of several oil-producing companies, paraffin and crude oil are available throughout China at low prices and in very large quantities. Coal, on the other hand, which is now obtained wholly from Japan, costs between $25 and $30 a ton, so that the saving effected by using motorcraft instead of steamers is found to be between 59 and 75 per cent and often more.



The bow and the stern of the West Calera, showing the four electrically released guillotines in place, ready to cut the ropes

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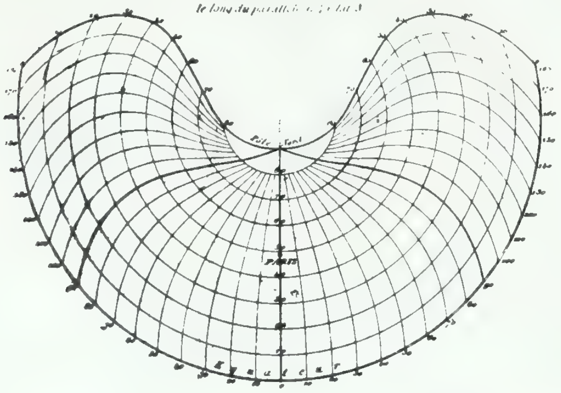
Projection dite de Bonne ou de la Carte de France

Développement du cône tangent le long du parallèle [illegible]



Nº XIX

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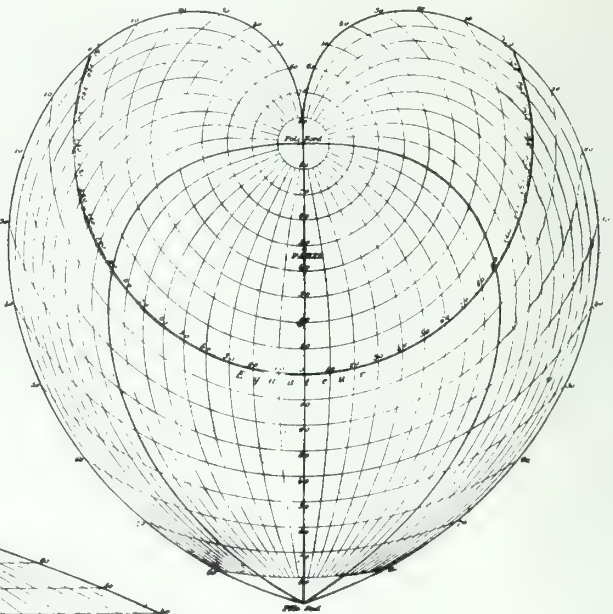
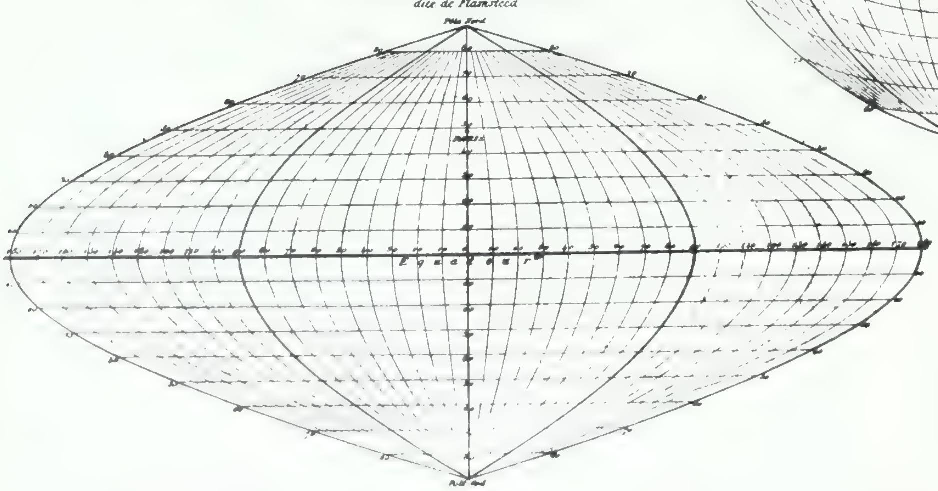


Nº XVIII.

Projection sinusoidale de Sanson, *dite de Flamsteed*



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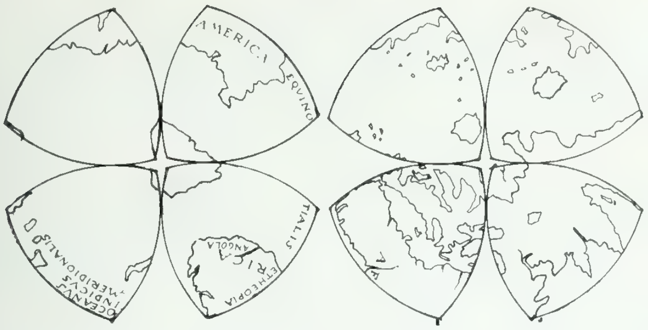
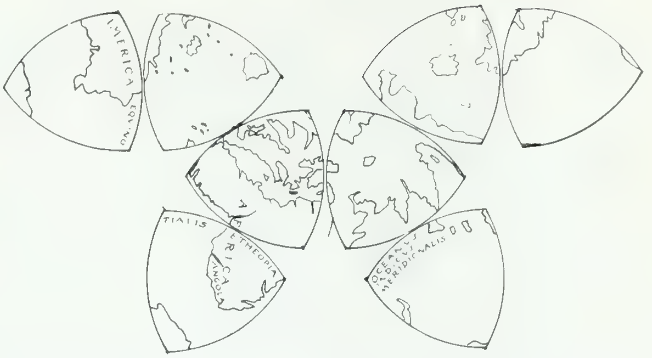


Mappemonde by Lionardo da Vinci, 1513. The first decentralized world map showing the surface of the sphere not from one point but from eight points of view—the only method by which the whole world gets fair representation.



The decentralized octants of Lionardo's mappemonde assembled so that the land of the world would be continuous when the curved sides of each octant were compressed to straight lines for half their length. If the prime meridian of this map (Lisbon) were shifted to the average prime meridian of the period, 22½° W., this projection would be identical with the Butterfly Map which was originally developed without any knowledge of that of Lionardo da Vinci.

We have gone rather far afield in illustrating the law of integration by disintegration, and we have applied the law to the political world. We shall now apply the same law to our globe and its representation on a plane.

In a preceding paper it was shown that the Greeks conceived the sphere as divided into four equal parts—the quarter which they knew, the Occumene, consisting very obviously of two distinct parts—Europe and Asia. We showed that a great circle through the poles a little east of the Ural Mountains could divide the world into eight equal parts, each with 90 degrees of latitude and 90 degrees of longitude, four such sections north of the equator and four south.

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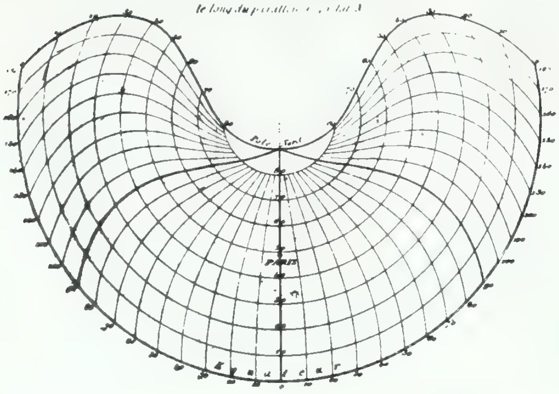

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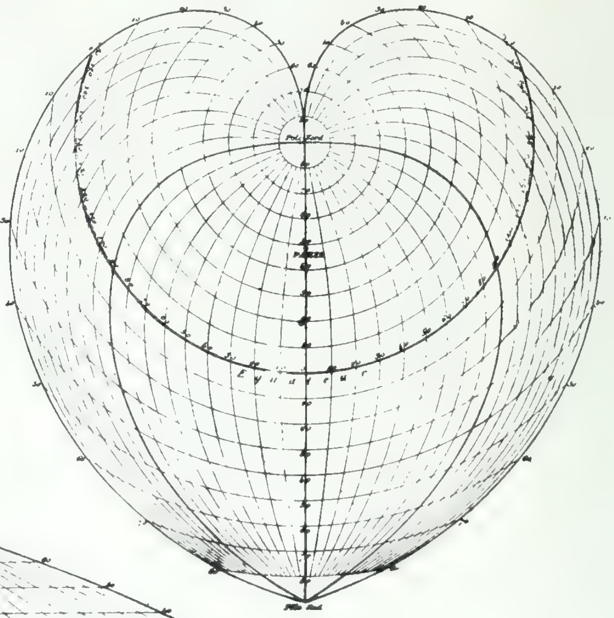

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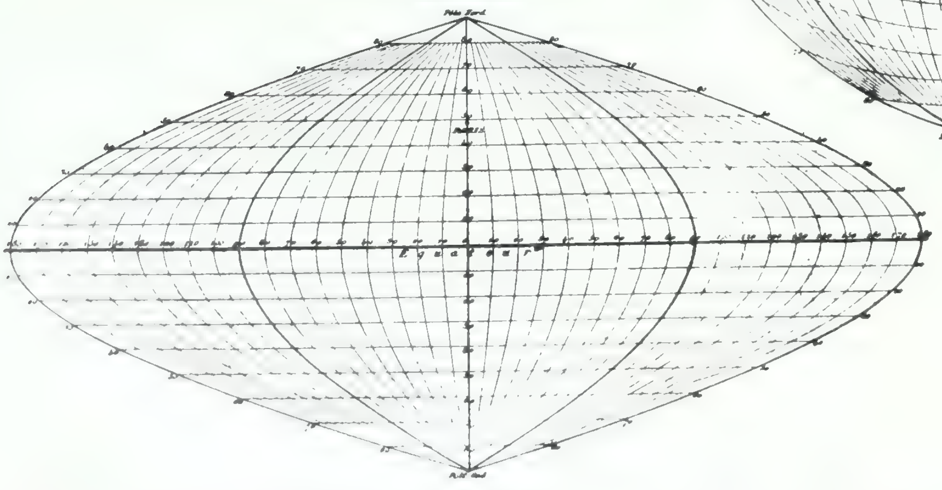

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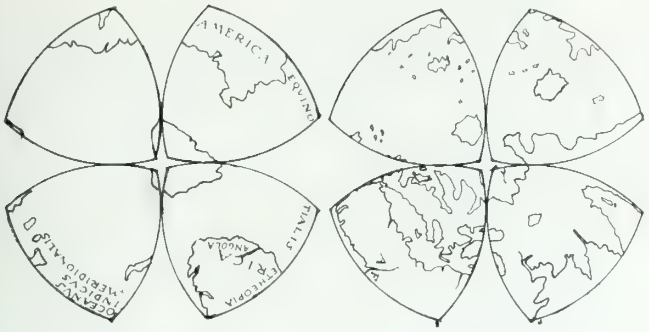

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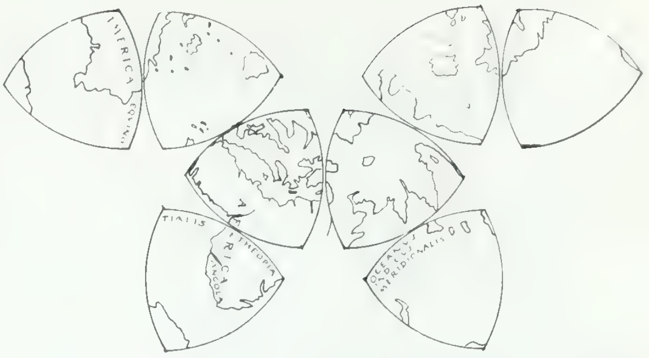

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Pacific Coast Shipbuilding Returns

Albatross Metal Furniture Company, Portland, Ore. (Standard Vault & Metal Works)

Purchasing Agent, **K. Kerekes.**

Manufacturing steel cabinets and lockers for ships.

Albina Engine and Machine Works, Inc., Portland Ore.

General Manager, **Mr. William Cornfoot.**

Overhauling and marine repairs a specialty.

Allen Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **G. E. Hunt.**

Two Allen type vessels, 274.6 B. P. by 44.9 by 26.4.

American Concrete Pipe & Shipbuilding Co., Seattle, Wash.

One 7,500-ton concrete steamship.

One 150-foot steam concrete tugboat.

Two concrete scows, 120 feet long.

American Marine Iron Works, Portland, Oregon

Purchasing Agent, **Carl R. Jones.**

Contracts covering cast iron fittings for steel and wood yards of G. M. Standifer Construction Corporation, Vancouver, Wash.

Ames Shipbuilding and Dry Dock Co., Seattle, Wash.

Purchasing Agent, **J. M. Roth.**

Twenty-seven vessels under contract, mostly 8800- ton freighters.

Anacortes Shipbuilding Co., Anacortes, Wash.

Acting Manager and Purchasing Agent, **Will W. Dunn.**

Two wooden vessels, Ferris type, 281 by 46 by 23.6; engines 19-36-56; 1500-h. p. watertube boilers. Delivery 1920.

Anderson Shipbuilding Corporation, 816 Alaska Building, Seattle, Wash.

Purchasing Agent, **W. G. Hall.**

Apex Manufacturing Company, Emeryville, Cal.

Purchasing Agent, **A. Youngholm.**

Several hundred metallic life boats for U. S. Shipping Board and shipyards.

Astoria Marine Iron Works, Astoria, Ore.

Purchasing Agent, **Mr. J. A. Jackson.**

Completely outfitting 27 Hough and Ferris type wooden vessels.

Contractors for United States and French governments.

Overhauling and repair of ships a specialty.

Marine railway under construction capable of handling ships up to 12,000 tons register. Fabricators of steel buildings, bridges, tanks and other structures.

Babare Bros., Old Town, Tacoma, Wash.

Purchasing Agent, **Mr. Geo. Babare.**

Four wooden freighters, Ferris type.

Ballin Water Tube Boiler Co., Portland, Ore.

Sixteen Ballin type water-tube boilers for eight steamers. For the Supple & Ballin Shipbuilding Co.

Twelve Ballin type water-tube boilers for six steamers building at the G. M. Standifer Construction Corporation.

Barnes & Tibbitts Shipbuilding & Dry Dock Company, Alameda, Cal.

President: **W. G. Tibbitts.**
Vice-President: **J. D. Barnes.**
Secretary: **J. J. Barnes.**

General repair and dry-docking business.

Benicia Shipbuilding Corporation, Benicia, Cal.

Purchasing Agent, **L. S. Jones,** Alaska Commercial Bldg., San Francisco, Cal.

Bethlehem Shipbuilding Corporation, Ltd. Union Plant, Potrero, Risdon, Hunter's Point, Alameda Works (Alameda Side)

General Manager, **Jos. J. Tynan.**
Assistant General Manager, **A. S. Gunn.**
Secretary and Treasurer, **Arnold Foster.**
Purchasing Agent, **O. W. Street.**
Alameda plant: Thirteen tankers, 10,100 dw.
Potrero works: Three freighters, 12,500 dw.
Fitting out two tankers, hulls Nos. 5259 and 5260.

Ralph J. Chandler Shipbuilding Co., Wilmington, Cal.

Six wooden vessels, Ferris type, 281 ft. 6 ins. by 46 ft. by 26; engines 19 by 32 by 56 by 3; 1400 h. p. Two tubular boilers. For U. S. Shipping Board.

Chilman's Shipyard, Hoquiam, Wash.

Purchasing Agent, **Mr. Iver Chilman.**

Two 3-mast auxiliary schooners 130 by 33 by 14. One 300-h. p. engine, for Belgian interests.

Columbia Engineering Works (Linnton), Portland, Ore.

Purchasing Agent, **Mr. C. W. Steele.**

Capacity of yard: 5 vessels at one time.

Prepared to build any type of wooden ship. Specialize in schooners of 1000 to 3000 tons deadweight.

Columbia River Shipbuilding Corp., Portland, Ore.

Purchasing Agent, J. C. Bowles.

Eight steel merchant ships, 8800 tons dw., General Electric and De Laval turbines, Scotch marine boilers. Four of above now on ways.

Commercial Boiler Works, Seattle, Wash.

Purchasing Agent, **Mr. J. H. Fox.**

Contracts for:

Fifty Scotch marine boilers, 14.9 inside dia. by 11 ft. long, H. S. 2695.5 sq. ft., W. P. 210 lbs., for vessels building on Pacific Coast. Delivery, twelve completed boilers per month.

Coos Bay Shipbuilding Company, Marshfield, Ore.

Manager, **Mr. J. H. Polhemus.**

Contracts for one Ferris type vessel. Length over all 281.6, 3500 dw. tons.

J. Coughlan & Sons, Vancouver, B. C.

Purchasing Agent, **F. Brammall.**

Four 8100-ton dw. freighters, 400 by 52 by 31, 3000-h. p., three Scotch marine boilers. For Dominion Government.

Two 8800-ton dw. freighters, 427 feet by 54 feet by 29 feet, 9 inches.

Crowley Launch & Tugboat Co., San Francisco, Cal.

Purchasing Agent, **John L. Crowley.**

Two 28-foot launches with 10-h. p. engines.
Two 38-foot launches with 30-h. p. engines.
Four 45-foot launches with 50-h. p. engines.
Eight covered barges, 125 by 40 by 12.
Derrick barge, 75-ton lifts, 125 by 50 by 12.

J. F. Duthie & Co., Shipbuilders & Engineers, Seattle, Wash.

Purchasing Agent, **E. C. Gaumnitz.**

Twelve 8800-ton cargo vessels, 2800-h. p., 425 feet by 54 feet by 29.9; Scotch boilers.

S. S. West Ivan launched December 20.

Elliott Bay Dry Dock Company, Seattle, Wash.

Local repair work, cleaning, painting and overhauling.

Elliott Bay Shipbuilding Co., Seattle, Wash.

Purchasing Dept., **C. A. Morrow.**

Six vessels, 260 by 46 by 26.

Contracts for five 3500-ton carriers.

Elliott Bay Yacht & Engine Co., Seattle, Wash.

Large amount of repair work.

Feeney-Bremer Company, Tillamook, Ore.

Contracts for three wooden ships, Ferris type, 281.6 by 46 by 26.

Foundation Company of British Columbia, Ltd., Victoria, B. C.

Purchasing Agent, **Mr. D. D. Long.**

Twenty 3000-ton dw. twin screw wooden steamers, 293.2 by 47.6 by 23.6, two Scotch marine boilers.

Foundation Co., Portland, Ore.

Local Purchasing Agent, **G. M. Raymond.**

Foundation Co., Tacoma, Wash.

Purchasing Agent, **Mr. Whiteside.**

Seattle Office: Smith Building.

Fulton Shipbuilding Company, Wilmington, Cal.

Purchasing Agent, **A. H. MacFarland.**

Four Hough design wooden steamers.

Nine Ferris design wooden steamers, 3500-ton, engines 19 by 32 by 56, 1400-h. p., two tubular boilers.

Grant Smith-Porter Ship Company, Aberdeen Yard, Aberdeen, Wash.

Manager: **Charles Albertson.**
Superintendent: **J. C. Langille.**

The Grant-Smith-Porter Ship Co., Portland, Ore.

Purchasing Agent, **Mr. P. S. Sinnock.**

Contract for twenty-two Ferris type ships; length 286 feet, beam 46 feet, depth 28 feet; two standard E. F. C. boilers.

Grays Harbor Motorship Corporation, Aberdeen, Wash.

Purchasing Agent, **Mr. H. L. Rich.**

Twelve 4000-ton ships of Ward type. For Emergency Fleet Corporation. Deliveries about two a month.

Eight building slips, maximum length 350 feet.

Complete machine shop for installing machinery.

Great Northern Concrete Shipbuilding Company, Vancouver, Wash.

Purchasing Agent, **Mr. Pacquet.**

Three concrete hulls, Nos. 4, 5 and 6, 100 by 25 by 12.6.

Hammond Lumber Co., Eureka, Cal.

Purchasing Agent, **W. R. McMillan.**

Two steamers, Ferris type.

Hanlon Dry Dock & Shipbuilding Company, Oakland, Cal.

Purchasing Agent, **H. P. Armes.**

Seven cargo vessels, 320 feet 9 inches by 46 feet by 26 feet 9 inches, 22 feet 1½ inch draft; three watertube boilers. For Emergency Fleet Corporation.

Harrison & Lamond, South Vancouver, B. C.

One auxiliary schooner.

Helser Machine Works, Inc., Portland, Ore.

20 large size hawser reels for Pacific Coast Shipbuilding Co.
12 same as above for Pensacola Shipbuilding Co.
30 same as above for J. F. Duthie & Co.
44 same as above for The Columbia River Shipbuilding Co.
56 8¼ by 8 single geared winches, single gypsey.
28 8¼ by 8 single geared winches, double gypsey.
56 9 by 9 single geared winches, single gypsey.
All of above winches for Southwestern Shipbuilding Co.
180 cargo winches for Schaw-Batcher Shipbuilding Co.
200 9 by 9 cargo winches.
300 8¼ by 8 cargo winches.
80 9 by 9 cargo winches for Southwestern Shipbuilding Company.

Hesse-Martin Iron Works, Portland, Ore.

Purchasing Agent, **Mr. R. M. Hoffman.**

All auxiliary machinery for ten wooden steamers building by the G. M. Standifer Construction Co.

All auxiliary machinery for twenty-four wooden steamers building by the Grant-Smith-Porter Ship Co., at Aberdeen.

Anchor windlasses, cargo winches, steam capstans and steam steering gears for eight wooden steamers building by Supple & Ballin at Portland.

Forty steam cargo winches for ten steel steamers building by the Northwest Steel Company.

One hundred and thirty anchor windlasses, forty steam steering gears and fifty hand steering gears.

Herzog Electric & Engineering Company, San Francisco

Purchasing Agent, **H. C. Toumey.**

G. W. Kneass, San Francisco, Cal.

Purchasing Agent, **G. W. Kneass.**

Two tow boats, 60x15, 125-h. p. engine. For Peterson Tow Boat & Lighterage Company.

Three hundred metal life boats for Bethlehem Shipbuilding Corporation, Union Plant.

Kiernan & Kern Shipbuilding Co., Portland, Ore.

Four composite steamers of Ballin design.

Kruse & Banks, North Bend, Ore.

Purchasing Agent, **Robert Banks.**

Two steam schooners, 240 feet over all, 43 feet beam, 17 feet depth of hold, double end type. For J. R. Hanify Company.

One five-masted sailing schooner, with a carrying capacity of 1,750,000 feet of lumber. For private interests.

Three building ways.

Llewellyn Iron Works, Los Angeles, Calif.

Builders of Marine Engines, Boilers, Tanks, etc., for Emergency Fleet Corporation.

Present contracts include 1400-h. p. and 2800-h. p. marine engines with marine boilers for same, for most of the ships being built on the Pacific Coast.

Also reinforced concrete bars for concrete ships being built for the Emergency Fleet Corporation at the San Francisco Shipbuilding Company's yard in Oakland and at the Pacific Marine & Construction Company's yards in San Diego.

Long Beach Shipbuilding Company, Long Beach, Calif.

Purchasing Agent, **Frank W. Philpot.**

Eight steel steamers, 8800 tons dw., 2700 h. p., triple-Scotch boilers. For U. S. Shipping Board.

One steel motorship for California & Mexican Steamship Company.

One steel vessel for sugar and coal trade, for Cuban interests.

Los Angeles Shipbuilding & Dry Dock Co., Los Angeles, Cal.

Comptroller, **F. G. Phillips.**

Thirty 8800-ton dw. vessels, 410 by 54 by 29.9, 3500 I. H. P. three Foster water-tube boilers. For Emergency Fleet Corporation. Delivery 1919-1920.

Five 11,000-ton dw. vessels, 430 ft. 3 in. by 54 by 29.9 to second deck, and 38.3 to upper deck. For Emergency Fleet Corporation. Deliveries 1919-1920.

Equipment ample to build passenger, freight and naval vessels of any size and type, including machinery and equipment.

Angeles launched December 27.

The Wm. Lyall Shipbuilding Co., Ltd., North Vancouver, B. C.

Three auxiliary schooners, 235 W. L. by 44.6 by 20.6 moulded.

Two 200-h. p. Fairbanks Morse Semi-Diesel engines for these boats.

Eight full-powered steamers, 1500 tons deadweight. For Republic of France.

Main Iron Works, San Francisco, Cal.

Four ocean-going tugs; engines 17 by 25 by 42 by 30; complete for Emergency Fleet Corporation.

Shafting for concrete ships for Emergency Fleet Corporation.

Repairs to vessels for Emergency Fleet Corporation.

Marine Pipe and Machine Works, Inc., Seattle, Wash.

Purchasing Agent, **Mr. E. A. Lamb.**

One 6-cylinder Sumner type heavy oil engine, 650-h. p. For Chilean Government.

Two 1200-h. p. triple exp. steam engines.

Special marine repair department.

Martinolich Shipbuilding Co., 306 California Bldg., Tacoma Wash.; Yard at Dockton, Wash.

Purchasing Agent, **Mr. Martinolich.**

Three wooden 4-masted auxiliary schooners, 250 by 43 by 21; twin 240-h. p. Skandia engines. For Norwegian interests.

Matthews Shipbuilding Company, Hoquiam, Wash.

Purchasing Agent, **G. F. Matthews.**

Five-masted sailing schooner, 262 feet by 44 feet by 21 feet 6 inches. Lumber capacity, 1,750,000 feet. For owner's account.

McAteer Shipbuilding Company, Seattle, Wash.

Purchasing Agent. **Mr. Ramm.**

One steel vessel, 160 by 30 by 16.

Two four-masted schooners, 250 by 44 by 21; Skandia engines.

McEachern Ship Co., Astoria, Ore.

Purchasing Agent, **Mr. O. E. Draper.**

Three steamers, 286 by 46 by 28; Hough design.

Meacham & Babcock Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **Mr. W. N. Voegtly, Jr.**

Ten hulls, Ferris type.

Moore Shipbuilding Company, Oakland, Cal.

Purchasing Agent, **M. G. Waites.**

Contract for eleven 9400 dw. steel freighters, 402 feet 6 inches by 53 feet by 34 feet 6 inches; 2800 h.p. For United States Shipping Board.

Five of the above vessels on the ways, five in outfitting basin, one keel yet to be laid.

Contract for nine 10,000-ton dw. steel tankers, 425 feet 6 inches by 57 feet by 33 feet; 2800 h.p. For United States Shipping Board.

Five of the above vessels on the ways, three in outfitting basin, one keel yet to be laid.

Motorship Construction Co., Vancouver, Wash.

President, **Merrill A. Reed.**

Purchasing Agent, **J. W. Dougherty.**

Builders of cannery tenders, tugs, barges, river steamers, power boats and concrete barges.

National Engineering Corporation, Wilmington, Calif.

Outfitting ships for Emergency Fleet Corporation.

New Westminster Construction & Engineering Co., New Westminster, B. C.

Purchasing Agent, **Mr. H. M. Fullerton.**

Four 2800 dw. wooden freighters, 250 by 43.6 by 25, 950-h. p.

Five 1500-ton dw. wooden freighters, 204 by 40.6 by 17, 550-h. p. twin engines, watertube boilers.

Nilson & Kelez, Seattle, Wash.

Purchasing Agent, **Mr. Kelez.**

Eight wooden hulls, Ferris type.

Northwest Steel Company, Portland, Ore.

Purchasing Agent, **Mr. W. C. Smith.**

Four freighters, 2800 I. H. P., 423 feet 9 inches by 54 feet by 29 feet 9 inches, 8800 tons dw., geared turbine drive.

Three freighters, 2800 I. H. P., dimensions same as above; three Scotch marine boilers, oil burners, reciprocating engines.

Pacific American Fisheries, South Bellingham, Wash.

Purchasing Agent, **Mr. B. U. Slyster.**

Pacific Boat & Iron Works, Portland, Ore.

Metal lifeboats and life rafts for steel yard in this district.

Contract for Corser's one-man simultaneous releasing hooks on all lifeboats.

Capacity: Three boats a day.

Pacific Coast Shipbuilding Co., 319 First National Bank Bldg., San Francisco, Cal.; Plant, Bay Point, Cal.

Purchasing Agent, **Mr. J. A. Smiley.**

Ten 9400 dw. steamers. Six launched.

Pacific Construction Co., Ltd., Coquitlam, B. C.

Purchasing Agent, **Mr. R. W. Holland.**

Two 2800-ton dw. wooden freighters, 250 by 43.6 by 25, 950-h. p.

No. 3, Wooden steamer, 250 by 43.6 by 25, 1000-h. p. watertube boilers.

No. 4, Same as No. 3.

Nos. 5 and 6, 1500-ton full-power barges, 204.8 by 39.8 by 17, 275 I. H. P. engines, 5 water-tube boilers.

Pacific Marine and Construction Company
(Scofield Engineering Company)
San Diego, Cal.

Contracts for two concrete ships of 7500 tons, 420 by 54, draft loaded 27 feet, light 17 feet, carrying capacity 58,000 barrels.

Thirty-four-acre yard. Two building ways for sidewise launching. Two other ways.

Pacific Marine Iron Works, Portland, Ore.

Purchasing Agent, **Mr. V. L. Hamlin.**

Contracts for four 1600-h. p. triple expansion engines.

Contracts for six 1400-h. p. triple expansion engines.

Patterson-MacDonald Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **W. J. Thomas.**

Ten wooden steamers, 281.6 by 46.10 by 27, twin screw, triple expansion engines, 1550-h. p. 30-15½-25½-42. Two Heine boilers.

Pacific Shipbuilding Corpn., Seattle, Wash.

Purchasing Agent, **C. H. Jones.**

Yard designed with six building ways.

Peninsula Shipbuilding Co., Portland, Ore.

Purchasing Agent, **Mr. H. H. Fisher.**

Two sailing vessels, 287 feet by 49 feet 8 inches by 27 feet 6 inches. For United States Shipping Board

Capacity of yard: Four ways, wood construction, installation wharf 1000 feet by 125 feet.

Puget Sound Boiler Works, Seattle, Wash.

One Scott Patent Water Tube Boiler, 200-h. p. pressure, for Anderson Shipbuilding Co.

Contracts for condensers, water feed tanks, boiler casings and smoke stacks.

Large amount of local marine repair work.

Rolph Shipbuilding Company, Eureka, Cal.

Purchasing Agent, **John D. Stelling.**

One steamer and one barge. For U. S. Shipping Board

Two barkentines, two steam schooners and one tug boat. For Rolph Navigation & Coal Company

Three barkentines, 3500 tons, converted Ferris type steamers for United States Shipping Board.

Sanderson & Porter, Raymond, Wash.

Five-way yard. No plant equipment for outfitting of hulls.

San Diego Marine Construction Co., San Diego, Cal.

Purchasing Agent, **C. W. Stose.**

No. 136, Tow-boat "Pullet," 55 by 12 by 7.6; 100 h. p. oil engines.

No. 137, Tow-boat, 56 feet by 12 feet by 7 feet 6 inches; 100 h. p. Fairbanks-Morse type C. O. engine. Immediate delivery. For stock.

No. 138, V-bottom pleasure boat, 40 feet by 9 feet by 2 feet 6 inches; 6-cylinder, 3½ by 5¼ Continental motor. C. W. Stose, owner.

San Francisco Shipbuilding Co., 310 California St., San Francisco, Cal.

General Manager, **V. H. Poss.**

Purchasing Agent, **E. F. Atkinson.**

Two 7500-ton dw. bulk oil steamers and one 7500-ton dw. freighter, reinforced concrete, at Government Island Plant, Oakland, Cal.

Schaw-Batcher Company Ship Works, South San Francisco

Purchasing Agent, **K. I. Dazey.**

Ten single-screw freighters, 8800-ton dw., 427 by 54 by 29.9; 2800-i. h. p. reciprocating engines, 24½ by 41½ by 72 by 48; three Scotch boilers.

Seaborn Shipyards Company, Tacoma, Wash.

Four-way yard prepared for any kind of wood construction.

Seattle Machine Works, Inc., Seattle, Wash.

Purchasing Agents, **Frank H. Wheelon** and **D. Crause.**

Three 2700-h. p. triple-expansion engines for Skinner & Eddy Corporation.

One 500-h. p. triple expansion engine for McAteer Shipbuilding Co.

One 2800 h. p. triple-expansion engine for Ames Shipbuilding & Dry Dock Company.

Seattle-North Pacific Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **F. H. Magune.**

Ten freighters, 402.5 by 53 by 34.5. Parson turbine, three Foster boilers. Deliveries 1919.

Skandia Pacific Oil Engine Co., Oakland, Cal.

Purchasing Agent, **Mr. E. B. Brown.**

Ten 825 B. H. P. Werkspoor Diesel engines for installation in 5600 tons steel fabricated motorships.

Two 550-B. H. P. Werkspoor Diesels.

Four 240-h. p. and two 120-h. p. Skandia engines.

Additional engines of smaller capacity.

Skinner & Eddy Corporation, Seattle, Wash

Purchasing Agent, **Ray Anderson.**

Contracts for twenty 9600-ton dw. freighters for U. S. Shipping Board.

Sloan Shipyards Corporation, Olympia, Wash.

Purchasing Agent, **Mr. L. P. Byrne.**

Sixteen freighters, 281.6 by 46 by 26, 19-32-56 by 36; 1400-h. p.

Somarstrom Shipbuilding Co., Columbia City, Ore.

Four wooden steamers, Hough design, 288 feet long.

Four wooden steamers, Ferris type.

Southwestern Shipbuilding Co., Los Angeles, Cal.

Twenty-three single screw freighters, 8800 tons dw., 427 by 54 by 29.9; 2800 i. h. p. reciprocating engines; three Scotch boilers. For U. S. Shipping Board.

G. M. Standifer Construction Corp., North Portland, Ore., and Vancouver, Wash.

Purchasing Agent, **Mr. H. Luckett,** Vancouver, Wash.

Four wooden freighters, 281 by 46 by 26; 1700-h. p., Ferris type.

Five composite steamers, Ballin design, 4500 tons.

Fifteen steel steamers, 9500 tons.

Three shipyards, fifteen building berths.

Stephens Bros., Stockton, Cal.

Two wooden towboats, 50 by 13 by 8, for Island Transportation Co.

One 65 ft. by 14 ft. butcher boat, equipped with 6-cylinder Wisconsin motor. For Pollard Brothers.

One 40 ft. by 7½ ft. raised deck runabout cruiser, equipped with 6-cylinder Wisconsin motor. For Mr. W. Q. Wright, of the Bay & River Dredging Company.

St. Helens Shipbuilding Co., St. Helens, Ore.

Purchasing Agent, **Mr. A. F. Barnett.**

No. 49, steam schooner, 250 over all by 46 by 22, to the order of Charles R. McCormick & Co., San Francisco, Cal.

W. F. Stone Shipbuilding Co., Oakland, Cal.

Purchasing Agent, **Mr. Lester F. Stone....**

Four 150-foot wooden hulls for seagoing tugs, 30-foot molded beam by 17 ft. depth.

One tug, 95 feet by 21 feet by 11 feet, 500 horsepower gas engine.

Miscellaneous repair work.

Supple-Ballin Shipbuilding Corporation, Portland, Ore.

Three 4500-ton steamers, Ballin design, 309 feet o. a. by 44 by 26, diagonal planked, steel reinforcing on top sides, single screw; 1600 h. p.

Tacoma Shipbuilding Company, Tacoma, Wash.

Purchasing Agent, **Mr. D. D. McKay.**

Contracts for six Ferris type vessels. For U. S. Shipping Board.

Motorship Ambassador, 120 by 22 by 12 feet for W. H. Rust.

T. R. Trahey, Ballard, Wash.

One oil barge, 110 feet long and 32 feet wide, capacity 150,000 gallons For General Petroleum Company

Tregoning Boat Co., Seattle, Wash.

Purchasing Agent. **Mr. C .Tregoning.**

A large number of lifeboats and ship power launches.

Todd Dry Dock & Shipbuilding Co., Tacoma, Wash.

Purchasing Agent, **Mr. C. L. Bankson.**

Eight cargo vessels, 380 by 53 by 23.9, 2500 h. p. 3 watertube boilers.

Twenty-four cargo vessels, 380 by 53 by 23.9, 2500 h. p. 3 S. E. S. boilers.

All of above for Emergency Fleet Corporation. Deliveries by January, 1920.

Todd DryDocks, Inc., Harbor Island, Seattle, Wash.

Purchasing Agent, **Mr. C. R. English.**

General drydock and repair work.

Union Construction Company, Oakland, Cal.

President: **W. W. Johnson.**

Vice-President and General Manager: **H. G. Peake.**

Purchasing Agent, **Mr. Chas. L. Froding.**

Contracts for 10 steel ships of 9400 tons, Isherwood type, 402.5 by 53 by 34.5; three watertube boilers, 2800-h. p. turbines. For the U. S. Shipping Board.

One 2800-ton Diesel-engined oil tanker for the Standard Oil Company of California.

One 10,000-ton tanker for the General Petroleum Company.

Vancouver Shipyards & Engine Works, Ltd., Vancouver, B. C.

Contracts in hand for two wooden vessels.

Wallace Shipyards, Ltd., North Vancouver, B. C.

Purchasing Agent, **Mr. C. Wallace.**

Contracts for four 8,100 dw. steel vessels.

One steamer, 320 by 44 by 25, single screw, triple-expansion, reciprocating engines, 1800 h. p., 4300-ton dw. capacity.

Two steamers, 331 by 46 by 25, single screw, triple expansion, reciprocating engines, 2500 i. h.p., 5100-ton dw. capacity.

Western Canada Shipyards, Ltd., Vancouver, B. C.

Five 195 by 39.8 by 17 watertube boilers.

Willamette Iron & Steel Works, Portland, Ore.

Purchasing Agent, **S. F. Woodbury.**

Three 13 feet 9 inches diameter by 11 feet 9 inches long Scotch marine boilers. For Todd Dry Dock & Construction Company, Tacoma, Washington.

Nine Scotch marine boilers for vessels building in Pacific Coast yards for Emergency Fleet Corporation.

Fifteen 14 feet 9 inches by 11 inches long Scotch marine boilers for G. M. Standifer Construction Corporation. Hulls 11 to 15 inclusive.

Two gunboat type boilers, 7 feet 8½ inches diameter by 17 foot 7 inches long, for Rodeo Vallejo Ferry Company, San Francisco, Cal.

Five submerged flue type boilers for Haviside, Withers & Davis, San Francisco, California.

One submerged flue type boiler for Union Construction Company, San Francisco, California.

Building tanks and intalling machinery, ship Everett, for St. Helens Shipbuilding Company, St. Helens, Oregon.

Wilson Shipbuilding Company, Astoria, Ore.

Purchasing Agent, **W. G. Wray.**

Four wooden vessels, 281.6 by 46 by 26; Ferris type. For Emergency Fleet Corporation.

Wright Shipyards, Tacoma, Wash.

Purchasing Agent, **Mr. Geo. P. Wright.**

Two wooden steamers, "Elissa" and "Endymion," 3500 tons each, length 282 feet, beam 46, depth 26. For U. S. Shipping Board.

Yarrows, Ltd., Victoria, B. C.

Two slipways suitable for building vessels up to 350 feet in length.

Marine railway, 315 feet long, 3000 tons dw. capacity.

Graving dock, 480 feet long, 65-foot beam.

Makers of manganese bronze propellers and large marine engine castings.

Engaged chiefly with repair work.

OTHER SHIPBUILDING COMPANIES

American Shipbuilding Company, Warrenton, Ore.
Ballard Marine Railway Company, Seattle, Wash.
Chico Shipbuilding Co., 4185 Arcade Building, Seattle, Wash.
Clapp & Reed Shipbuilding Company, Seattle, Wash.
Columbia River Shipbuilding Co., Vancouver, Wash.
Craig-Wilde Ship Company, Los Angeles, Cal.
Wm. Cryer & Son, Oakland, Cal. W. E. Cryer, Purchasing Agent.
Fellows & Stewart, Inc. V. B. Stewart, Purchasing Agent, Wilmington, Cal.
French-American Shipbuilding Corp., 418-420 Marsh-Strong Bldg., Los Angeles.
Halstrom Shipbuilding Co., Inc., Seattle, Wash.
International Shipbuilding Company, Columbia City, Ore.
King & Winge Shipbuilding Co., C. B. Winge, Purchasing Agent, Seattle, Wash.
Marine Iron Works, Seattle, Wash.
Mare Island Navy Yard, Mare Island, Cal.
Muller Shipbuilding Company, 410 I. N. Van Nuys Building, Los Angeles, Cal.
Oceanic Shipbuilding Co., Milwaukee, Ore.
John E. Price & Company, Hoge Building, Seattle, Wash.
Port Blakeley Shipyard, Port Blakeley, Wash.
Puget Sound Navy Yard, Bremerton, Wash.
T. B. Puck & Co., Honolulu, T. H.
Raymond Shipbuilding Co., Raymond, Wash.
Sehrs Shipyard, Port Townsend, Wash.
South Bend Shipbuilding Co., South Bend., Wash.
Southern California Shipbuilding Corporation, 405 Trust & Savings Bldg., Los Angeles, Cal.
H. D. Stewart Shipbuilding Company, American Bank Building, Seattle, Wash.
Union Timber & Products Co., O. L. Craven, Pres., Port Towsend, Wash.
United Shipbuilding Corporation, Hoge Bldg., Seattle, Wash.
U. S. Steel Shipbuilding Corp., Ltd., Los Angeles, Cal.
Varney Shipbuilding Corporation, Seattle, Wash.
Washington Shipbuilding Corp., C. E. McMasters, Pres., Burke Bldg., Seattle, Wash.
West Coast Shipbuilding Co., H. W. Hellman Bldg., Los Angeles, Cal.

Book Reviews and Trade Literature

BOOK REVIEWS

Wrinkles in Practical Navigation, by S. T. S. Lecky. 814 pages, 136 illustrations and plates. Published by D. Van Nostrand Company, New York. Price $5 net.

This volume is the eighteenth edition of "Wrinkles," which contains numerous important illustrations and additions, and has been prepared by William Allingham, whose long friendship and close association with the late Commander Lecky eminently fitted him to carry on and modernize the work of the author.

An entirely new chapter has been added, entitled "New Meterological Measures for Old," and four appendices dealing with the following subjects: 1. Substitute for Horizon. 2. Gyroscopic Compasses. 3. The Moon an Auxiliary. 4. Chronometers: Use and Abuse.

Elements of Radio Telegraphy. By Ellery W. Stone. 260 pages, 126 illustrations, 33 plates. Published by D. Van Nostrand Company, New York. Price $2.50 net.

This interesting book on the practice of wireless telegraphy was primarily written for the guidance and instruction of radio students in the communication service of the Navy, and has now been published for general distribution in the belief that it will be found helpful to students in the radio department of other military branches of the government and in civilian radio schedules.

The treatment is such that the subject matter may be readily grasped by the layman, as it is presented from the physical rather than from the mathematical standpoint.

Every shipping man should have this book on his desk, as a perusal of its contents will certainly enable him to understand the needs, and appreciate the advantages of the wireless sets in operation on his ships.

Regulations for the Electrical Equipment of Ships, as established by the Institution of Electrical Engineers. First edition published by E. & F. N. Spon, London. Price in paper covers 65 cents net.

This little booklet of 86 pages embodies the decisions of the Institute of Electrical Engineers, ship electrical equipment committee, which have practically been adopted by Lloyd's Register as standard practice

TRADE LITERATURE

The Diamond Power Specialty Company of Detroit, Michigan, has just published Bulletin No. 134, entitled "How Some Shipowners Increased Their Profits." This bulletin illustrates and describes Diamond Soot Blowers for all types of marine boilers. Much space is given to the consideration of economies in the steam generators of marine propulsion plants, and a considerable amount of very useful data has been collected, classified and graphically illustrated in this booklet. Plans for mechanical illustrations are given to fit practically every commercial marine type of water-tube boiler and also the Scotch boiler.

McCord Force Feed Lubricators. An attractive 35-page booklet just published by McCord Manufacturing Company of Detroit, Michigan. This booklet, profusely illustrated, sets forth the advantages of this well-known type of lubricator and gives instructions for the operation and maintenance of various types of machinery.

Bulletin No. 30 of the Wellman-Seaver-Morgan Company of Cleveland, Ohio, gives a detailed description of the four electric traveling gantry cranes installed at the United States Army Supply Base, Boston.

The Catalog for 1919 of Black & Decker Manufacturing Company, Baltimore, Maryland, describes the electric air compressor, portable electric drills and electric valve grinders manufactured by this well-known firm. The "Electroflater," a portable, combination of a direct-current motor, geared to an efficient air pump and having an attachment plug cord for connecting to electric light sockets and a gauge reading to 150 pounds, can be carried about like a satchel, its net weight being only 44 pounds Three types are manufactured, one for 110-volt, one for 220-volt and one for 32-volt circuits, the last intended to work on farm lighting circuits. This would seem to be an ideal arrangement for private and small public garage and service station air compression. These outfits are mounted in a number of ways together with compressed air tanks. Electric compressors of larger capacity are also manufactured and a complete line of portable electric drills, valve grinders and fittings for the same

Catalog "A," 1919, of C. F. Braun & Company, San Francisco. A handsome 90-page book issued as a complete condensed catalog to cover all of the products of this firm, which include aerators, condensing equipment, both dry and wet vacuum, cooling towers, distilling condensers, evaporators, expansion joints, pressure and gravity filters, grease extractors, feed water heaters, service heaters, heat exchangers, pipe anchors, pipe guides, centrifugal pumps, strainers, by-pass valves and water softeners. Twenty-five pages of this book are devoted to the description of the organization and manufacturing facilities of the firm, which has developed a very efficient management method and a splendid modern shop plant, the plans of which are shown in the Pacific Machinery section of this issue of Pacific Marine Review.

Catalog No. 31 of Beckett, Laycock & Watkinson, Ltd., Willesden, London, N. W. 10, England. This very handsome British catalog describes the "Beclawat" line of patent self-balancing ships' windows in a great variety of types and with numerous fittings and clamping and locking appliances. This type of window has been used to a very great extent on the large passenger liners of the Atlantic and with some of the larger operating companies has become practically standard specification. This firm also manufactures the following specialties for ship work: Window blinds of all descriptions, frictionless ball race-runners for sliding doors, special electric light fittings, special locks and other ships' fittings, and Pullman combination and "Beclawat" berths.

Catalog of the John Finn Metal Works, San Francisco, California, describes their extensive line of special alloy metals such as Babbitts, newspaper metals, tinsmith's, brazier's and wire solders, pig tin, antimony, slab, bar and dust zinc, cast and rolled zinc plates, copper, pig and caulking lead. The John Finn Metal Works are prepared to manufacture alloys strictly guaranteed to any specification. They specialize on different alloys of Babbitt for bearings for the various types of machinery. They also operate a very complete galvanizing and sherardizing plant. Interesting tables are given on the properties of metals and Babbitt-bearing alloys which will be of value to engineers.

Drop Forgings Catalog of J. H. Williams & Company, Brooklyn, New York. This is the seventeenth edition of a catalog of this well-known firm, and several additions and revisions have been made. Set screw pattern turning tools and adjustable boring tool posts are shown and described and some new plain and sleeve bars for the same. Offset socket wrenches are shown separately from the straight pattern and automotive wrenches are also listed separately. Several new sizes and sets of automotive tappet wrenches and S. A. E. standard automotive wrenches have been added to the catalog. A very interesting short treatise on drop forgings, case hardening and heat treatment occupies eight pages at the end of the book.

Catalog No. 12, 1920, of the Wood Turret Machine Company, Brazil, Indiana, entitled "The Tilted Turret—A Clear Track for the Stock." This is a very attractive 45-page booklet, profusely illustrated, describing this well-known turret lathe and some new fittings and equipment now supplied therewith.

Bulletin No. 47942, Sprague Electric Works of the General Electric Company, 527-531 West Thirty-fourth Street, New York City, New York, describing a new line of safety panel boards and cabinets in a great variety of sizes and types which are applicable to many marine installations.

Kerr Economy Marine Equipment, Catalog of the Kerr Turbine Company, Wellsville, New York. This booklet sets forth the advantages of marine turbines with reduction gears in comparison with standard reciprocating engine plants and gives many arrangement plans for various sizes of Kerr turbine reduction gears and lubricating oil systems. Kerr turbine auxiliaries are also described.

Catalog "F," Alberger Pump & Condenser Company, 140 Cedar Street, New York. This book gives a very concise but comprehensive description of the Alberger line of centrifugal pumps and the Alberger-Curtis steam turbines. Tables of dimensions are given for electric reciprocating steam engine and steam turbine driven pumps, both single and in multistage types and in capacity up to 28,000 gallons a minute. The Alberger Pump & Condenser Company also manufacture a complete line of condensers, cooling towers, air pumps, water heaters, expansion joints, water meters and air coolers.

Seattle North Pacific Shipbuilding Company, Seattle, Washington. An attractive, handsomely illustrated brochure describing the shops and the shipbuilding facilities of this corporation.

Catalog "M" of the Thatcher Propeller & Foundry Corporation, Albany, New York. This book describes the lines of anchors, bitts, propeller wheels and general heavy marine hardware and castings. The Thatcher Propeller & Foundry Corporation specialize on nicely balanced cast wheels with blades designed by the Dyson method. They have practically an unlimited capacity for the casting of these wheels and for their accurate machining. They are also equipped to manufacture large castings of practically any design for marine and stationary engine work.

Grinding Machines—A Condensed Catalog of the Products of the Landis Tool Company of Waynesboro, Pennsylvania. This book gives specifications for plain grinding machines up to thirty inches for all classes of work and also specifications for 24-inch roll grinding machines, universal, internal, ball race, cam shaft and cam special grinders are also illustrated, described and their specifications outlined.

Mesta—A Catalog Describing the Plant and the Products of the Mesta Machine Company, Pittsburgh, Pennsylvania. This concern has what is probably the most modernly equipped and largest capacity foundry and machine shop for heavy work in America. They specialize on rolling mill machinery and on gas and steam engines for rolling mills and power plants and on gas and steam blowing engines for blast furnaces. Mesta machinery will be found in all the large iron and steel plants and many of the power plants of the United States and also in the iron and steel plants of Canada, Austria, India, England, France, Italy and Japan. The catalog contains 128 pages, profusely illustrated, and bound in stiff buckram covers. Notable among the many facts concerning the plant is the capacity of the steel foundry for making up to 125 tons in weight, which requires a pouring capacity of 180 tons of molten steel to a single heat. In the gear molding department are many interesting machines for molding spur, bevel and double helical gears. These machines have the same accuracy of dividing mechanism as is found on the modern gear cutting machines. In the forge department will be found steam hydraulic presses up to 2000 tons of the Mesta Company's own design and construction. During the late war the Mesta Machine Company added a complete department for the manufacture of ship shafts and general marine castings, this department being equipped to manufacture from the raw materials to the finished product the largest tail, line, thrust and crank shafts for marine work. The contract for the line, tail and thrust shafts for the first 180 ships to be built at the Hog Island plant of the United States Shipping Board was given to the Mesta Company. These shafts are all finished and assembled in the shop and the accuracy required is that the maximum variation throughout the entire length of any one set of shafting shall not exceed 3/1000 of an inch.

BEERS PIPE-BENDING MACHINE

IN designing, perfecting and placing upon the market the Beers pipe-bending machines, three objects were borne in mind. First, a more economical and simple method of bending pipes; second, a machine that would appeal from its ease of operation; and third, a machine free from complication of construction.

Mr. W. H. Beers, the inventor and developer of this machine, is peculiarly fitted to accomplish these objects. At the age of seventeen he entered upon a four-year apprenticeship with T. J. Bryne & Company of New York, matriculating as a finished pipe fitter. For many years he worked as a pipe fitter and steam fitter with such firms as the Walworth Manufacturing Company of Boston, Westinghouse, Church, Kerr Company, and the Columbia River Shipbuilding Corporation, Portland, Oregon. He acted as superintendent of the meter department of King County Gas Company, New York, and of all pipe installation for Nicola Tesla, Long Island, New York; as chief plumber on the Isle of Porto Rico, and also as chief plumber of the Transport Service, U. S. Army.

It is claimed for the Beers pipe-bending machine that it will bend cold, without injury to the metal, any size up to its capacity, iron pipe, galvanized pipe, copper pipe, electric conduits, cold rolled steel, steel rods, or iron rods, and will form any of these into spiral coils, expansion bends, return bends or any other shapes or curves necessary in steam fitting, general plumbing or electrical installation work. Each machine is guaranteed and thoroughly tested. The apparatus is manufactured in the following sizes:

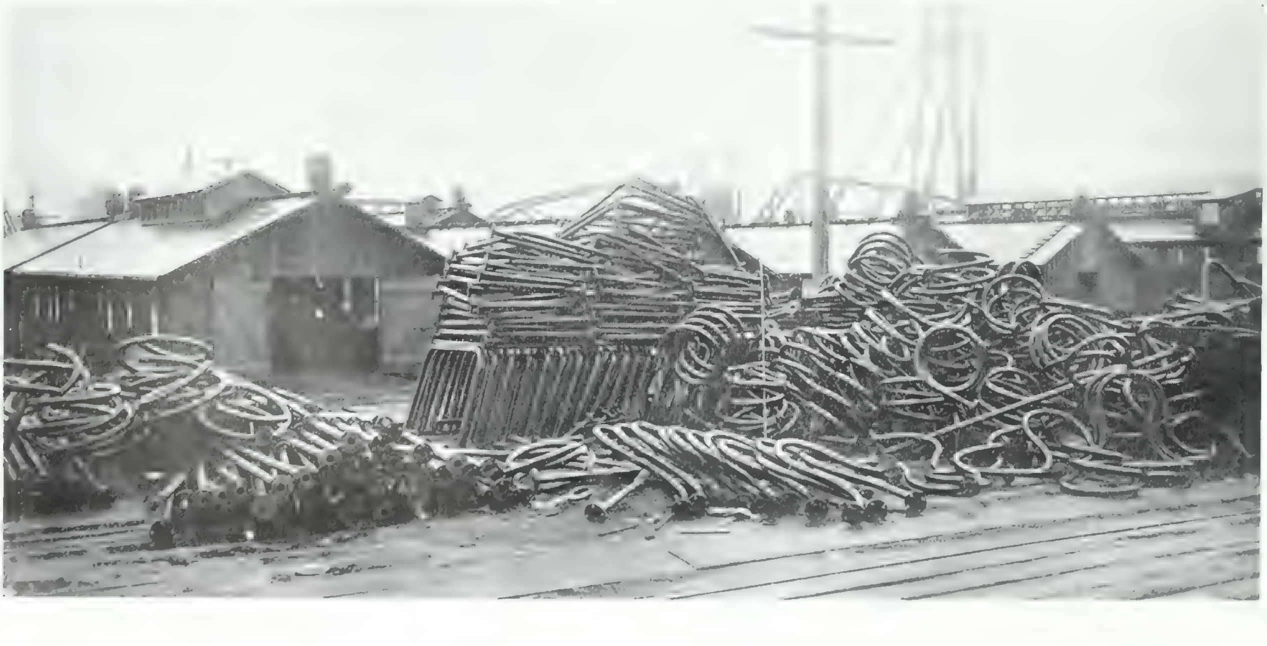
No. 1 Machine: Shipping weight, 1300 pounds; floor space required, 36 inches square; operated by one man; motor power optional; handles pipe sizes ¼ inch, ⅜ inch, ½ inch and 1 inch.

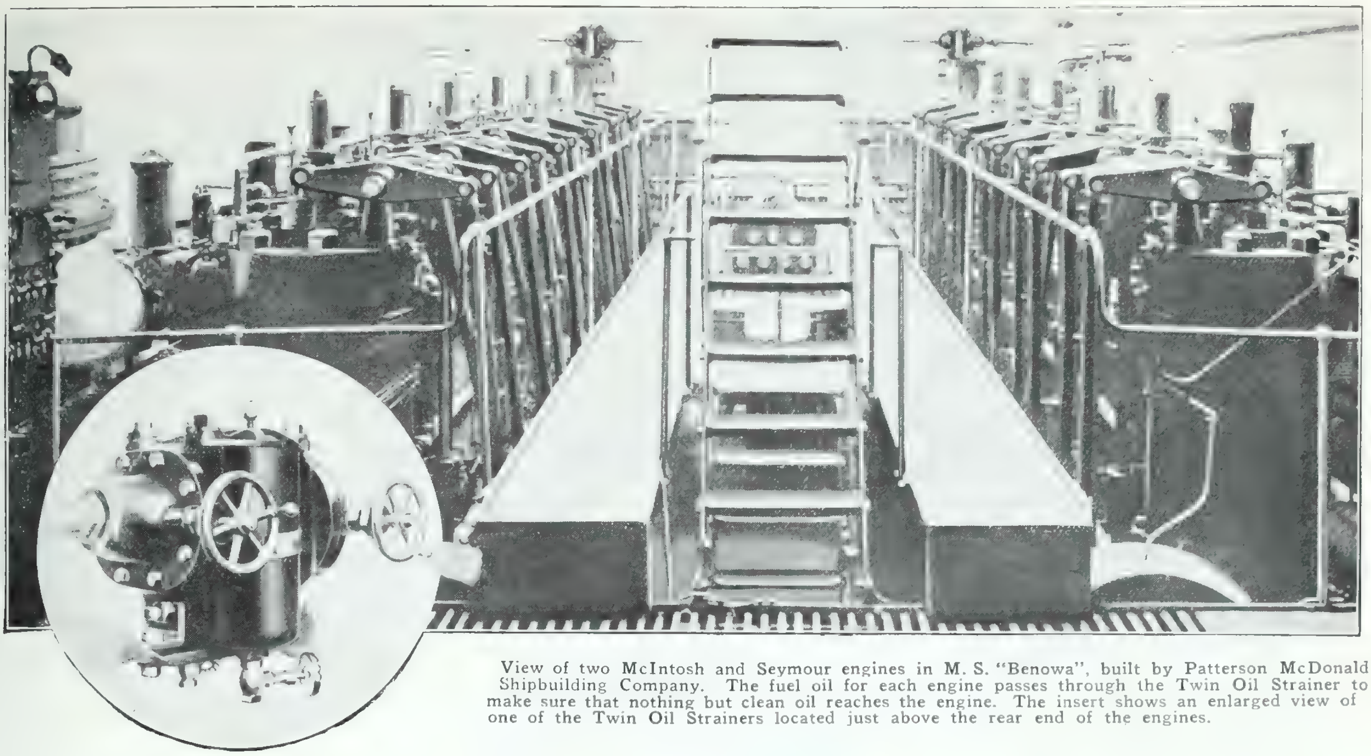
No. 2 Machine: Shipping weight, 2100 pounds; floor space required, 4 by 4; operated by one man; motor power optional; pipe sizes handled, ¾ inch, 1 inch, 1¼ inch, 1½ inch and 2 inches.

No. 3 Machine: Shipping weight, 4 tons; floor space required, 10 by 10; equipped with a motor power and hoist davit; size of pipe handled, 2½ inches, 3 inches, 3½ inches and 4 inches.

No. 4 Machine: Shipping weight, 7 tons; floor space required, 13 by 13; equipped with motor power; size pipe handled, 4½ inches, 5 inches and 6 inches.

(Section continued on page 130e)





View of two McIntosh and Seymour engines in M. S. "Benowa", built by Patterson McDonald Shipbuilding Company. The fuel oil for each engine passes through the Twin Oil Strainer to make sure that nothing but clean oil reaches the engine. The insert shows an enlarged view of one of the Twin Oil Strainers located just above the rear end of the engines.

The Twin Oil Strainer

gives the same service as two single strainers, but it is more convenient to operate, requires less space for installation and does away with the extra valves and piping necessary to connect up. These are the features that lead to its being used in submarines and destroyers for the United States Navy, and in cargo boats for the United States Merchant Marine.

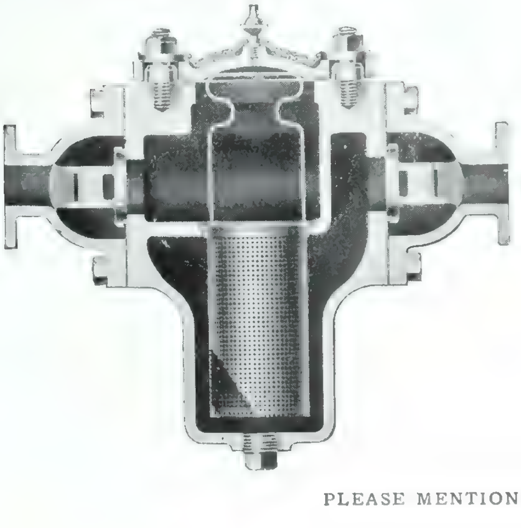
Twin Oil Strainers are furnished in sizes from 1 to 5 inch. (2½ inch and larger sizes have flanged connections). Basket mesh 1/64 inch or larger. Complete information in bulletin "AA" which will be sent on request.

USE TWIN OIL STRAINERS AND INSURE A CONTINUOUS SUPPLY OF CLEAN OIL.

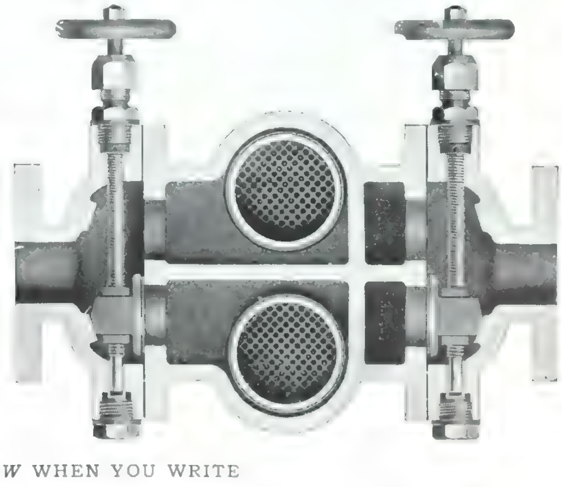
ELLIOTT COMPANY

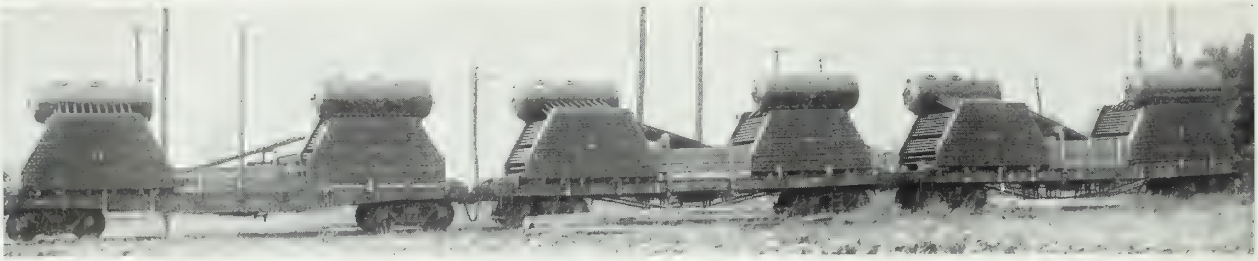
443 Grant St., Pittsburgh, Pa.

The oil enters the Strainer at the left and empties into and passes through the straining basket, then up and out at the right. All solid impurities are retained in the straining basket.



When a basket is clogged, the valves are shifted to direct the flow of oil into the clean basket, which is in reserve. The compartment containing the dirty basket is then opened up, the basket removed, cleaned and replaced, and held in reserve until the basket then in service needs cleaning.



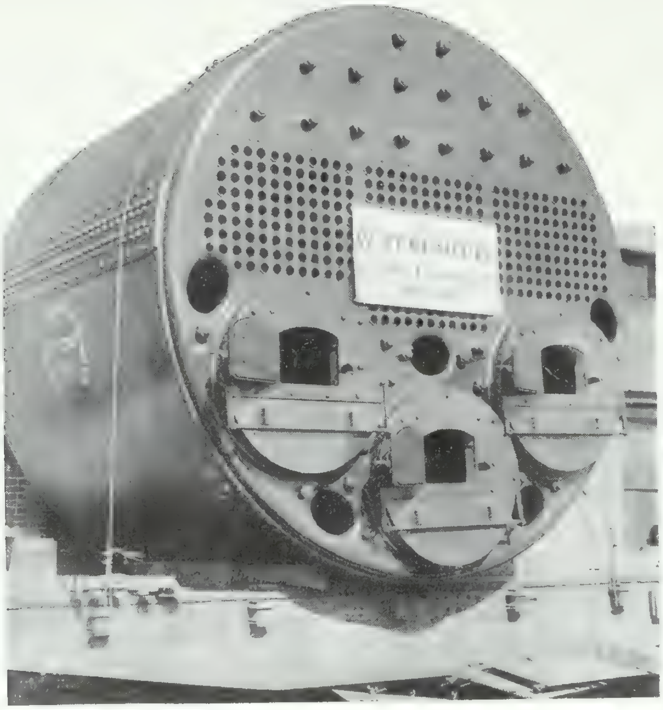


THE BOILERS FOR THREE OF THE SHIPS

Standard Marine Water Tube Boilers

For

U. S. Shipping Board Emergency Fleet Corp.



14'6"×12'0" SCOTCH MARINE BOILERS FOR
HARBOR TUGS U. S. SHIPPING BOARD

Ask the Engineers and Inspectors of the Emergency Fleet Corp.

Ask the Inspectors of the American Bureau and the U. S. Steamboat Inspector Service.

Ask the Shipbuilder who installed our Boilers.

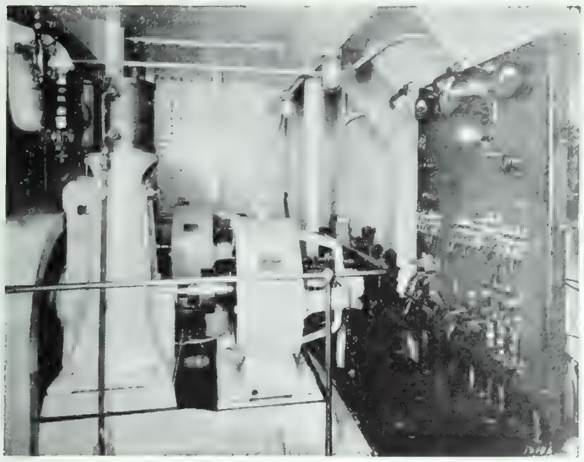
We will rest our case on what they unite in saying about the QUALITY OF OUR WORK.

DE PERE MANUFACTURING CO.

CHICAGO
ILL.

WEST DE PERE
WIS.

A New Marine Lighting Outfit

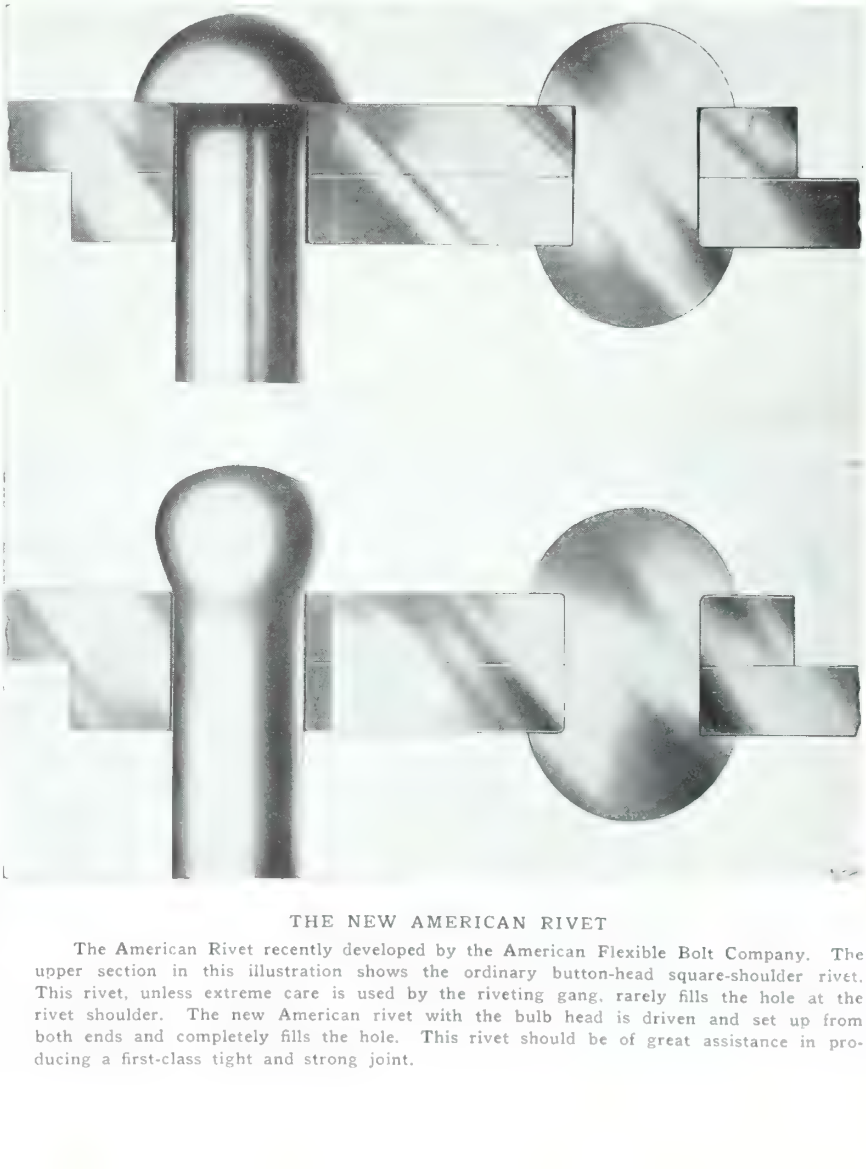


Above: A 15 kilowat steam engine driven marine electric light generator. Engine built by Clarage Fan Company. Generator built by Westinghouse Electric & Manufacturing Company. Left: Shipping room of the American Flexible Bolt Company.

A NEW line of engine-driven marine lighting generators, designed especially to insure reliability of operation, has recently been developed by the Westinghouse Electric & Manufacturing Company. The sets range in size from two to fifty kilowatts, and each consists of a steam engine coupled to a generator, the whole being mounted on a bedplate so as to form a compact unit The fifteen kilowatt size, shown in the illustration, is six feet long, three feet wide, five feet high, and weighs about 3300 pounds.

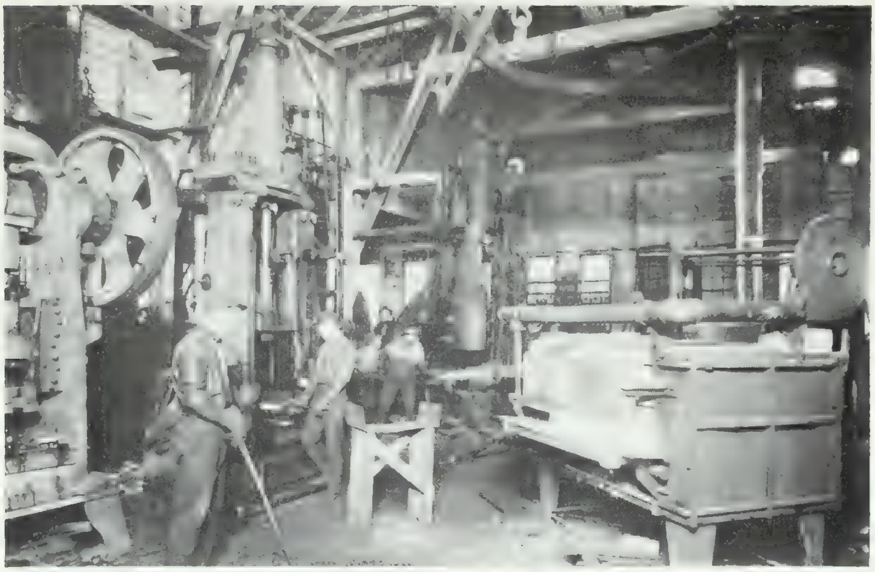
The engine used in these sets is manufactured by the Clarage Fan Company. It is of the single cylinder, vertical enclosed V type with automatic lubrication. It can be supplied for operation on steam pressures of from 80 to 250 pounds, and is suitable for either condensing or non-condensing service. The engine speed ranges from 500 r. p. m. in the smallest sizes to 350 r. p. m. in the largest.

The generator, while in general of standard Westinghouse construction, is specially designed for marine service. The bearings are arranged so that perfect lubrication is assured, regardless of the tossing of the vessel. The windings are specially insulated to protect them from salt and dampness. Metal parts subject to corrosion are made of non-corroding alloys. A special feature of these generators is their freedom from sparking at the commutator, even under heavy overloads. They are supplied for either 125 or 250 volts, direct current, and for either two or three wire systems.



THE NEW AMERICAN RIVET

The American Rivet recently developed by the American Flexible Bolt Company. The upper section in this illustration shows the ordinary button-head square-shoulder rivet. This rivet, unless extreme care is used by the riveting gang, rarely fills the hole at the rivet shoulder. The new American rivet with the bulb head is driven and set up from both ends and completely fills the hole. This rivet should be of great assistance in producing a first-class tight and strong joint.



The Seattle shop of the Bacon & Matheson Forge Company showing Erie steam hammers for drop forging and Mahr Furnace

SEATTLE'S FIRST DROP FORGE PLANT

The Bacon & Matheson Forge Company of Seattle has recently installed a new steam drop hammer built by the Erie Foundry Company of Erie, Pennsylvania, and, in connection with this hammer, a complete equipment for die sinking, so that this firm will now be able to supply manufacturers of the Pacific Coast with drop forgings made to almost any specification of steel alloy up to the limit of its hammer capacity. It is not necessary at this stage of our engineering and manufacturing development to expatiate on the advantages of drop forgings over the ordinary cast metal. In any machinery part where lightness and strength are considerations, the drop forging is practically standard specification and the fact that this well-known Seattle firm is going to specialize on the production of fine drop forgings and their special heat treatment will be welcomed by every manufacturer of machinery on the Pacific Coast.

A HANDY INDICATOR CORD HOOK

A VERY simple and ingenious indicator cord hook has been developed and patented by the Trill Indicator Company of Corry, Pennsylvania, which enables the engineer to connect the indicator cord with the cross-head of a high-speed engine as easily and quickly as with a low-speed engine.

Experienced engineers appreciate the difficulties and dangers involved in connecting the ordinary indicator cord to the standard on a cross-head. This is especially true in cramped places and on high-speed engines. Not only does the engineer risk his life, but there is danger that the indicator may be wrecked.

Numerous devices have already been designed for safely accomplishing this feat, but these devices, although more or less successful, have proved cumbersome and expensive.

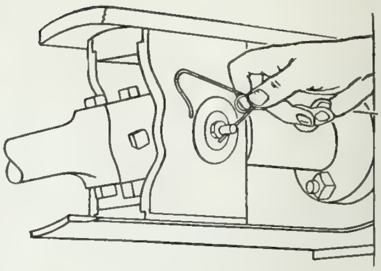


Fig. 1

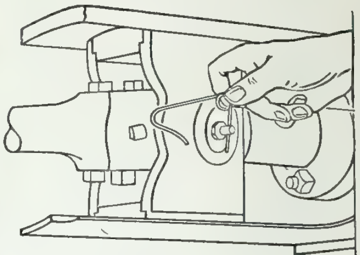


Fig. 2

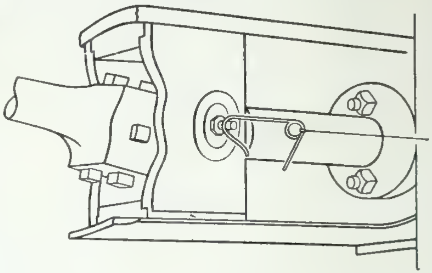


Fig. 3

The Trill handy indicator cord hook

The three accompanying illustrations clearly show how the patented Trill cord hook is attached while the engine is running. The loop of the hook is held between the thumb and the finger, as illustrated in Figure 1, in such a position as to allow the pin on the standard to strike the straight part of the hook when the standard is within about one inch of the end of its travel. The hook swings about the thumb and finger as a pivot, as illustrated in Figure 2, which action shoves the hook downward. At that instant the piston has reached the end of its stroke. On the return stroke, the pin on the standard engages the hook, as illustrated in Figure 3, and the attachment is complete. The operation is very simple and there is absolutely no danger involved.

A group of match plate patterns used in the foundry of the Price-Corcoran Pfister Company, Los Angeles

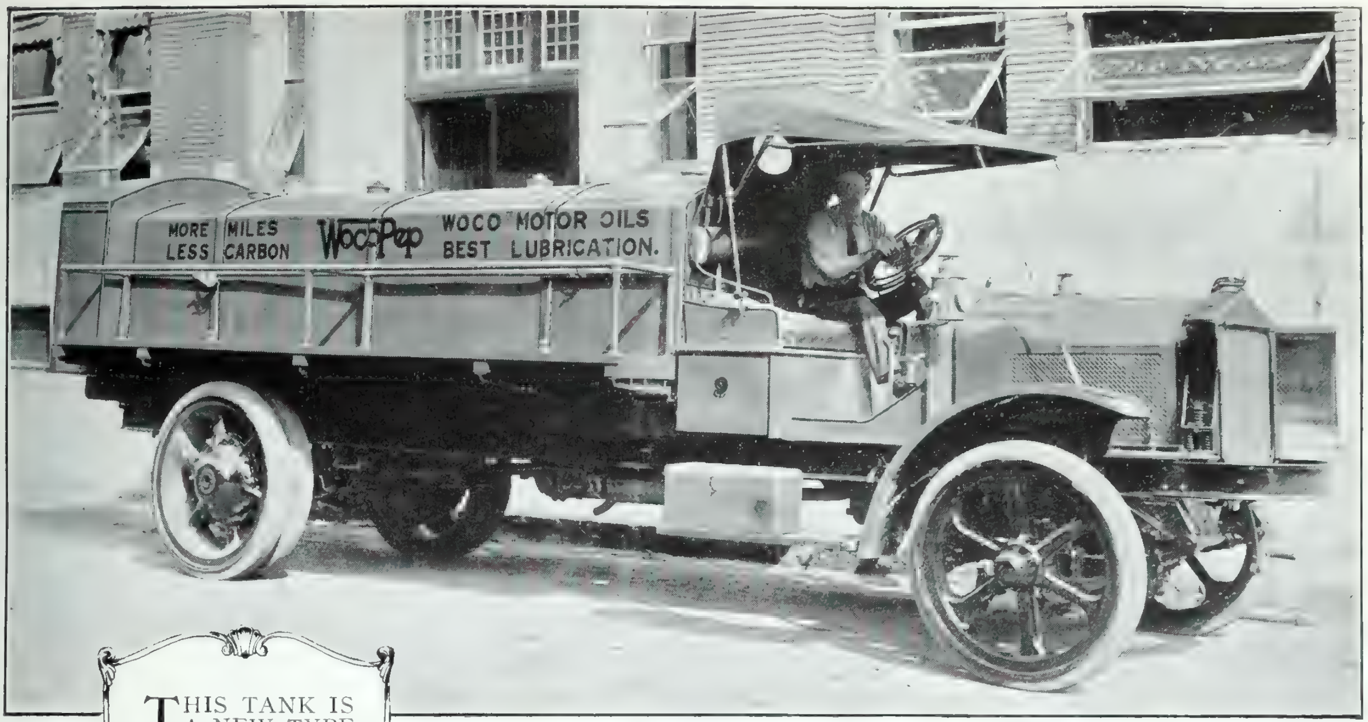
S-M UNIVERSAL CONDUIT BOX

THE conduit box shown here meets practically every requirement as an outlet for electric wiring in a conduit system and can be used for junction, switch, plug, receptacle, angle or pendant fixtures and other devices. Thus it is a "Universal Box." This unusual but very useful feature is made possible because the box serves as a sort of unit which can be made to fit any of the above requirements, merely by adding different types of covers and fittings to meet the individual case.

Furthermore, the box is drilled and tapped to be used either for a one, two, three or four way. These holes are sealed absolutely pressure-tight by patented plugs as illustrated above thus possessing all the advantages of a knock-out box, and yet being threaded for pipe, for one or more ways.

This is a most useful feature, since it makes it unnecessary to know in advance how many boxes of one, two,

(Section continued on page 130h)



THIS TANK IS A NEW TYPE OF ONE-PIECE CONSTRUCTION WHICH WAS ESPECIALLY BUILT BY THE WELDED PRODUCTS CO., BIRMINGHAM, ALABAMA, TO CARRY WOCO MOTOR OILS.

Truck Held Together By Welded Tank When Side Frame Breaks

THE 1,000 gallon, 4 compartment oil tank on this 3½ ton chassis is oxy-acetylene welded in every seam.

It was built to carry heavy loads over southern country roads that "treat 'em rough". The beauty and finish of the tank work are undeniable.

Its strength was amply proven on a recent trip when the rear end of the truck dropped into a deep ditch and one of the 6-inch channel side-frame members snapped clean through. But——

So strong and rigid was the welded tank that, from its 3-point suspension, it held the truck together and permitted it to run to the repair shop on its own power, supported by the tank.

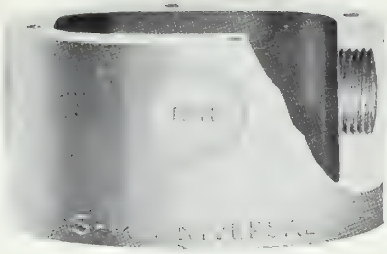
Prest-O-Lite

DISSOLVED ACETYLENE

in its convenient portable cylinders is every day opening up to manufacturers new and important economies in metal working through the use of the oxy-acetylene process.

Why not tell Prest-O-Lite Engineers what sort of metal work you do? Very likely they can help you to make it stronger, better—and cheaper.

THE PREST-O-LITE COMPANY, Inc., 30 East 42nd Street, New York
Kohl Building, San Francisco
In Canada, Prest-O-Lite Co. of Canada, Limited, Toronto



The Seidler universal conduit box

three or four ways are to be used, which information is so necessary in the use of boxes with threaded hubs. Unlike the latter, the Universal Box, once it is installed, need not be taken out when it becomes necessary to make additional runs. To take care of this, merely knock out a plug and screw in the conduit.

The same simplicity applies when it is desired to change from a plug to a fixture, switch or junction, merely by changing the covers.

This Universal Box eliminates the need of a large assortment of fixtures. One type of box, easily fitted with a few interchangeable connecting parts, will accommodate a plain globe holder at practically any desired angle. The combined cost of these parts with the plain fixture and the S-M Universal Box average less than the made-up combinations and very much smaller assortment of material is required.

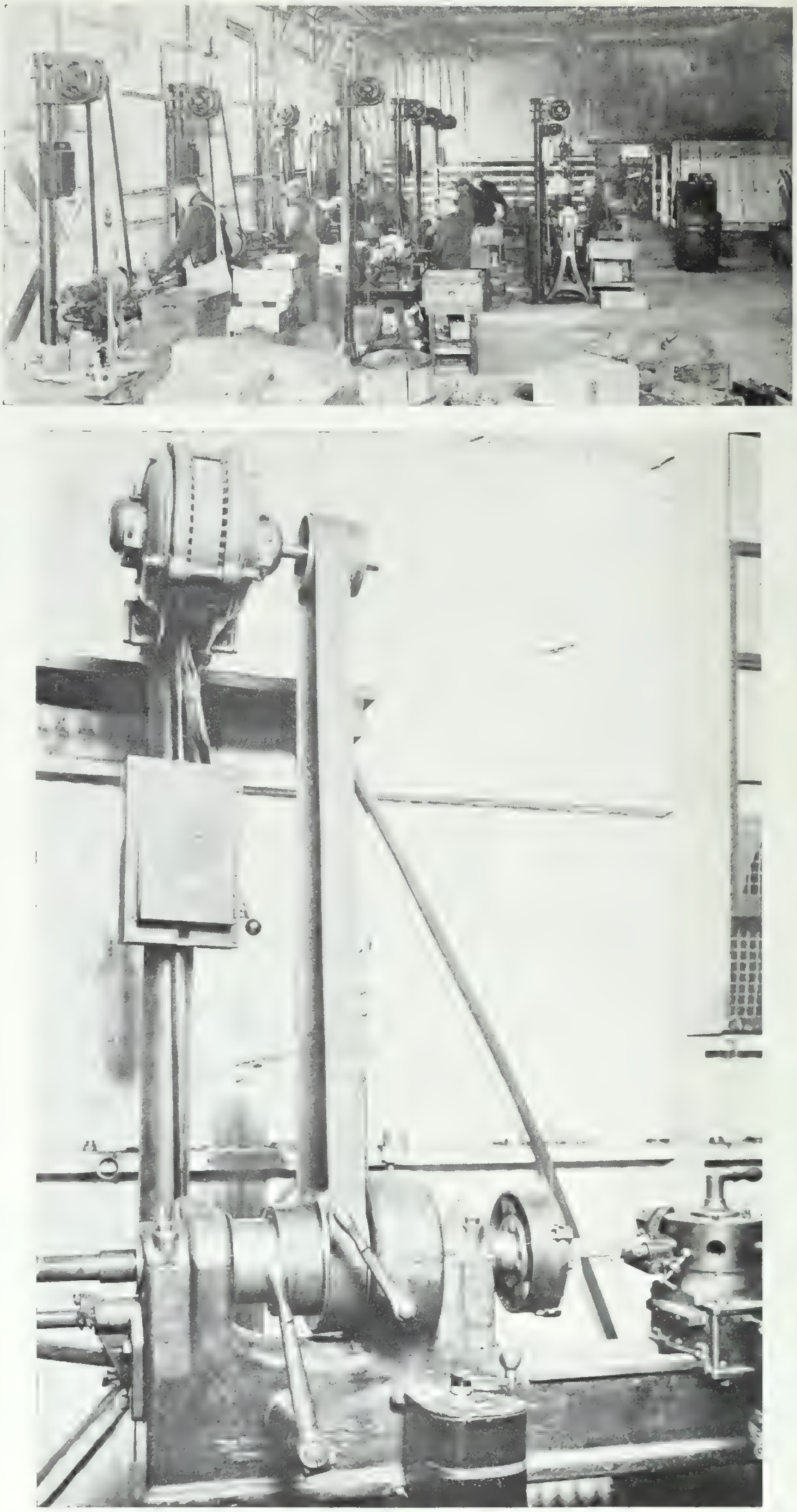
This conduit box is made by the Seidler-Miner Company of Detroit, and they have just issued a new catalog illustrating a few of the many combinations possible through the use of this device. We suggest that you send for a copy of this catalog.

A MODERN BRASS FACTORY

THE Price-Corcoran-Pfister Company of Los Angeles has found that modern manufacturing equipment has paid big dividends, enabling it to compete with the large Eastern manufacturers of brass fittings for steam, gas, water and oil. The accompanying illustrations show the brass turning equipment. It will be noted that there are eleven Warner & Swasey brass working turret lathes. The machines were sold by Smith-Booth-Usher Company, the Los Angeles distributors of the Warner & Swasey line.

A very interesting factor in this Warner & Swasey installation is to be found in the manner in which the individual electric power is connected up with these machines. It will be noted in the illustration that the electric motors are mounted on individual columns with the electric controller mounted on the bed plate of the lathes. Thus the operator has quick control of the machine, bringing the lathe to a quick stop by merely moving the handle of the controller past "stop position" to reverse.

The Price-Corcoran-Pfister Company is manufacturing a very complete line of brass goods and its present business has increased to such an extent that its capacity will be doubled during the coming year. The firm's plans call for an extension of the present site to an additional 50,000 square feet.



Above: Group of Warner-Swasey Brass working turret lathes in the shop of the Price-Corcoran-Pfister Company: Below: Special column electric drive. Note controller at headstock of lathe.

Besides modern screw machines, other factors contributing to the success of this business are molding and metal departments, in which are used brass melting furnaces of Price-Corcoran-Pfister design, manufactured in their own plant. Match plate patterns are used in the molding rooms. These are made at considerable expense but are found to greatly speed up production, reduce costs, and tend to uniformity of result.

Hydraulic Turbines. Wellman-Seaver-Morgan Company of Cleveland, Ohio. A 100-page book, 17 pages of which are devoted to a consideration of hydraulic turbine characteristics, 21 pages to plant design and details of construction in hydro-electric power plant and 62 pages to a description of some of the products and installations in the hydro-electric field of the Wellman-Seaver-Morgan Company.

(Section continued on 132)

TACKLE
BLOCKS
with a
Safety Factor
of
Five to One!

The **safe working load** of each block with shackle fitting is equal to that of the best quality manila or plow steel wire rope used, **with a safety factor of five to one.**

Scientifically built to stand the strain of strenuous service

PARISH DEPENDABLE
Tackle Blocks

mean safety to life and property — ease and smoothness in handling all loads—and enduring economy in operation.

Complete catalogue upon request

Parish Supply & Mfg. Co.
TACKLE BLOCKS *CONSTRUCTION TOOLS*
2860 Quinn Street
CHICAGO

Entrance and file room, Cox & Stevens, New York

INCREASED ACTIVITY IN VESSEL DESIGN AND BROKERAGE

As an evidence of the increasing importance of shipbuilding and ship operation in all its branches, the development of the firm of Cox & Stevens, naval architects and engineers, may be noted.

This firm has been in operation for some fifteen years and has divided its attention between commercial vessels and pleasure craft.

During the past six years the volume of their business has increased greatly and their organization has been developed so as to be able to handle efficiently the various classes of business in which they are engaged.

This firm recently found itself cramped in its New York quarters, and, requiring additional space where its designing work could properly be carried out, decided to consider establishing its designing office and drafting room in Brooklyn, where it has recently secured most attractive quarters, as shown in the accompanying illustrations.

The main office of Cox & Stevens is still at 15 William street, New York, where vessel and yacht brokerage is conducted and where the members of the firm transact their business. The Brooklyn office is in the Terminal building at Borough Hall and is within fifteen minutes of New York via subway.

Corner of main drafting room, Cox & Stevens, New York

This arrangement has been in force for several months and is found to work well. As a result, carrying out of professional work proceeds under admirable conditions and without interruption, and, in addition, owing to the space available in the Brooklyn office, a large additional force of draftsmen can be put on at any time to take up special or rush work.

Drafting room, Cox & Stevens, New York

The organization of this firm is well known to those familiar with vessel matters, but it may be said that it includes highly qualified men who are in charge of the various branches of the work which are under separate management so that the various departments are kept separate, all being under one control.

In the early days of their activities, Cox & Stevens were perhaps best known in connection with yacht design and yacht brokerage, which departments have always been operated at high efficiency, the volume of business in these branches equalling, if not exceeding, that of any other similar organization, and many well-known and successful pleasure craft, including seagoing yachts, fast express turbine yachts, house boats, motorboats and sailing vessels, have been built from their designs.

Subsequently it developed that there was a larger field in the design and superintendence of construction of commercial vessels and the firm has given an increasingly large portion of its time to this work, without, however, in any wav neglecting the yachting field.

The submarine tender Fulton, the first full Diesel engined motorship in this country, was designed by this firm, as well as some of the earliest geared turbine and motor engined tankers.

Among the most important recent undertakings that this firm has executed or is now in process of handling, may be mentioned forty auxiliary schooners, twenty steamers and thirty-eight mine sweepers for the Foundation Company; twenty trawlers for the East Coast Fisheries Company; one hundred and twenty-four steel vessels, including towboats, self-propelled barges and barges without power, for the United States Railroad Administration; the superintendence of new construction for the Aluminum Company of America, including two steamers, two ocean-going barges and a number of river craft; the superintendence of two 10,000-ton steamers for the Shawmut Steamship Company; the rearrangement as passenger vessels and the conversion to oil-burning from coal of several large steamers for the Shipping Board, and the design and superintendence of construction of the largest Diesel engined yacht that has yet been built in this country.

¶ Your patronage during the past year is appreciated.

¶ The Llewellyn rolling mills are working to fullest capacity; although our organization is experiencing unprecedented demands, we are confident that your requirements during 1920 will be supplied.

INGOTS BILLETS

BARS SHAPES

Heavy Forgings Steel Castings

LLEWELLYN IRON WORKS

Cable Address:
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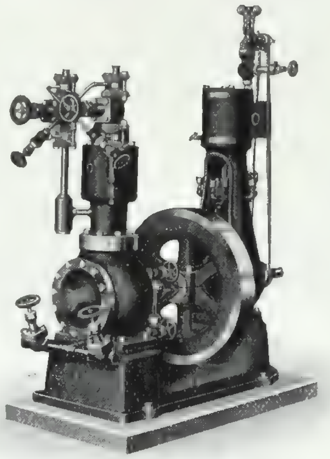
Rolling Mill Products, Marine Water, Oil and Fuel Tanks, Marine Boilers and Engines

ICE MACHINES

FOR SHIPS

"ON-TIME" DELIVERY



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BEDELL ENGINEERING CO.

LOS ANGELES

We offer our experience of many years
as specialists in Marine Refrigeration.

W. T. Cleverdon

Average Adjuster

FOR SALE

Salvage from the Passenger
"S. S. Bear"

4500 H. P. Engines, Anchor and Cargo Winches, and General Equipment

Also numerous other Engines and Boilers (up to 1200 H. P.) from other vessels

Steamers and Tugs for Sale

Nickel Steel **Hull,** 170x17x5' 11"
Torpedo Boat **"Rowan"** and
3 **Thornycroft Boilers,** 3200 H. P.

FIFE BUILDING **SAN FRANCISCO**

P & H
Improved No. 12 Boring and Drilling Machine

The invention of the P & H Horizontal Drilling and Boring Machine had its origin in the need for a machine in our own plant capable of operating on the bulky parts characteristic of our principal products,—cranes, hoists, and monorail systems. The P & H Horizontal provides not only for accuracy but great convenience of operation; centralized control allows the operator to maintain a fixed position while changing speeds.

The compactness of design, the ease of operation and the versatility of performance of the P & H make it indispensable equipment in the modern machine shop.

Write our Western Offices for Blue-Book of P & H Drilling & Boring Machines

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Oregon Fruits and Vegetables for Every Time and Clime

By H. B. Kelly

CHOICEST fruits and succulent vegetables from the Pacific Northwest available the year round—this is the newest gift of modern science. A novel type of food conservation by dehydration has been perfected that endows man with rare powers over the old problem of distributing supplies.

Reduced to simple and brief terms, dehydration is super-drying—the removal of the water content. The trade term distinguishes a special type of process to preserve fruits, vegetables, meats, fish and eggs for indefinite periods. Properly done, this process entails no loss of the original constituents of the material. The mineral salts, vita-mines, acids, proteins, etc., are retained in their original fullness and the cellular structure remains intact.

The basic principle of modern dehydration is a gradual extraction of the moisture content at low temperatures by means of the action of air drawn over the material. Mechanical and automatic devices control both the velocity of the air current and its temperature, thus insuring a thorough and even drying. The column of air passing through the drying tunnels varies from 25,000 to 50,000 feet a minute, yet so gradual is the action of capillary attraction on the raw material that the cell structure goes through the process unbroken.

Dehydration reduces the weight without sacrificing quality. The following table of comparisons shows the reduction effected:

	Number pounds of fresh required to make one pound of dehydrated
Apples	10
Apricots	5
Cherries (pitted)	5
Loganberries	6
Pears (peeled)	8
Peaches (peeled)	10
Prunes	3½
Raspberries	6
Strawberries	8
Cranberries	6½
Beets	9
Cabbage	12
Carrots	10
Celery	15½
Onions	10
Parsnips	8
Potatoes	6
Pumpkin	13
Squash	9
Spinach	15
Stringless Beans	10
Tomatoes	15
Turnips	15

Transportation problems are still further simplified by dehydration through the decrease in volume of the product and the fact that for overland shipments these products do not require hermetic sealing.

The dietetic value of dehydrated products compares favorably with that of fresh fruits and vegetables. Prolonged feeding tests on guinea pigs show that crisp, newly gathered vegetables, properly dehydrated, retain in the finished state their full, life-sustaining and anti-scorbutic properties; whereas there is practically a total loss of these constituents in the withered, green vegetables that have been picked for several days—a type too often offered for sale in congested consuming centers.

Because of the diversity of its products, the Pacific Coast has given impetus to this new industry. An Oregon firm is establishing dehydration in the national market with an educational campaign calling for space in the most influential media in the country. The King's Food Products Company is backing their advertising with the combined output of two huge plants. The sanitary features of these factories would please the most fastidious housewife. Of the daylight type of construction, they are big and airy, eliminating dark nooks and dirty corners. The snow-white walls and working tables in the big preparatory rooms are flushed daily and thoroughly scoured. Here the vegetables are washed, scraped and diced; the fruits pared, cored and pitted. Steel cars carry the products from the tables on through the processing, eliminating the touch of human hands.

The possibilities for export trade in the excellent horticultural products for which California, Oregon and Washington are justly famous, will be multiplied manyfold by the development of dehydrated plants like those of the King's Food Products Company.

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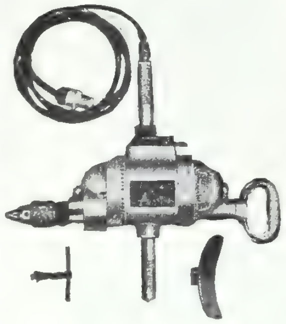

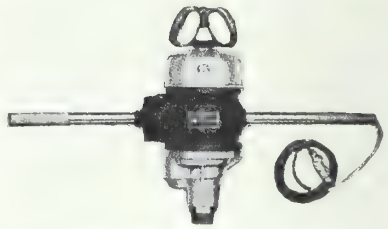

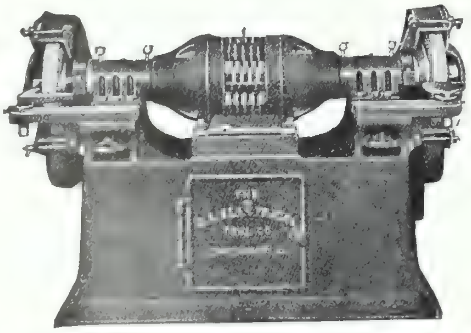

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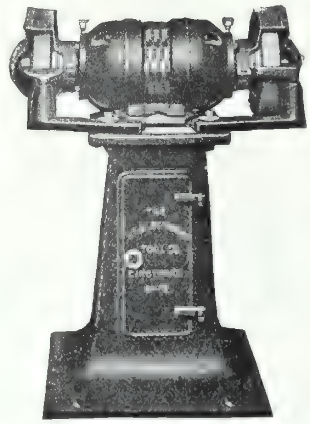

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Pacific Marine Review

FEBRUARY
1920

NATIONAL FOREIGN
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MAY 1920

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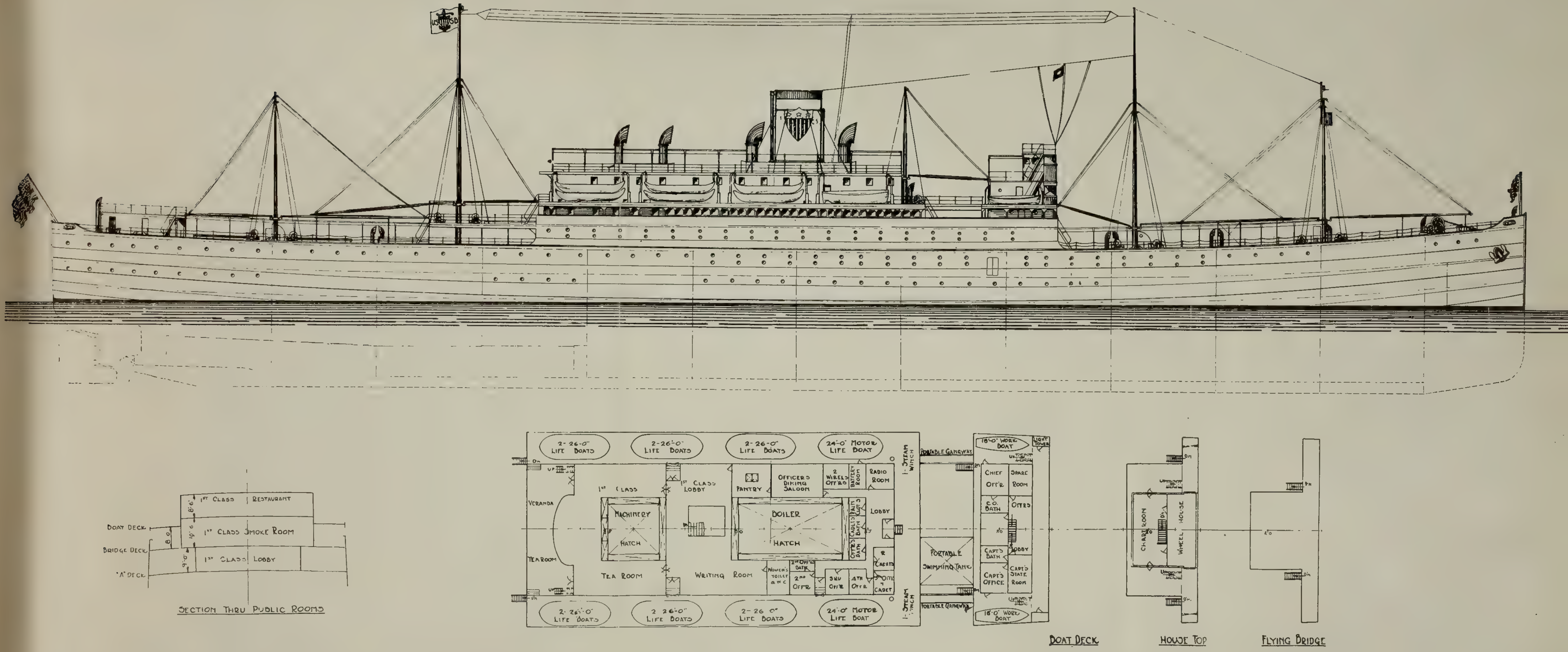
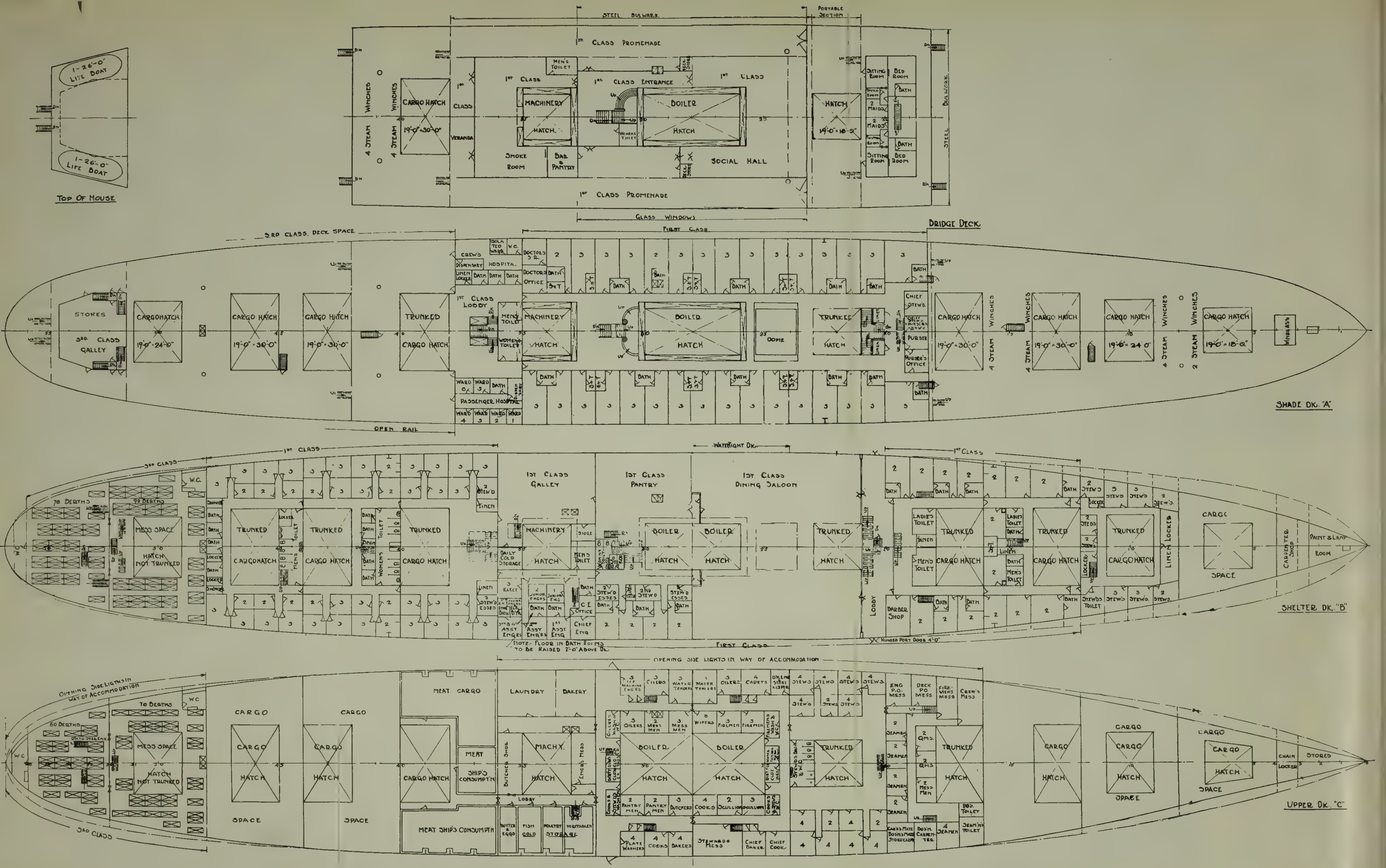
New Passenger Liners of the United States Shipping Board



Outboard Profile and Superstructure Plans of 535-Foot Type



Deck Plans of 535-Foot Passenger Liners of U. S. Shipping Board

Pacific Marine Review

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The National Magazine of Shipping

February, 1920

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The Shipping Board Passenger Liners

CONSIDERABLE press publicity has been given to the prospective 1000-foot passenger liners which the Shipping Board has in contemplation, and which, if built, would give to America the crown of supremacy in the North Atlantic passenger ship lanes.

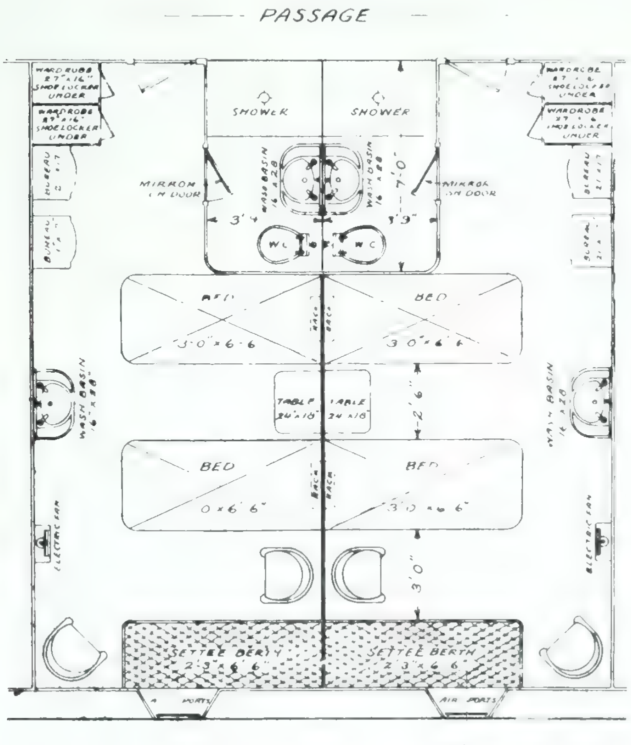
We must confess, however, that, as practical ship-minded citizens, and particularly as residents of the Pacific Coast, we are much more interested in the actual construction program of the Shipping Board that is now being carried out; that is, the converting of army and navy troopships into first-class, moderate sized passenger liners and passenger and freight steamers which will be used in the trans-Pacific service with home ports at Seattle, Portland and San Francisco. We are therefore very glad to be able this month to give to our readers profiles, plans, and artists' sketches showing all the salient features of these new steamers.

These vessels will be of two types, and for the purposes of description in this article, they will be known as the "535-foot type" and the "502-foot type." These figures represent the respective lengths of each type. Nineteen of the 535-foot type are being converted to passenger ships, two by the Newport Shipbuilding & Drydock Company, eight at Sparrows Point, and nine by the New York Shipbuilding Company. Seven of the 502-foot type are now under construction at the plant of the New York Shipbuilding Company. It is stated that all these vessels are for Pacific Ocean routes.

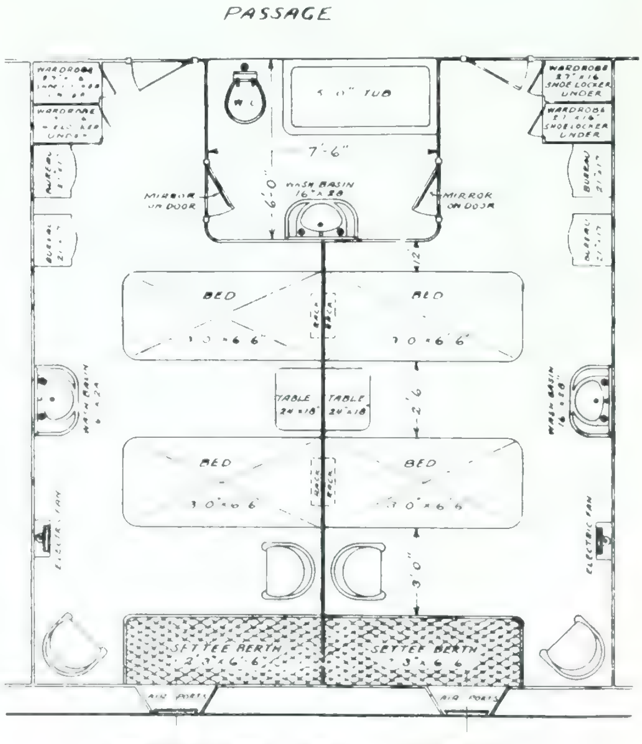
The following data and descriptive matter are compiled from information sent out by the Construction and Repair Department of the Operating Division of the Emergency Fleet Corporation of the United States Shipping Board.

The 535-Foot Type

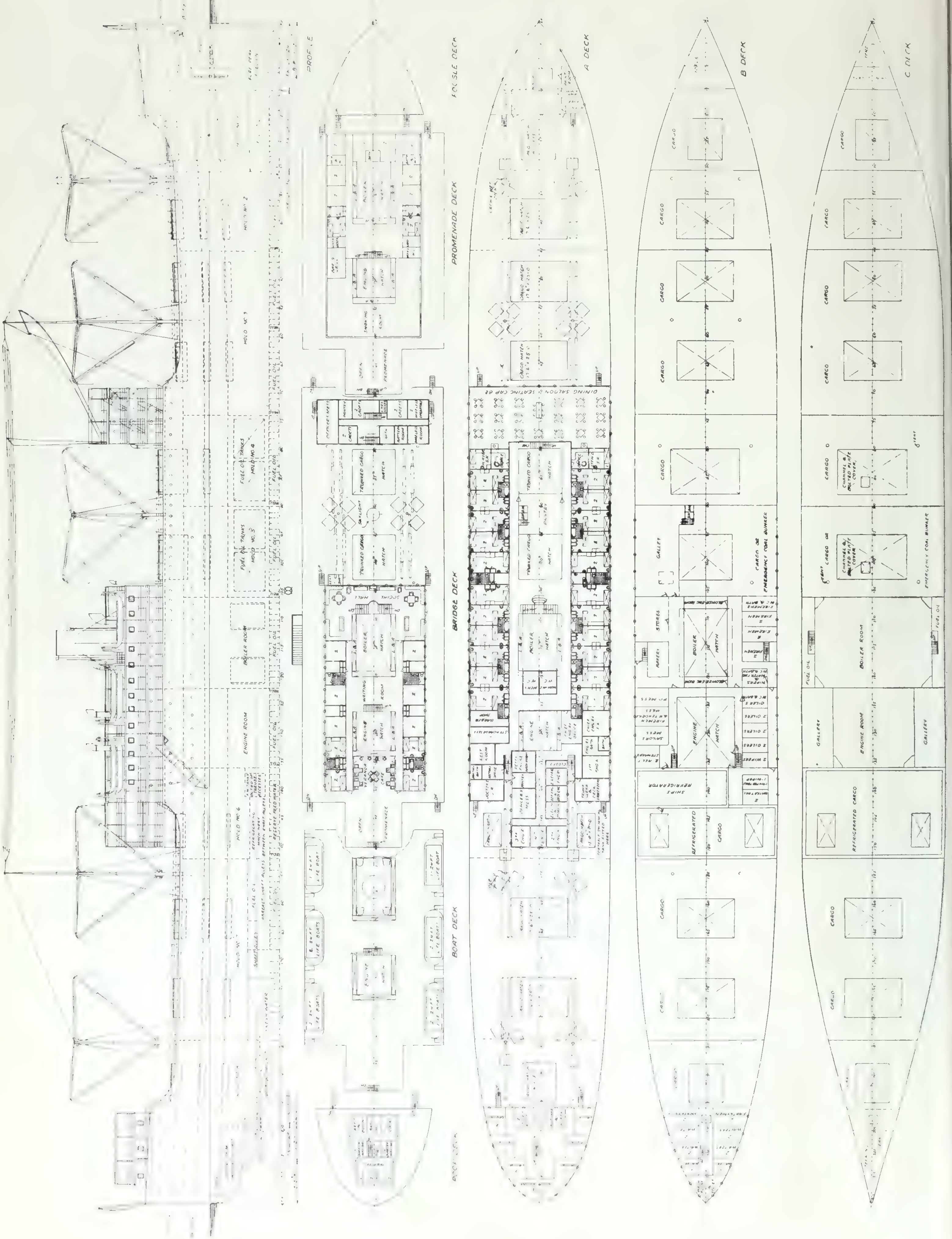
These vessels, as will be noted in the artist's drawing and outboard profile shown herewith, are of the flush deck type. They will have a length overall of 535 feet and a length between perpendiculars of 518 feet; beam molded 72 feet; depth to shade deck 50 feet; draft 30 feet 6 inches; freeboard 19 feet 6 inches. Passenger accommodations are provided for 257 first-class passengers and 300 third-class passengers. As shown in the illustrations, the first-class accommodations are devised with a view to great comfort, the state rooms being arranged in pairs with communicating bath and being provided with all the modern conveniences for making sea travel luxurious.



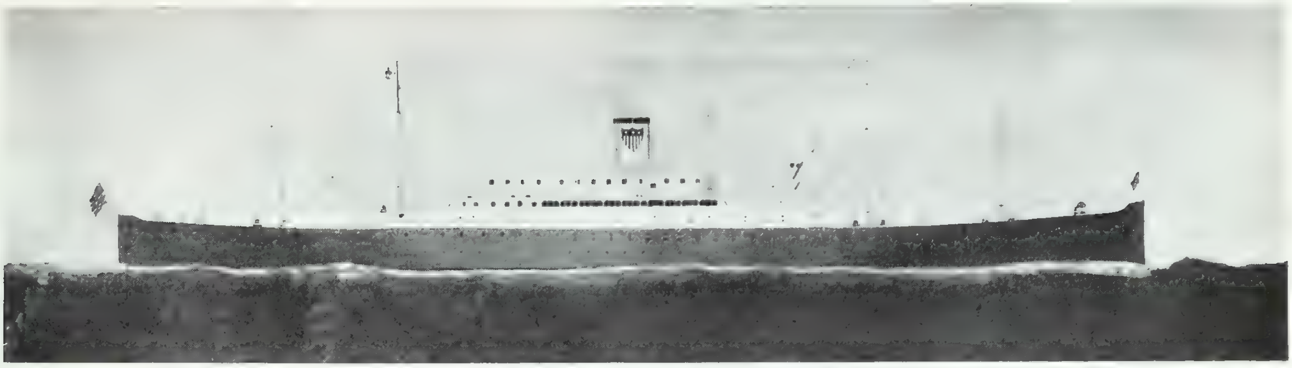
Plan of combination double staterooms with individual shower baths



Plan of combination stateroom with communicating bath room



Inboard profile and deck plans of the United States Shipping Board passenger and cargo steamers, 502-foot type



Artist's drawing of United States Shipping Board 535-foot passenger liner

The holds on this type of ship will furnish capacity for the carriage of 11,000 tons deadweight in cargo. Abundance of hatches are provided to take care of quick turnover of cargo. There are five hatches 19 feet wide by 30 feet long; two 19 feet wide by 24 feet long and two 19 feet wide by 18 feet long.

The fuel oil tanks have a capacity for 3290 tons, and the power plant is equipped with water-tube oil burning boilers and turbines, giving a total shaft horse power of 12,000, which drives the hull at a sea speed of seventeen knots and gives a steaming radius of 11,700 miles. This steaming radius is amply sufficient for a round trip from San Francisco or Seattle to Yokohama and return, either direct or by way of Honolulu, and is sufficient for the round trip to Hongkong or the Straits Settlements with a partial fueling on the way back at either Manila or Honolulu.

These 535-foot ships will certainly be a welcome addition to the American passenger fleet on the Pacific ocean, and should be a great commercial success, as they will undoubtedly be able almost constantly to have both passenger and cargo accommodations filled to the limit.

The 502-Foot Type

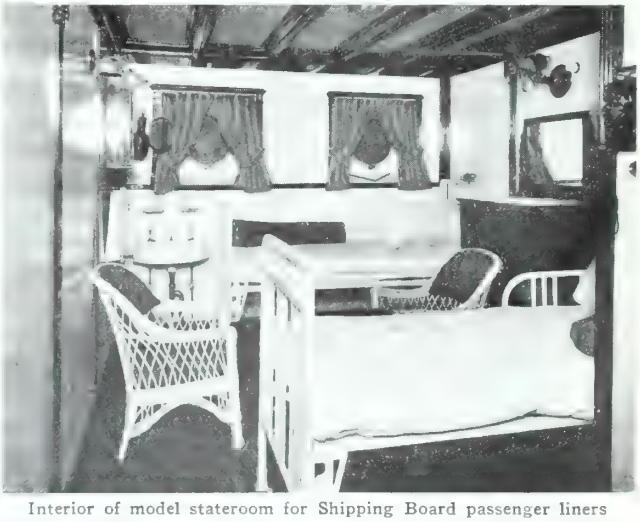
This type is intended mainly as a freight carrier with limited accommodation for first-class passengers. The length between perpendiculars is 502 feet, beam molded 62 feet, depth molded 42 feet, draft 31 feet 9 inches, freeboard 10 feet 3 inches. As will be noted from the pictures, these ships are of the well-known double well-deck type. The deadweight capacity is 12,000 tons.

A very lavish equipment has been provided for the handling of cargo. The deck plans show no less than 34 winches and a similar number of booms arranged singly and in pairs on ten cargo masts. There are five hatches, 17 feet 6 inches by 25 feet, one 18 feet by 15 feet, one 17 feet 6 inches by 15 feet, two 19 feet by 20 feet, all of which are served by at least two cargo booms and winches, and each of the five larger hatches is served by four booms and winches. In addition there are two smaller cargo hatches 8 feet by 15 feet, used for the refrigerated cargo space, each served by a boom and winch. The passenger accommodations on these boats are similar in every way to those on the 535-foot type, but are limited to seventy-six first-class cabin passengers.

These vessels have a power plant of oil burning Scotch boilers and reciprocating engines with a shaft horse power of 7000, which will drive the hull at a sea speed of fourteen knots an hour. The fuel oil tanks have a capacity of 3550 tons, which gives the vessel a steaming radius of 15,000 miles, amply sufficient for a round trip from the Pacific Coast of the United States to New Zealand, Australia or Straits Settlements, or any point on the west coast of South America, without re-fueling.

Chairman Payne has authorized the following statement of the tentative ship disposal program:

"In the plans of the United States Shipping Board for the development of passenger service



Interior of model stateroom for Shipping Board passenger liners

United States Shipping Board freight and passenger steamer, 502-foot type

Interior model bath room, United States Shipping Board passenger liners

from United States ports, the needs of the Pacific Coast will play a prominent part. The Board fully appreciates the primary importance of increased passenger facilities on the Pacific. The tentative program now under consideration for three passenger services from Pacific Coast ports is as follows:

"To Japan, China and the Philippines—weekly sailings.

"To Japan, China and Vladivostock—weekly sailings.

"To Philippines, Straits and India, a sailing every three weeks.

"It is the present intention of the Board that these services shall be maintained by the so-called 535-foot passenger ships. Four of these steamers will be required to maintain schedule on each service, making a total of twelve in all for Pacific assignment.

"Nineteen of these vessels are now under construction, divided between the New York Shipbuilding Corporation, Bethlehem Shipbuilding Corporation and Newport News Shipbuilding and Drydock Company. They will be seventeen knot oil burning ships with the most modern passenger accommodations and 11,000 tons deadweight capacity. Accommodations will be provided for 249 first-class passengers and approximately 300 third-class passengers.

"The question of Pacific Coast terminal ports is now under consideration and the decision upon this matter and also upon the selection of operating agents will not be made until a most careful investigation is completed.

"The first of these vessels is expected to be available in May, 1920, and deliveries are anticipated thereafter so that the entire fleet of twelve vessels will be in service by the end of this year. It is the present intention of the Board to place the first twelve vessels in the Pacific trades outlined above."

View of the New York pier of the Kerr Steamship Company. Note cargo storage congestion

American Classification for American Ships

By the Traffic Manager

MOTIVE

A very logical argument is here presented by the Traffic Manager for the maintenance and upbuilding of the American Bureau of Shipping. A report issued by the Society of British Lloyd's Register of Shipping covering its work for the year 1918-1919 inspired the writing of the article.

There is no attempt made in any way to disparage the work of Lloyds, which is recognized by marine men the world over to have been of prime importance, but the plea is made that every American citizen should join in the effort now being made to have the Federal Government and all its branches adopt the American Bureau of Shipping for its classification society, just as Lloyd's Register has been adopted by the British Government.

This step is all the more necessary on account of the great progress made in the last three years in shipbuilding in the United States, and certainly the time is ripe to make the American Bureau of Shipping supreme in America on all matters pertaining to the classification of ships.

PROBABLY nowhere in print has the writer met with more convincing and complete reasons for the building and maintenance of an American Merchant Marine and an American classification society than in the 1918-1919 report of the society of British Lloyd's Register of Shipping, the report also being a general survey of the work carried out by the said society during the war, and all quotations which follow have been taken from that report.

Quotation from page 5:

> "It is safe to say that if our (Britain's) wonderful mercantile marine with its splendid officers and crews had failed us in our time of trial, as the enemy hoped and expected they would, neither our invincible Navy nor our heroic Army could have saved the Empire from a humiliating defeat. The nation does not even yet realize how much it owes to the enterprise and courage of the able men who built up, sometimes under much difficulty, the magnificent fleets of merchant ships which were destined to play so important and distinguished a part in the war."

Shipbuilding during the War

Even today much opposition exists (principally throughout our agricultural districts) to the expense for the building of an American Merchant Marine. Is there any more convincing argument than the above quotation, coupled with the added humiliating fact that if it had not been for England's merchant marine no American army could have been landed on French soil in time to help stay the Teutons' final gigantic effort to win the war? It is the writer's hope that the above quotation may reach every American Merchant Marine skeptic in the land of the Stars and Stripes. Our history shows that we do not seek war, but it also shows that we have been forced into war, and should that time ever come again and we have no friends to aid us, of what help is our army and navy if it is not mobile, and how can it be mobile without a supporting merchant marine? The prayer of every American should be that our government pursue to completion its shipbuilding program.

Classification Society

Hand in hand with the building of our merchant marine must go the building up of an American classification society; in other words, we must know how to make our own building rules and material specifications and to train the technical men required to interpret such rules and inspect and pass on the workmanship thereunder. We have such a society: the American Bureau of Shipping. It has not had much encouragement in the past, probably because we were not a maritime nation, but now it must be supported, for we can no longer depend on foreign building rules and foreign inspection of our material and workmanship. It would leave us an incomplete maritime nation.

New Vessels Classed

Quoting from Lloyd's report, page 8:

> "During the year classes were assigned by the committee to 1251 vessels of 3,801,221 gross tons. Of the tonnage classed, the United States of America built the largest amount, viz.: 470 vessels of 1,883,759 tons; the United Kingdom 579 vessels of 1,265,036 tons; Japan 70 vessels of 355,304 tons; and Canada 87 vessels of 199,941 tons. The ownership of the vessels is allocated as follows: United States of America, 453 vessels of 1,890,176 tons, **of which 1,801,235 tons were for the United States Shipping Board, etc."**

At the time Lloyd's committee was writing this report, there were building in the United States of America 419 additional vessels with a view of classification with Lloyd's Register, and principally for the United States Shipping Board. That surely was the time to make the American Bureau supreme, but probably it was considered that it did not have the requisite organization. Be that as it may, the war is over and now is the time to extend support to our own society. Does it not seem humiliating that our government should class its ships with a building society of a foreign nation?

Plans of Vessels Classed

Quoting from Lloyd's report, page 9:

> "During the twelve months ended June 30, 1919, the society passed on plans of 1136 vessels, representing 3,644,040 tons of shipping to be built under the society's survey with a view to classification in Lloyd's Register Book."

Readers, 470 of these plans were for American vessels, and a foreign nation also passes on the plans of vessels building for our Government and private citizens of the United States of America. Our new ship developments are thus placed in the hands of one of our principal maritime competitors. Former Director of Operations, Mr. J. A. Rosseter, has said that one of the ways out for the American merchant marine was to create something more efficient in the ship line than our competitors had created. Now, how can we do that if we hand to our competitors plans and specifications containing our latest ideas of efficiency for their approval? Our government should give the same recognition to our American society as other nations give to their classification societies.

Shipbuilding in the United States of America

Quoting from Lloyd's report, pages 10 and 11:

> "At the outbreak of the war the combined output of merchant shipbuilding from the yards in the United States was at the rate of about 200,000 gross tons per annum, but in November, 1918, when the armistice was signed, there were not less than 140 shipbuilding yards in the United States, capable of a collective annual output of about 3,500,000 gross tons.
>
> "As new shipbuilding yards and engineering works were established in America, further trained and experienced surveyors were sent out from the United Kingdom, and it may be fairly claimed that, in newly created yards, the constant supervision exercised by the society's surveyors had a most beneficial effect, and conduced to the production of efficient work."

It will be noted from the above quotation that the shipbuilding capacity of the United States increased 1750 per cent from the outbreak of the war to November, 1918, and that it was necessary for our nation to import foreign experts to supervise our wartime construction and educate our new shipbuilding plants in the art of shipbuilding.

Further quotation from Lloyd's report, page 11:

> "In 1917 the committee instructed Mr. Ruck-Keene, assistant to the society's chief engineer surveyor, to proceed to America to visit the principal engineering establishments and inspect the work in course of construction in the United States and Canada, and Mr. Ruck-Keene, who, in company with Mr. French, the society's chief surveyor for the United States and Canada, was engaged for several months on this duty, was able to get personally into touch with the various establishments and give all the advice and assistance which lay in his power."

Evidently it was also necessary to secure foreign engineering advice to successfully conduct our engineering establishments.

Shipbuilding in Japan

Quoting from Lloyd's report, page 13:

> "After America, Japan showed the greatest increase in her shipbuilding output during the war.
>
> "In June, 1918, at the **request of the United States Shipping Board,** the committee instructed Mr. French, the chief surveyor for the United States and Canada, to visit Japan with a view to arranging for the supervision of the large number of vessels to be built in Japan on account of the Shipping Board."

Our own shipbuilding capacity evidently was not deemed sufficient, and the United States of America had to ask Japan to construct additional war tonnage requirements; but note here, not alone were we building ships in a foreign country, but it was also necessary to ask the surveyors of another foreign country to look after our shipbuilding in Japan.

Some American vessels were also to be built, or are building, in China under the supervision of British Lloyd's.

Flexibility of the British System of Vessel Operation as Compared to Our Own United States Inspection Service Under the Stress of War

Miscellaneous quotations from Lloyd's report:

> "On the recommendation of Lloyd's general committee, it was decided by the British government, as a war emergency measure, to allow a reduction in the length of chain cables supplied to vessels, there being a chain shortage, although the size of the cable was adhered to."
>
> "At a later date the committee decided to sanction, for the duration of the war, the omission of kedge anchors, hand pumps and Downton pumps; further, in view of the scarcity of timber, owners were permitted to dispense with fitting of wood sparring in holds and wood ceiling on tank tops."
>
> "Owing to the curtailment of supplies of oil, the idea of bringing oil fuel in the double bottoms of cargo vessels was examined, and with the adoption of all possible precautions was carried into effect with great success in the case of a large number of vessels."
>
> "In order to increase the deadweight carrying capacity of all available tonnage, the question was considered of allowing tonnage openings in the shelter deck steamers to be closed, thereby permitting the vessels to be more deeply laden, and such permission was granted."
>
> "At an early stage of the war it became apparent that, in order to enable mercantile vessels to continue in service to the fullest extent, it would be impracticable to require a full compliance with the society's rules for special periodical surveys, and in the summer of 1915 Lloyd's committee instituted the practice of calling for a general examination, with a view to further postponement of a special survey beyond the period allowed by the rules."

No such easements, so far as the writer knows, were granted American shipowners during the stress of war by our government through its steamboat inspection department, and rules in every way were just as rigidly enforced by the United States inspectors as in pre-war times. Would it not be a step forward for our government to officially adopt the American Bureau, as Lloyd's has been adopted by the British government, and at the same time combine its inspection department with the American Bureau? In this way the same simplicity and flexibility of the British system may be acquired and result in the better and less costly operation of our own merchant marine.

Mr. American Citizen, no matter what your vocation or occupation, urge your representative in Congress to complete the American merchant marine building program, and, Mr. American Shipowner, build up and support your own American classification society.

Notes From the East

By "Americus"

SHIPPING men in New York and the East generally are all agog at this writing as to the sudden determination of the Shipping Board to sell the passenger ships taken over from Germany during the war. Plans had matured for the operation of these ships by private shipping interests, the Government, of course, retaining ownership. The work of reconditioning these ships was well under way, and it seemed assured that the United States was really to embark in the first-class passenger service. Hence, when, like a bolt from a clear sky, the notification of the proposed sale of these erstwhile German vessels became known, there was consternation on all sides.

Various ulterior motives were ascribed to the Shipping Board for this change of front. The first of these was that prohibition had scared the Shipping Board officials. As a matter of fact, this will prove to be a serious deterrent to the successful operation of passenger ships under the American flag. Whatever may be our predilections on the subject of temperance, it is unfortunately the fact that the great majority of the American public who can afford to travel and do travel on first-class ships are not composed of those who fly the white ribbon. A week's travel on the briny deep, with the attendant holiday attitude and lack of care, is very prone to arouse a latent thirst for alcoholic beverages. A Munson Line steamer bound for South America was about to sail when the Shipping Board announced its prohibition dictum; immediately there were sixteen cancellations of the forty or more first cabin bookings. Not a very large number it is true, but sufficient to spell financial failure in keen competition on the seas.

The question is, will the great majority of Congressmen who placed the prohibition laws on the statute books take note of this condition, and make reparations to our shipping people, to enable them to compete with our lusty sea opponents, who do not operate on so high a moral plane? Virtue may be its own reward, but it does not promise to pay any shipping dividends in this respect. As these ships, if sold to private parties, will still have to operate under this handicap, it will unquestionably tend to lower the prices offered.

Others contend that the Shipping Board was led to offer these ships for sale by the prospect of the enormous cost of reconditioning the former soldier transports; some experts estimate this cost to be over $50,000,000, pointing out that it will cost over $6,000,000 alone to fit out the Leviathan as a first-class passenger vessel.

In some quarters, critics have ascribed the haste to make these sales to a desire on the part of the Shipping Board, while legislation is pending to dispose of the entire Shipping Board fleet, to demonstrate to Congress the futility of selling the government-owned fleet of vessels at anything like a fair price. Be any of these conditions as they may, bids will be opened on January 20 next, and already a number of prominent shipping people have announced, in private at least, their intention of submitting proposals to fulfill the conditions of operating under our flag, so let us hope that Old Glory will continue to fly over these fine ships, and that the operators will not lose money.

A great commotion was raised by some ill-advised people, and papers as well, over the action of the United States authorities in turning the Imperator and six other large German passenger ships over to England. While I am just as jealous of our maritime and shipping prerogatives as anyone, there was absolutely no reason why we should not have returned these vessels to the inter-allied council, as we merely borrowed the ships to bring back our soldier boys from Europe. That having been successfully accomplished in very short order, we, of course, had to return the ships from whence we obtained them. If the inter-allied council decided that England should get them, as her share of seized German vessels, why should we worry? It will be found, when all accounts are balanced, that we fared very well in the matter of seized enemy ships. It was alleged that we should have held these seven ships as a lever to force the inter-allied council to return us certain Standard Oil tankers taken over by the British from Germany. These ships it is understood belonged to a German subsidiary of the Standard Oil Company, and as the officials of the American end of this great company seemed content with the disposition of these tankers, again why should we worry?

This matter of motor-driven freighters is again up in the Shipping Board. After a period of profound inactivity on the part of that body, a recommendation has been made by the operating end of the board to build twenty motorships of about 10,000 tons deadweight each. It is generally understood that there is a strong sentiment in Congress to build some of these ships, and that no objection would come from the legislative end of the government to the Shipping Board's balancing up its fleet by adding these Diesel engined ships. When it is considered that the principal argument advanced by the proponents of the original shipping bill was that the utilizing of our great natural advantage of controlling two-thirds of the world's oil supply would enable us to meet foreign competition on the seas, it seems high time that we get into this motorship business as rapidly and extensively as possible. About sixty-five Diesel engines were ordered by the Shipping Board at various times during its tempestuous career, and they were cancelled and reinstated so often that it would remind one of the oft-told tale of the lamented Finnegan. However, it appears that at this date there are about thirty-three of these engines "on again." But where are the ships to put them in? Several of the engines have been sold to private oil companies, thereby showing that private enterprise is looking toward economical ship propulsion if the government does not. There are rumors that one of the Submarine Boat Company's standard 5500 tonners is to be fitted with Diesel engines, and the Bethlehem Steel Company has built its own Diesels to go into a motor-propelled ore ship.

The Worthington Pump Company has engaged the services of Dr. Lucke, formerly head of the engineering school at Columbia University, and one of the leading internal combustion engineers in the world, to design a straightout American Diesel engine. The first one is nearing completion at Buffalo, New York, and is said, by those who have seen it, to be one of the best yet designed. In the humble opinion of the writer, American ships with economical propulsion such as furnished by Diesel engines can compete with any ships afloat; therefore let us hope that this branch of our merchant marine development will be pushed to the utmost.

From occasional accounts in the daily papers, it appears that the Franklin committee, appointed by the Shipping Board to revise the navigation laws, is making satisfactory progress in that complex undertaking. It is said that the suggestions offered by the Pacific American Steamship Association are the most definite and comprehensive recommendations yet received by the committee. A sub-committee, consisting of Mr. Hugo P. Frear, chief naval architect of the Bethlehem Shipbuilding Corporation; Mr. Ernest Cornbrooks of the Newport News Shipbuilding Company, and Mr. Alfred Ducher chief admeasurer of the port of New York, has been appointed to settle once for all the much mooted question of whether or not American ships are discriminated against in the official measurements for net tonnage, as compared with foreign vessels. The technical knowledge and standing of these gentlemen are unquestioned, and whatever they find to be the facts in the case must be accepted as conclusive.

The government has gotten out of one of its big fabricated shipbuilding plants in fine shape. The deal whereby the Submarine Boat Corporation will take over the Newark plant, which it has been operating, has, after two months of dickering, been consummated. The Shipping Board is to get $4,000,000 rental for the plant for the next three years, after which it is said to be sold to the operators. All fabricated steel now in the plant belonging to the government goes to the Submarine Boat Corporation at fifty cents on the dollar. The operators intend to complete for their own account the thirty-two ships which were cancelled by the government; they will undoubtedly be able to sell these ships at a reasonable price. The Hog Island plant will be next in order to settle up, and if the government can get out of that investment with as good terms, it will be doing very well. Very few of its war activities will be salvaged so advantageously as the shipbuilding investments.

There is to be here in New York at the Grand Central Palace, beginning the week of April 12 next, an entirely novel exposition for this country, and that is one to exploit our merchant marine. The entire space has been sold to shipyards, shipping companies, and other branches of our maritime activities. Many ship models, various auxiliaries used on shipboard, and novelties of all kinds relating to shipping, will be displayed. There is to be a parade on the opening day, speeches by men of national reputation, and, in general, everything possible will be done to attract the attention of the public and to educate them to think in terms of shipping.

As over one-tenth of the population of the United States lives within two hours' ride of the exposition building, this project is bound to produce good results and should be patronized by all interested in making this country the greatest on earth, and keeping it there. Our merchant marine will do the trick.

NOTE.— In connection with the remarks of "Americus" on the effect of prohibition on the dividends of American passenger lines, we learn that the following measure, known as the Edmonds Bill, has just been introduced into the House of Representatives:

"Be it enacted, etc., That Title II of the Act entitled 'National Prohibition Act' is hereby amended by the addition of a new section as follows:

"Section 40. That nothing in this act shall prevent the carrying of liquors on passenger vessels of either American or foreign registry: Provided, That within the three-mile limit of the shore of the United States no liquor shall be sold, and all containers properly sealed and locked under such regulations as required by the commissioner of internal revenue."

Auxiliary steam clipper Royal Charter, a passenger liner of the 1850 type, which made regular trips from Liverpool to Australia

Discussion of the Ship Mortgage Bill

THE bill introduced into the House of Representatives by Ira Campbell, formerly Chief Counsel to the United States Shipping Board, has been creating considerable discussion both adverse and favorable. This bill was proposed to take the place of the present ship mortgage law and its intention was to stimulate the interest of capitalists in ship investments.

Adverse Argument

We quote below a circular letter sent out by the National Industrial Traffic League with headquarters at Chicago. This circular letter was sent to many of the more prominent shipping, ship-owning and exporting companies:

"At the recent annual meeting of the League, held in Chicago, attention was directed to H. R. Bill 8873, introduced into the House in August, 1919. This bill proposes to modify the present ship mortgage law. A snyopsis of the bill is as follows:

"'In accordance with its caption, the bill provides that a mortgage on any vessel or part or share of any vessel of the United States shall take precedence over all other maritime contracts, except for wages and salvage.

"'This means among other things that if any American vessel mortgaged under this law should fail to fulfill her contract of affreightment in any respect, the exporter or the holder of the bill of lading would find himself without remedy if the mortgage was equal to or exceeded the value of the steamer.

"'An American steamer with valuable cargo meeting with disaster and urgently needing repairs at a port of refuge might be denied repairs by contractors unless the master or owners were able to give satisfactory security that the repair bills would be paid. In such a case a valuable cargo might be delayed in transit until it had suffered deterioration or lost its market.

"'Heretofore cargo owners, ship repairers and other suppliers of necessaries have enjoyed under the law the right of first lien against the steamer for her failure to fill her contractual liabilities.

"'It has not been necessary heretofore for cargo owners to investigate a steamer, her owners, agents or charterers to ascertain whether the steamer was mortgaged or if the operators were solvent, but cargo owners have had the privilege of requiring the marshall to attach a steamer for debt or for liability for debt with attachment or libel operated as a first lien. Under this proposed law it is obvious that irresponsible corporations will be encouraged to operate mortgaged steamers, and their failure to fulfill their obligations will be at the loss and expense of the cargo owners. Dummy ship owners may come into existence, and the ship being virtually owned by the mortgagor, with a like result. The default of many shipping corporations during the war is an indication of what may be expected to occur regularly if such a law, as is proposed, is enacted. Furthermore, the liability of the ship for damage to cargo may be escaped under this proposed law if enacted. There are many damages which are not insured against, and even if cargo underwriters, standing in the shoes of exporters, were deprived of their present remedies against the steamer, the effect would be indicated surely in rates of marine insurance.

"'The bill is intended evidently to encourage American investors in American ships and for that purpose it deprives the cargo owners of their present rights and transfers them to the vessel owner. It would appear that whatever encouragement this bill may offer the investor is quite nullified by the effect it would have on the future fortunes of American shipping. No exporter would be willing to investigate a steamer to ascertain if the steamer is mortgaged, and to investigate the financial standing of her operators before making a freight contract. Rather, the exporter would prefer to deal with foreign shipping to the exclusion of any American ships regardless of their ownership or solvency, and thus the object which American shipping legislation seeks to attain is destroyed.'"

Adverse Argument Answered

Below we quote the reply of a prominent Eastern ship-owning company which seems to us to answer the arguments contained in the circular letter above in a very fair and logical way.

Discussion of these problems always brings out the complexity of the various marine interests connected with the operation of any foreign trading, and the necessity of laying the foundations very carefully in working out constructive legislation plans for the furthering of the interests of our American merchant marine.

"We have before us your letter of December 15, Circular 183, relative to Ship Mortgage Bill H. R. 8873, which we believe is at present in committee in the House of Representatives at Washington.

"We have carefully noted your arguments against this bill, as outlined in your letter, and would like to go on record as disagreeing with you strongly in your arguments and conclusions.

"Under our present laws every claim against a vessel comes ahead of the holder of the mortgage, except the owner's rights. This law, we are advised, differs radically in this respect from laws of the other large maritime nations, such as England, Norway, Holland, and probably others, as in those countries the holder of a mortgage is protected in his investment. The consequence has been in this country that it has been almost impossible to place mortgages on ocean-going vessels, except in the case of large, strong companies operating a number of ships, in which case the mortgage was really secured by a number of ships, as well as the standing of the borrower.

"This inability for a man starting to engage in the shipping business to borrow money on one or two ships with which to start his fleet has effectively restrained people from going into the shipping business.

"At the present time the United States government owns an enormous fleet of vessels, which it is conceded they should dispose of to private interests. This would involve an investment of a large amount of capital and the greater part of such capital would necessarily have to come, both on these ships and ships built to replace them from time to time, from borrowed money. Insufficient protection for the lender would, in our opinion, effectively kill this transfer of ownership from the government to private individuals; and as a continuation of government ownership, with the necessary replacement of vessels from time to time from government funds, with the possible international complications that would result from such government ownership, are economically unsound, we would be faced with a rapid decline in the size of our merchant marine as soon as the present fleet of government-owned vessels began to depreciate and become obsolete. In our opinion, the reason for this bill was to facilitate this transfer to private owners and permit private owners to borrow a portion of the necessary capital required.

"A plant or company doing business on shore can issue bonds and borrow money against such business or plant on reasonable terms with proper protection to the bondholder and with at the same time no diminution in protection to concerns doing business with the borrower, provided, of course, such concerns take advantage of the facilities available for ascertaining the amount of unpledged collateral. Under the terms of the bill, it is required that every mortgage against a ship be registered and be noted in the ship's papers. Should a shipper have a sufficient amount of freight involved to warrant his questioning the equity in the vessel above the mortgage, he has ready and immediate facilities for doing so, because of the requirements that this mortgage be so recorded. In the vast majority of cases, a shipper's interests, however, are relatively small, and he need not concern himself about the equity in the vessel, for the reason that common business prudence would prevent a concern that had issued the bonds against the vessel from placing bonds in excess of approximately 60 per cent of the value of the vessel, leaving an equity of 40 per cent for such claims as might come against her.

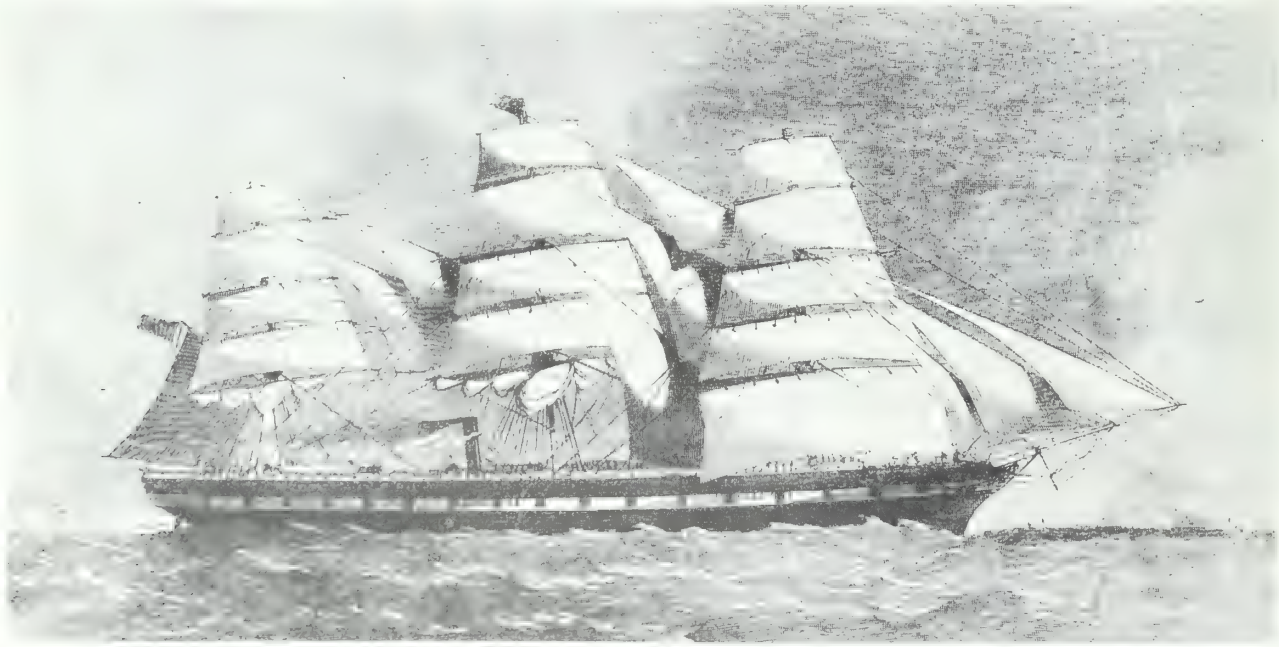
"We accordingly believe that except in a very limited number of cases, where perhaps full cargoes are involved, the shipper need have no more concern than he has at the present time.

"We do not feel that this—which you term added risk—would be reflected in the marine insurance rates and can see no reason why this should be so. We have consulted one of the leading marine insurance companies in this country on this subject and quote herewith a letter from them on this subject, which entirely substantiates our opinion:

> 'Referring to the writer's telephone conversation with you this morning in connection with the question of insurance upon cargoes of steamers that have mortgages or liens against them, the writer has talked the matter over with others here in the office, and we consider the situation is about as I outlined it to you this morning.
>
> 'Where the vessels in question are under good management and of proper seaworthy construction, the fact of their having mortgages upon them should not in any way affect the question of insurance rates, either upon the vessels or their cargoes.
>
> 'For many years we have been insuring coastwise vessels and cargoes where many of the ships have had mortgages upon them, and we have never known any question or discrimination in insurance rates on such steamers as against vessels where the ownership was absolute.'

"We think you will agree that practically no large line of business has ever been built up without the aid of borrowed capital. If you will concede that and will also concede that we need an American merchant marine under the American flag, we think you will agree with us that anything that can be done to make conservative mortgages possible should be aided by every league or association in this country that is interested in shipping matters.

"We have taken considerable interest in this bill and found that when it was first proposed there were a number of people who opposed it for reasons similar to those which you advanced, but in the majority of cases we think that on further and more careful consideration of the principles involved and the protection provided for, they have changed their opinion and are now in favor of the bill as a necessary adjunct in the maintenance of an American merchant marine.



Auxiliary steam clipper Great Victoria. These famous ships of the Liverpool and Australian Steam Navigation Company were fitted with a screw shaft which was detachable and the propeller could be hoisted on deck when driving before a fair wind. This illustration and the one on page 60 are reproduced from old prints in the Illustrated London News, furnished by the courtesy of Captain Lincoln Rogers of Victoria, British Columbia.

A National Merchant Marine Policy

PROPOSALS for a national merchant marine policy, advocated by the Chamber of Commerce of the United States, as a result of a referendum just completed, were recently placed before Congress. The referendum vote was taken among the more than 1200 trade and commercial organizations comprising the chamber's membership.

Private ownership of vessels and of shipbuilding yards, with whatever government aid may be necessary in private operation of ships, are included in the chief suggestions put forward. To secure a wide distribution of the vessels now in the hands of the government, it is proposed that the government invite the formation of quasi-public regional associations to act in an intermediary capacity in placing shipping in the hands of corporations and individuals.

The membership of the chamber voted on nine proposals as advanced by its committee on ocean transportation. These proposals were made by the committee with a view of ascertaining the sentiment of the country's commercial interests with respect to disposal of government-owned ships and their operation and with regard to the future of shipbuilding in the United States. The recommendations voted on, with the ballot cast for and against each, are given as follows:

Sale of all wooden vessels and of steel vessels under 6000 tons deadweight on the best terms obtainable from American or foreign bidders—for, 1235; against, 235.

Sale of other government-owned vessels to regional associations for transfer at cost to private individuals and corporations of the several regions—for, 1200½; against, 244½.

Absorption by the government of the difference between war cost and present value of ships, as a war loss—for, 1394; against, 61.

Freedom from regulation as to routes and rates—for, 1369; against, 84.

Restriction for a period of years upon transfer to a foreign flag of steel vessels over 6000 tons deadweight purchased from the government—for, 1337; against, 121.

Preference for American underwriters and use of the underwriting market of the world for insurance not covered by American underwriters, without intervention by government insurance—for, 1374; against, 73.

Encouragement of an American classification society—for, 1408; against, 44.

A general declaration by Congress of a policy to give aid toward maintenance of a privately-owned and operated American merchant marine—for, 1373; against, 93.

Continuance of operation of the competent American shipbuilding yards, on private account, both as to the yards and the vessels they construct—for, 1413; against, 42.

In support of its position that the government should not own and operate the country's merchant marine, the committee declared that under government ownership and operation it is almost inevitable that considerations entirely apart from economic reasons would constantly interrupt the natural courses of management of ships and trades.

"The management of cargo-carrying ships," says the report, "is one of the most complicated businesses in the world . . . and a successful merchant marine depends on the development of a large class of energetic, resourceful shipping men, ... all animated by a spirit that would not be expected of government employes. Government ownership and operation of ships would be destructive of the initiative and flexibility in ship management that are essential to the success of the business and would cost more than private ownership and operation.

The objection to government-owned and operated ships apply, the committee points out, with only a little less force to privately-operated government-owned ships.

In proposing the creation of regional associations to represent the various maritime sections of the country in disposing of ships over 6000 tons, the committee suggests that they be formed at the prompting of the government and developed under encouragement of local, state and city authorities, chambers of commerce and other similar organizations. These associations would assist corporations and individuals, when necessary, in procuring capital with which to purchase vessels. The committee suggests in this connection that terms of sale should be liberal.

Coming home through the Golden Gate [illegible]

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ANDREW FARRELL . . . . . . Associate Editor
G. N. SOMERVILLE. . . . . . Associate Editor
J. G. BRAY . . . . Pacific Coast Adv. Mgr.

NEW YORK OFFICE
339 at 30 Church Street
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SHIPPING BOARD SCANDALS?

CERTAIN investigations now under way by the Federal agents have led to a so-called exposé of gigantic frauds in Pacific Coast shipyards. San Francisco's evening papers in glaring headlines declared to the world that shipbuilders of the Pacific Coast had "stolen" from the United States Government one billion dollars, and notwithstanding the subsequent denial of these figures the impression remains in the minds of many citizens that fraud on a tremendous scale was practiced by the shipbuilders. That this impression has been disseminated is extremely unfortunate, because it is absolutely false. No undertaking of the United States Government, during the war, can show the same proportion of salvage value, or of useful, remunerative, productive effort as can the shipbuilding program of the Emergency Fleet Corporation of the United States Shipping Board.

We are confident that this statement cannot be denied with any assurance by any one who carefully will analyze the situation. It is true in a great many cases the ships cost more than they might have cost if built under peace time competitive conditions, but that same fact is true of practically every product manufactured under government control during the war.

Many of the government activities during the war will result in a dead loss, but the activities of the Emergency Fleet Corporation and the Shipping Board have resulted in presenting America with the largest fleet of useful Merchant Marine shipping in the world—a fleet which even under wasteful government operative control is showing large earning power and is very speedily writing off the books its excessive cost.

AMERICAN MERCHANT SHIPPING

THE total registered enrolled and licensed American shipping on January 1, 1920, according to the records of the Bureau of Navigation, Commerce Department, was, in round numbers, 28,500 vessels of 15,325,000 gross tons. The complete returns, not all received yet, of smaller vessels from various seaports probably will not change the total 50,000 tons. The complete returns for the first quarter, ended September 30, 1919, of the current fiscal year show the following distribution of tonnage registered for the foreign trade and enrolled or licensed (small vessels) for domestic trade.

	September 30, 1919		June 30, 1919		Three Months' Increase	
	No.	Gross tons	No.	Gross tons	No.	Gross tons
Registered	5,347	7,860,070	5,032	6,669,726	315	1,190,344
Enrolled	12,752	6,178,998	12,646	6,108,811	106	70,187
Licensed	10,023	135,520	9,835	128,763	188	6,757
Total Merchant marine	28,122	14,174,588	27,513	12,907,300	609	1,267,288

During the following three months ended December 31, 1919, the seagoing ships of 1000 gross tons or over increased 250 of 1,101,692 gross tons. The fleet of seagoing ships of 1000 gross tons or over on January 1, 1920, numbered 2584 of 9,588,787 gross tons, of which the United States Government, represented by the Shipping Board, owned 1465 of 5,940,742 gross tons, or 62 per cent of the tonnage. At the beginning of the current fiscal year on July 1, 1919, these seagoing ships numbered 2058 of 7,300,022 gross tons, of which the United States Government, represented by the Shipping Board, owned 982, of 3,827,201 gross tons, or 52 per cent, while a year ago on January 1, 1919, our documented seagoing ships of 1000 gross tons or over numbered 1663 of 5,656,856 gross tons, of which the government, represented by the Shipping Board, owned 608 of 2,303,015 gross tons, or 41 per cent of the tonnage. During the calendar year 1919 our registered enrolled and licensed tonnage increased from 11,261,444 gross tons to 15,325,000 gross tons, of which increase nearly all, 3,931,930 gross tons, was of seagoing ships of 1000 gross tons or over, and of this increase 3,637,777 gross tons are owned by the Shipping Board and built with appropriations by Congress. Up to June 30, 1919, the expenditures of the Construction Division of the Shipping Board aggregated $2,512,692,000, of which $1,741,997,945 were expended during the fiscal year ended June 30, 1919.

IMPROVED NAVIGATION LAWS

IN an editorial in the National Marine, P. H. W. Ross, president of the National Merchant Marine League of the United States, calls the attention of his readers to "A Brief in Advocacy of an Improved Legal Regime for the American Merchant Marine," prepared for the National Merchant Marine League by Carman F. Randolph of the New York Bar, and in very happy metaphor declares that, "Every man or woman who is directly or indirectly interested in shipping, foreign trade, or manufacturing, should see that a copy of the Randolph Brief is in the hands of some influential friend in the Middle West. It is they who are the Sea Lords of America, not the denizens of the Seaboard States, and just as soon as they see that their own daily prosperity is bound up with the successful operation of American ships, the thing is done. The prescription can then be drawn up because the Middle West doctor has diagnosed the case to his own satisfaction."

We heartily agree with Mr. Ross and with the opinion he has expressed of the Brief prepared by Mr. Randolph. The section of this Brief on Maritime Law appears to us so good that we make no apologies for quoting it in full, and we shall probably find occasion to make many more quotations from the Brief in later issues:

"Overseas transport is affected by conditions which segregate it in many respects from all other forms of industry. To this extent the legal regime of the sea is differentiated from that of the land, and an appreciation of several of its singularities will show why adequate sea laws must ever be framed with a peculiarly sympathetic art.

"Few landsmen realize how deeply the laws affecting the shipping industry are conditioned on the 'perils of the sea,' employing the phrase in its general and not merely its technical sense.

"A constant risk to ship, life and cargo, an isolation binding the chance company of voyagers into a petty community, demand a stern rule unmatched, because uncalled for in any other branch of industry. An efficient master of a ship lives up to his title. He is required to enforce, and the passengers and crew to respect a discipline ranging from routine strictness to emergency severity.

"Both owner and master are subject to stringent regulation in the interest of safe transport and the former may be required to spend money for safe construction, proper equipment, etc. A just definition of such pecuniary obligations, ignoring counsels of perfection from those who have no investment in ships and of parsimony from those who have, will promote that reasonably safe and profitable operation of ships which alone will keep them moving.

"From 'perils of the sea' grew that system of marine insurance which not only supports shipping by indemnifying losses but has, immediately for its own benefit but for the good of all, advanced the art of safe and convenient ship construction. Furthermore, wireless distribution of storm warnings, current market news, etc., has appreciably mitigated physical and financial risks. Yet when discipline, constructive art and improved communication have done their utmost, there remains in sea transport an irreducible margin of physical peril and a peculiar irregularity of profit which must receive due attention in framing the governing law.

"The ship itself is, in point of law, a peculiar property. Above all other things a ship may be said to have personality—the descriptive 'she' is not a misnomer. In fact a ship is so far 'personally' responsible for certain claims and debts that she may be seized and sold to satisfy them.

"A ship has not only personality. It has also nationality. Everywhere it is a floating bit of the national territory indicated by its flag though in a foreign port it is subject to local regulation. It is matter of general concern that a ship be always identified in respect of her name and nationality, regularly inspected as to sea-worthy condition and that her condition during the voyage be as frequently ascertained as possible.

"The sea is in time of peace a common highway giving access to and from all seaboard states, but to enter it from one port a ship may be required to obtain permission from the state of departure, to leave it at another port permission from the state of destination. 'Freedom of the seas' simply smooths the way for whatever voyages between sovereign states are agreeable to both.

"The diverse nationality of outbound and terminal ports subjects every ship in the course of a foreign voyage to the jurisdiction of two bodies of national law. The laws of its own country govern it in the home port and at sea; in the foreign port it is, broadly speaking, amenable to so much of the law of the land as the comity of nations or a treaty may sanction or the local sovereign may impose as a condition of entry.

"Commercial competition between the nations is in some phases direct and palpable. In others it is indirect and may even be so roundabout that only by a careful analysis and comparison of conditions can it be detected. In no phase, however, is the competition so palpable as in seagoing ships. As these contend for business on the world's highway the shipping laws of their respective states are more closely ranged for comparison than those on any other subject. Therefore it behooves the United States to revise its shipping laws with a keen eye to the policies of its competitors—policies which, like our own, are being readjusted because of the war."

One point brought out by Mr. Randolph is of the utmost importance, viz.: The timeliness of agitation for a constructive program of Marine Law. He points out very truly that in the past practically every American effort to pass laws favoring our own Merchant Marine has been nullified by the fact that these laws were all contingent upon treaties with foreign nations and almost universally contained the phrase, "provided that nothing in the foregoing clause shall be construed as conflicting with any commercial treaty now in effect between the United States and any foreign nation."

At the present time practically all commercial treaties are either in the process of change—or dead, and it is therefore the psychological time for the ship-minded men and women of America to bend every effort toward a betterment of the legislation concerning the operation of our Merchant Marine.

THE AMERICAN RED CROSS AS AN AUXILIARY TO THE UNITED STATES MERCHANT MARINE

WHEN the United States merchant marine in the course of events took a leading place among the trading fleets of the world, it necessarily shook up allied industries and activities. These activities have had to take strides to keep apace with the marine fleet, but they are determined to keep up with the forward march. The Red Cross, for instance, which became acquainted with the men of the merchant marine when it was assisting in the transportation of the A. E. F. and its supplies, does not mean to let go its friendly grip. It has planned, in its peacetime program, to follow the merchant sailor around the world—or, rather, to meet him in ports scattered around the far seas—with a service that savors of home.

This extended work of the Red Cross will be undertaken by the seaport chapters of the Insular and Foreign Divisions which are located in South and Central America, Europe and the Far East—nearly fifty in number. As a start, club-rooms,

Famous Pacific liner Great Northern

libraries and recreation halls will be established where American sailors can make themselves perfectly at home while they are ashore. In ports where sailors' homes are already operating, the Red Cross will co-operate and supplement in manifold ways.

This departure of the Red Cross is regarded as a valuable aid to the United States Shipping Board in its efforts to secure, not only a large organization of sailors for its merchant fleet, but to induce the highest type of American men to engage in this calling.

The Home Service Department of the Red Cross, which aided hundreds of thousands of service men and their families during the war, will continue to operate both at home and abroad, and will be particularly useful to merchant marine men and their families, for it will assist the families that are left at the home port, as well as the men themselves, who are on the high seas, or in a distant port.

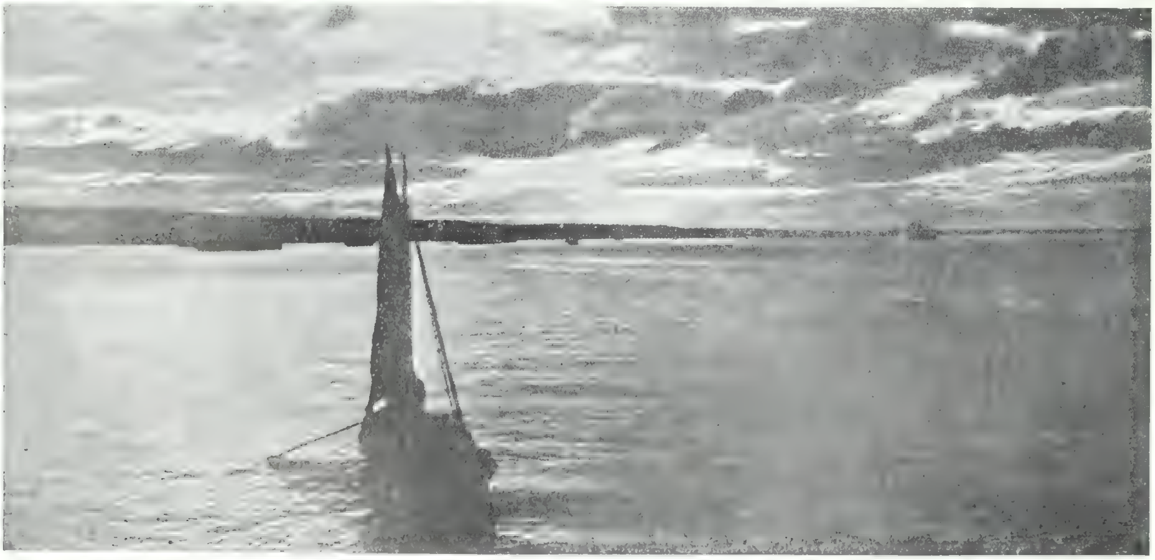
Home Service will endeavor to give to families such information as they need in working out family problems or untangling business difficulties, which may develop while the head of the family is away; it will give financial aid if it is necessary; it will help to trace members of the fleet who, in time of storm or disaster, may be reported missing; if illness should develop in the family it will co-operate with the Red Cross Public Health Nurse, who will give advice as to the best course to be pursued, arrange for hospital care or do actual bedside nursing. In other words, the Home Service of the Red Cross will seek to keep the merchant marine man and his family as closely in touch as though the sea were a mill-pond, and the war has shown that this can be very nearly done.

AMERICAN BUREAU OF SHIPPING APPOINTMENTS

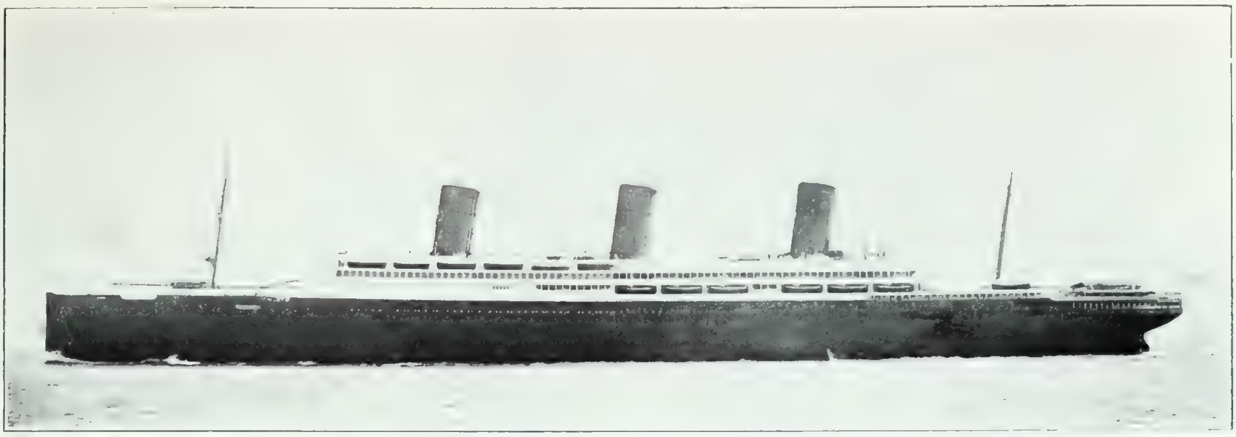
The American Bureau of Shipping, in carrying out its policy of having its agents at all foreign ports where American merchant vessels may call, has just made the following new appointments at various ports in the Orient:

Mr. Dean J. Hanscom at Hong Kong.
Mr. E. E. Johnson at Kobe.
Mr. H. P. Laidlaw at Yokohama.
Mr. E. L. Matteson at Vladivostock.
Mr. W. J. Eisler at Shanghai.
Mr. W. J. Wright at Manila.

These surveyors will be available for all surveys, damage and other kinds, coming under the supervision of the Bureau, and will greatly facilitate the transaction of business for American vessels calling at these ports.



Moonlight on the Bay Punta Arenas, Chile



Steamship Leviathan, formerly the Hamburg-American Liner, Vaterland

Old Friends of the Sea

By Ralph E. Cropley

YEARS ago, at least twenty, before the days of wireless, a sea voyage really meant something when the ship had blended with the mists of the horizon. For even though the ships of days gone by were small in comparison to modern liners and at times we would get a never-to-be-forgotten tossing, on the morrow the sun always seemed to shine so winsomely; so invigorating came the fresh breezes to bellow out the sales from the yards, and the sea apparently so repentful that we forgave its petulance and loved it all the more. On such a trip we never could fail to give ourselves up to rest, to utter abandonment of the heckling cares and worries of the work-a-day world. By merely standing on deck and looking out upon the boundless waste of waters, we not only got inspiration and happiness but health as well.

There are many of us who resent the building of mammoth liners like the Leviathan, Olympic and Aquitania. For with their palm-courts, swimming pools, Ritz Carlton cafes, jazz bands and other things of shore life one takes a sea voyage to get away from, they have robbed the sea of its charm and mystery—robbed it of the old liners for which many of us have a deep veneration because they were "ships which were ships and not damned freight houses," as one old skipper put it as he stood on the bridge of his twentieth century Noah's Ark and looked on the ship he had commanded thirty years before.

There was the City of Rome, with her clipper bow and graceful yacht-like lines; the Umbria, Alaska, La Gascogne, Servia, Germanic, Lucania, Aller, Normania, and scores of others which for years proudly steamed in and out of New York harbor, and have now, like fallen stars, been forgotten by the public. Milestones in the progress of ship-craft they were, these old friends which safely ferried us across the great pond. What we owe to some of them may be recorded as follows:

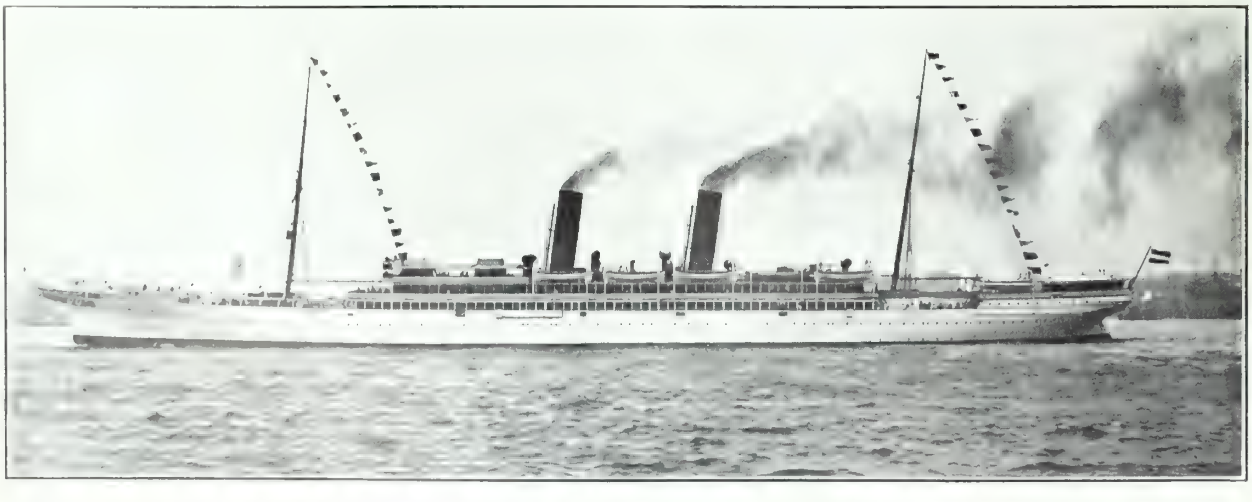
The famous trans-Atlantic liner City of Rome

1868—Italy: First Atlantic steamer with compound engines.
1869—City of Brussels: First Atlantic steamer with steam steering gear.
1871—Oceanic (first): First with midship passenger accommodations.
1874—Britannic (first): First to exceed 5000 tons (Great Eastern excepted).
1875—City of Berlin: First with electric light.
1879—Arizona: First Atlantic steamer to be saved by water-tight compartments.
1879—Buenos Ayrean: First Atlantic steel steamer.
1881—Alaska: First to cross Atlantic under seven days.
1881—Servia: Last Cunard iron steamer.
1882—City of Rome: First ship to be fitted with three funnels.
1883—Aurania: First Cunard steel steamer.
1884—Umbria: First ship to steam twenty knots.
1886—Aller: First triple-expansion express steamer.
1888—City of New York and City of Paris: First twin-screw steamers; first to exceed 10,000 tons (Great Eastern excepted).
1889—Teutonic: First to be designed as mercantile cruiser.
1890—Furst Bismarck: First under six and one-half days from Southampton.
1890—La Touraine: First under six and three-quarter days from France.
1893—Lucania: First twenty-two-knot ship.
1895—St. Louis and St. Paul: Largest express ships ever built in the United States of America.
1897—Kaiser Wm. der Grosse: Record breaker.
1899—Oceanic (second): First with balanced engines and to exceed 15,000 tons.
1900—Deutschland: Fastest ship afloat till the Mauretania came.

What has become of our old friends of the sea pushed into oblivion by a Leviathan or Olympic? Well, prior to the war, there were in Europe many "boneyards" where old steamers which have outlived their usefulness have been broken up. Genoa was the center of this industry. As practically all parts of a vessel are tangible, it is a healthy investment to be a ship junkman. For the engines may find a new home in a tramp, the boilers retubed, a berth ashore or afloat; the plates of the hull remodeled and worked onto new liners or river barges, and frequently, as was the case with the White Star liner Majestic in 1914, being recast into torpedoes, guns and shells.

Back in the eighties the Blue Ribbon of the Atlantic was contested for just as strenuously as it has been in the last decade. At present the Mauretania holds it, although our Leviathan and the rakish France are making her step lively to retain her laurels. The Inman Line (later American line) was in the field with a series of vessels named after cities, of which the City of Rome is probably the most famous of her day. The "Pride of the Atlantic" she was called, and for many years school children had no conception of a steamship other than she, as her picture, and hers only, long retained a prominent place in all geographies. Unfortunately, she failed to make her contract speed. Returned to her builders by the Inman Line, she endeared herself to the traveling public in the service of the Anchor Line between Glasgow and New York. In 1898 the American government chartered her to carry Admiral Cervera and other war prisoners back to Spain. It was her last appearance in New York, for the Boer War broke out and she was commandeered as a transport and was broken up in 1903. There have been rumors that her engine was placed in another ship and her steel plates refitted onto a modest cargo carrier. Of this I have no proof. It is just gossip, fascinating in its probabilities. Along the New York waterfront you will find plenty of longshoremen who will tell you that there never has been a ship since the City of Rome that so aptly fitted the phrase, "the liner she's a lady."

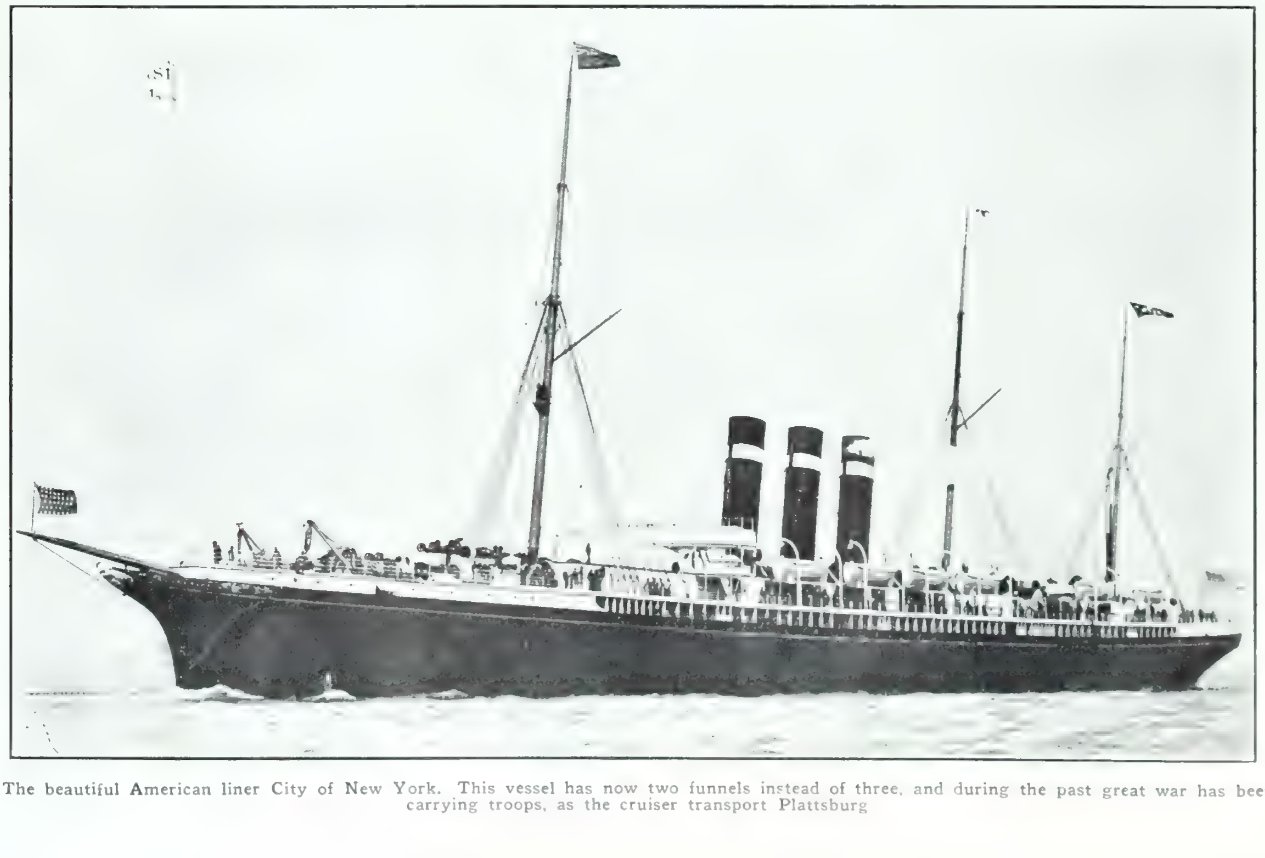
Of the other Inman liners of this period the City of Chicago met a tragic fate: The City of Chester since 1898 has been the United States Army transport McClellan, and although built in 1873 is still in service as a refrigerator ship: The City of Berlin (1875), the first ship to be fitted with electric lights and for many years the only ship over 500 feet long, in 1898 also was purchased by



The liner Oceana, later the Alfonso XIII. This vessel is a splendid example of the yacht-like lines of the old passenger steamers

The Auguste Victoria

The Kroonland of the Panama-Pacific Line



The beautiful American liner City of New York. This vessel has now two funnels instead of three, and during the past great war has been carrying troops, as the cruiser transport Plattsburg

The famous Germanic of the White Star fleet

the American government and called the Meade. For years she carried troops to and from the Philippines, carried them to Vera Cruz in 1914, and since then has lain at an army pier in Newport News awaiting a buyer, the $4000 bid for her having been rejected. With her clipper bow and yacht-like lines, in her white paint with buff superstructure, yellow funnel tipped with black, beneath which are bands of red, white and blue, at the age of forty-four she is still a thing of beauty most scintillating in comparison to the mere bulk of modern liners.

Her great rivals when she was built were the White Star flyers Britannic (first) and Germanic. The late W. H. Vanderbilt said of these two ships that he never wanted a steam yacht so long as he had such palatial ships on which to travel. Although only 5017 registered tons, 455 feet long, and steaming 16½ knots, very few later ships lasted so long as they. Until replaced by the 17,274-ton Oceanic (second), of 704 feet length, the Britannic (first) plied regularly back and forth between Liverpool and New York for twenty-five years, making 260 round trips, steaming over 2,000,000 miles and carrying over 400,000 passengers. During the Boer War she was transport No. 62. In 1903 she met her fate in a ship-breaker's yard. The Germans ended her career, as in 1916 they ended that of the 50,000-ton hospital ship Britannic (second).

As for the Germanic, she obtained a longer lease of life than her sister ship by being re-boilered and reconstructed, living to the ripe old age of thirty-eight, when the fortunes of war left her a shattered hulk on the shores of the Dardanelles. Her last appearance in New York harbor occurred in 1905. Thereafter she was known as the Canadian emigrant liner Ottawa, passing into the hands of the Turks in 1911, becoming the troopship Gul-Djenal and being finished by the Greeks in 1912.

In 1879 the world was thrilled by the Guion liner Arizona running bow on into an iceberg and living to tell the tale. This was the first example of the usefulness of water-tight bulkheads. In 1881 her sister ship Alaska thrilled the world by crossing the ocean in less than seven days. Of these two ships the Alaska met her fate in the Pacific and the Arizona, after being the American naval transport Hancock since 1898 and actively carrying troops over to France in spite of her forty years, is now to be discarded like an old glove and sold by the government. As a modest freighter, the once "Queen of the Seas" may still exist for many years. The Oregon, a running mate of the Alaska and Arizona, became a Cunarder and in 1883 was mysteriously sunk off Fire Island, forty miles east of Sandy Hook. Everyone was saved by the North German Lloyd steamship Fulda, thus fulfilling the boast of the Cunard Company since 1883 that they never lost a life. Unfortunately, the Lusitania broke this wonderful record. Another ship which fitted in with these Guion liners was the America, the last and only express liner the National Line ever built. So palatial was she that the King of Italy purchased her in 1885, and today she is still afloat as the present King's private yacht.

Until the Finland and Kroonland ushered in a new lease of life for the Red Star Line, New York was favored with the presence of such old-timers as the Noordland, Pennland, Walesland, Belgenland, Westernland, and the clipper bow Friesland of 7116 tons, running between New York and Antwerp. Gradually these vessels were relegated to the Philadelphia - Liverpool run of the American Line, and by 1912 all had been broken up with the exception of the Friesland, which ran for some time as an Italian liner ere she too went the way of all good ships.

In the fight to wrest the speed laurels from the Guion Line ships, the Cunard Line brought out the Servia and Aurania (first) in 1881 and 1883. The only distinction which remains to these once popular ships is that the Servia was the last Cunarder to be built of iron and the Aurania (first) the first of steel. They had the misfortune to be outclassed in 1884 by their compatriots, the famous Umbria and Etruria, which were the first to steam twenty knots an hour. In 1901 the Servia vanished as junk and the Aurania (first), after a spell as a coal hulk at Genoa, was broken up in 1905.

As for the Umbria and Etruria, they were handsome single-screw vessels of 8100 registered tons and were striking advances over anything yet built. Equipped with exceptional luxuriance for their time, they ushered in a new epoch in trans-Atlantic travel. Until replaced by the Mauretania and Lusitania, twenty-four years later, they ran as regular express trains on the Cunard Liverpool-New York run, and their performances, even in the evening of their lives, were phenomenal. As "junk" the Etruria brought about $87,000 in 1909 and the Umbria about the same sum two years later, after she had made several intermittent visits to New York and been called a disgrace by the younger generation attuned to Mauretanias, and by many who, when they first came to America, thought the Umbria's steerage the acme of luxury. Many a present-day ship will be forgotten before the Umbria is—she lives in one's memory like the City of Rome. She was a roller and a diver, but, God bless her, she was true blue.

The two Cunard boats which first trimmed the sails of the Umbria and Etruria, no longer are afloat. The Lucania and Campania, brought out in 1893, made twenty-two knots and were the first to exceed 600 feet in length, with the sole exception of the Great Eastern, built in 1858. For fifteen years they carried the cream of Atlantic passenger travel. In 1909 the Lucania came to an untimely end by being gutted by fire as she lay at her Liverpool dock. The Cunard Company never rebuilt her—simply turned the hulk over to the underwriters, as they deemed the Lucania to be of too antiquated a design to be worthy of reconstruction. The wreckers made money on her hulk, as she was constructed of the finest of Siamese steel. Her sister ship Campania, displaced by the Aquitania in 1914, was to be broken up, but with the advent of war she was turned into a mother ship for aeroplanes and did yeoman service until sunk by collision in the Firth of Forth in November, 1918. She had the honor of being in the battle of Jutland and towing disabled warriors afterwards. As a mother ship one would hardly have recognized the once crack New York flyer. As originally built she had two funnels set far apart: marine architects removed the forward one, divided it in two, placing one part outward on each side. Between this divided funnel an aeroplane runway was constructed, extending forward over the bow from a new navigating bridge constructed just in front of the old second funnel.

All the ships of the White Star Line in trans-Atlantic service today are twentieth century leviathans. The first Oceanic, built in 1871, after a spell on the Atlantic, became a trans-Pacific liner and retired forever in 1895. The second Oceanic, brought out in 1899, also is no more, having been needlessly wrecked by a naval officer off the coast of Scotland in September, 1914, two weeks after she had been put in service as an auxiliary cruiser. It will be many a day before another vessel is so finely built as this second Oceanic. She had the distinction of being the first vessel over 700 feet in length and the first to exceed the famous Great Eastern both in length and tonnage. No ship has ever kept so regular a schedule, for except in the worst of winter weather the Oceanic never failed to show up in New York harbor the morning of the seventh day after she had sailed from England.

The first White Star Adriatic, built in 1871, became the emigrant ship Amerika in 1896 and has disappeared from Lloyd's Register. The first Celtic, known as the Island, carried many emigrants to death when she sank off the Scottish coast about fifteen years ago. She was at the time a Scandinavian liner.

In 1889 the White Star Line made a try for the "Blue Ribbon of the Atlantic" by putting in service the mercantile naval auxiliary cruisers Majestic and Teutonic to compete with the Inman liners City of New York and City of Paris, as well as the crack flyers of the two big German companies. The Majestic and Teutonic were the first White Star twin-screw ships. They looked the part of cruisers and lived up to it. Twenty-five years the Majestic served New York with the exception of one year during the Boer War, when she was a transport. As re-conditioned after her trooping, the Majestic came the nearest to rivaling the grace of the City of Rome. In April, 1914, she brought $150,000 as "junk." By the time war came, four months later, she was in such a stage of decomposition at the hands of the ship-breakers that her value as a ship was over, but on Flanders Fields you will find pieces of the old Majestic, as her steel plates were recast into shells and other war material. Her sister ship Teutonic proved equally valuable to the Allies. Unlike the Majestic, she had never been rebuilt, so upon the advent of the Olympic she was relegated to the Canadian emigrant trade. During the war, as a mercantile cruiser, the 10,000-ton Teutonic proved herself to be the most valuable of the British auxiliary fleet. So successful was she that the Admiralty re-boilered her, reconstructed her, and she carried to France many an American boy. In spite of her German name, the Teutonic is an honored member of His Majesty's navy and will probably end her career in that service.

(To be continued.)

PORT OF LONDON ACTIVITIES

In an appendix to the annual report of the Road Board, it is urged that a new authority be set up to prepare a comprehensive scheme for the whole of the London dock and riverside area. The intention is the development of the Thames shores between the docks and Tilbury into a fully occupied industrial region of docks, works and housing villages. It is estimated that 50,000 working people and their families would require accommodation.

The Port of London Authority, in recently compiled returns, reports that the net registered tonnage of vessels which entered and cleared from the port, and paid tonnage dues, during the six months ended September 30, 1919, aggregated 9,959,175 tons, which compares with a total of 6,083,591 tons for the like period in 1918. Of the total increase, 2,876,937 tons were of vessels engaged in foreign trade and 998,647 tons coastwise trade. The six months' aggregate of 9,959,175 may be further compared with 13,077,713 tons for the year ended March 31, 1919, during which latter period there were seven and a half months of war.

European Marine Notes

Exclusive Correspondence of Pacific Marine Review

THE close of 1919 finds the shipping business here in a very mixed condition indeed, very largely as a result of the chaotic control of the government, which has lingered over from war-time. One important shipping authority declared point blank that, as a matter of fact, British shipping at the present moment is being run mainly in the interests of anybody but British shipowners. Sir Norman Hill, chairman of the Port and Transit Executive Committee, said a week or two ago that he could not find one single word to say on behalf of the government. He declared it was hopeless for anybody to look to departmental control for that "give and take" by which commercial men made the most of all opportunities. Sir Norman added that since the armistice, the ship-carrying power available in this country had been steadily increasing month by month until there was now at the disposal of the country more tonnage than was necessary to satisfy all requirements. At the same time, however, ships were being kept idle in ports for days and weeks and carrying power was wasted. The ports were blocked, although not more than 75 per cent of the imports dealt with under pre-war conditions were coming in; therefore we had short supplies and high freights.

At the same time, while what Sir Norman Hill says is quite correct in most cases, some modification of the high freights question is wanted. Last March, for example, the British government fixed the rates of freight from Australia at 105 shillings (at the present rates of exchange about $21) for wheat and flour per ton. This rate today does not pay running expenses. At the same time it fixed the rate from the "River Plate" at 93s. 6d. ($18.70) for barley, 62s. 6d. ($12.50) for wheat and maize, and 93s. 9d. (about $18.75) for oats. Recently in the open market a steamer received 230s. (about $46) to load for two ports in West Italy, and naturally the question is asked: If the foreign shipowner is allowed to charge 230s. a ton for his carrying space, where do we come in at 62s. 6d. a ton to the United Kingdom and 115s. (about $23) to West Italy? Is the foreigner to get away with a freight twice as large as the British owner? If Italy can charter ships at 230s. for certain requirements, why should British tonnage be "directed" to load for the same destination at half the rate? Our shipowners say, let Italy or any other nation pay for its tonnage in a free and open market. They declare that there is too much sentiment about this business altogether.

Lord Inchcape's Speech

Again, it is asked, Why should British shipowners be compelled to carry sugar from Java to this country at 90s. (about $18) a ton, or less than one cent a pound, when a foreign shipowner can ask and secure a freight of about 450s. (about $90) a ton on copra basis to Hamburg from the same loading center? At the present time foreign boats can get 250s. (about $50) a ton for sugar from Java to the Continent, while the British owner secures 90s. Until these things are cleared away the British shipowner refuses to be comforted, even at the festive season.

Every year the address of Lord Inchcape at the annual meeting of the Peninsula & Oriental Company is an event that "dates." His lordship knows all about shipping and a good deal about everything else, and speaks on a range of subjects of the widest and most interesting character possible. On December 10 he had much to say about government versus private management of business, but could say nothing in favor of nationalization of industry. Perhaps the kindest thing he said in this connection was his tactful reference to the action of W. M. Hughes, the Commonwealth premier, in starting a Commonwealth Government Shipping Line. He is satisfied that Mr. Hughes is actuated by the highest motives, but is equally convinced that Mr. Hughes' conception of what is good for Australia is wrong. Mr. Hughes, he believes, would be "infinitely better advised if he left the business of the country to those who are in commerce, and allowed his own people to work out their own salvation." He is not without hope that the Commonwealth government will reconsider the matter "when things settle down to normal" and dispose of its ships as the Imperial government has disposed of the ships it built and bought during hostilities. A reference to a speech in which Sir Joseph Cook, a colleague of Mr. Hughes, declared that "governments must never get in front of the enterprise of the business man, nor tifle his individuality and enterprise," was effective. Lord Inchcape showed how, when once the Imperial government had taken its decision to dispose of its ships, British owners who had been hesitating gained heart and proceeded to build up their fleets, and he added that "the P. & O. and its associates have not been behind-hand in this endeavor."

No one who has had experience of the management of government departments can fail to recognize the justice in the comparison Lord Inchcape drew between the working of offices under government and private management. Filling in the details of his picture, he proceeded:

"They have in front of them questions in Parliament and the Public Accounts Committee, and all proposals have to go through many hands and many departments before they can be dealt with. It is true that with a public company the directors have their stockholders to face, and they have to give an account of their intromissions at the end of the year; but, if they are able to produce a decent balance sheet and profit and loss statement certified by their auditors; if they are able to assure their proprietors that their assets are well written down, and, above all, if they are able to recommend a good dividend, they have nothing to fear; any mistakes that they have made involving a loss are not inquired into, so long as other operations have been sufficiently successful to wipe these out and leave a good trading balance sufficient to provide for full depreciation, contingencies, and dividend."

There is no doubt that Lord Inchcape, in putting the case repeatedly and trenchantly as he does for private enterprise, is fighting the battle of the whole commercial community.

Fires on Shipboard

Of late there has been a marked increase in fires on board ship, both when ships are at sea and in harbors. Various theories are being put forward by those concerned. Two generalizations which have been made are that a large proportion of the fires start in cargoes of copra, and another large proportion in the ships' bunker coal. In regard to the former, some experts attribute the outbreak to the Calcutta jute packing, which is said to generate great heat when subjected to moisture. The presence of moisture in the hold, again, is attributed to labor difficulties and shortage of tonnage, conditions which, it is said, result in a ship's being less thoroughly dried out before a new cargo is taken in. With respect to bunker fires, observation shows that in many, if not most, cases the fires have occurred in vessels which have coaled in the East with Indian coal, which is dry and powdery. Here again the want of skilled labor is put forward, because it is pointed out that fire may arise in consequence of bad stowage, producing lack of sufficient ventilation of the coal. A similar explanation advanced in the case of dry coal is what is known as the vice propre of the cargo, which is, in other guise, something not very different from our old friend, spontaneous combustion.

Finland's Shipbuilding Proposals

The British Legation at Helsingfors reports that the committee recently appointed to inquire into the shipbuilding industry in Finland has now issued its report and recommendations. A brief summary is as follows: In 1911, 5,376,416 tons of shipping was employed between Finnish and foreign ports. In 1913 this figure had been increased to 7,367,619 tons. Of this only 38.3 per cent was Finnish owned, and the export of wood has throughout been practically entirely in foreign hands. In 1913 only 15.5 per cent of Finnish wood was exported in Finnish bottoms. It is pointed out that as the cost of freights constitutes a large part of the value of the goods, very considerable sums thus go to foreign countries through the chartering of foreign tonnage. As the stock of wood in Finland is now 50 per cent larger than before the war, the question of freight is of the first importance. If Finnish tonnage were available, Finland could make over a billion marks on wood freights alone.

The committee recommends the immediate increase in commercial tonnage, and proposes that the building of the required ships should be left to private enterprise, which should be encouraged in every possible way. Access to wood in the state forests should be allowed, and certain favorable arrangements made for the sale of wood from the state forests for shipbuilding purposes. The committee further proposes that customs duties should be lowered in favor of the import of shipbuilding materials, as well as for ready-built ships, and that a subvention system should be established to support shipbuilding generally.

The Yokohama Dock

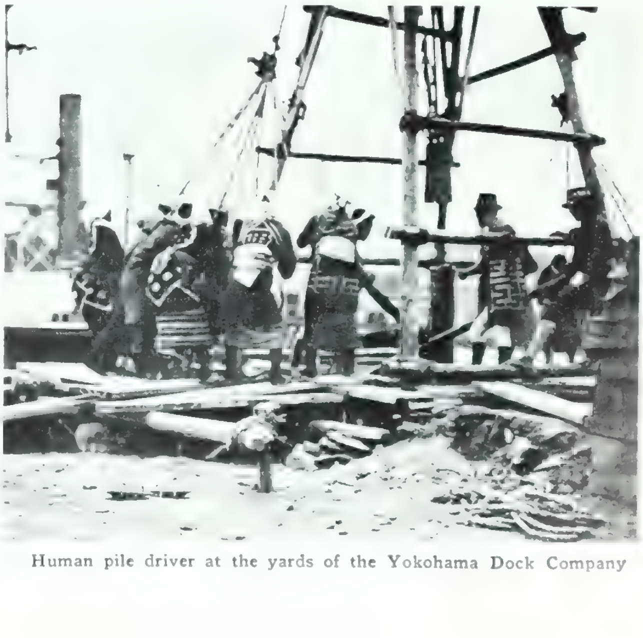
NEAR the Sakuragicho station, Yokohama, within the shadow of the elevated tracks of the Imperial railways, is the Yokohama Dock Company's yard. Its cranes are those that first catch the eye of the traveler between Yokohama and Tokyo. Established in 1895, and thus one of the oldest and best known of the yards of Japan, it was borne up to its present high standing on the wave of shipbuilding prosperity that followed in the wake of the German submarine.

Those curious contradictions of the new-old East are encountered quite strikingly at the Yokohama Dock. Just inside the embankment of the Imperial railways is a jinrikisha stand. Inside the yard compound the sound of air-hammers, driving rivets on ships for the United States Shipping Board, is in the ears of men who are driving piling by hand, a score of them heaving on a weight. On the other side a locomotive crane rubs elbows with junks that are not even the remote ancestors of the steel vessels building nearby. The old past and the changing present, labor-saving machinery and the typical Oriental waste of man power, walk together.

But it is by no means to be assumed that the Japanese yards, the Yokohama Dock among them, are to be taken lightly. The Japanese have their eyes open twenty-four hours of the day and they are learning rapidly. They are learning—that perhaps is the keynote of Nippon today—to seek after that new thing which the West has and to adopt it.

Five concrete ways, based on concrete piling; contracts with the Shipping Board for three 6300-deadweight-ton steel steamers at $175 a ton; with the Nippon Yusen Kaisha for two 10,600-deadweight-ton vessels; and a program that calls for three sisters of the Shipping Board vessels to be built of the steel supplied by the States on a basis of three tons of ship for one of steel—that, briefly, is the present status of the Yokohama Dock. As for the future—Japan over-expanded her shipbuilding, as the States did, but whatever happens, the Yokohama Dock should weather it well.

The first Shipping Board keel, of the Eastern Guide, was laid May 24, although the contracts for the three were let in May, 1918. Steel was a long time in coming (eight, nine and eleven months after the signing of the contracts); just why, no one in Japan seems to know definitely, unless priority was given American yards. When the keel of the Eastern Guide was laid, all the steel for the three vessels had not been received, although the missing parts were minor. Tamataro Tojo, managing director of the Yokohama Dock, expected, in early June, to deliver the Eastern Guide in Septem-



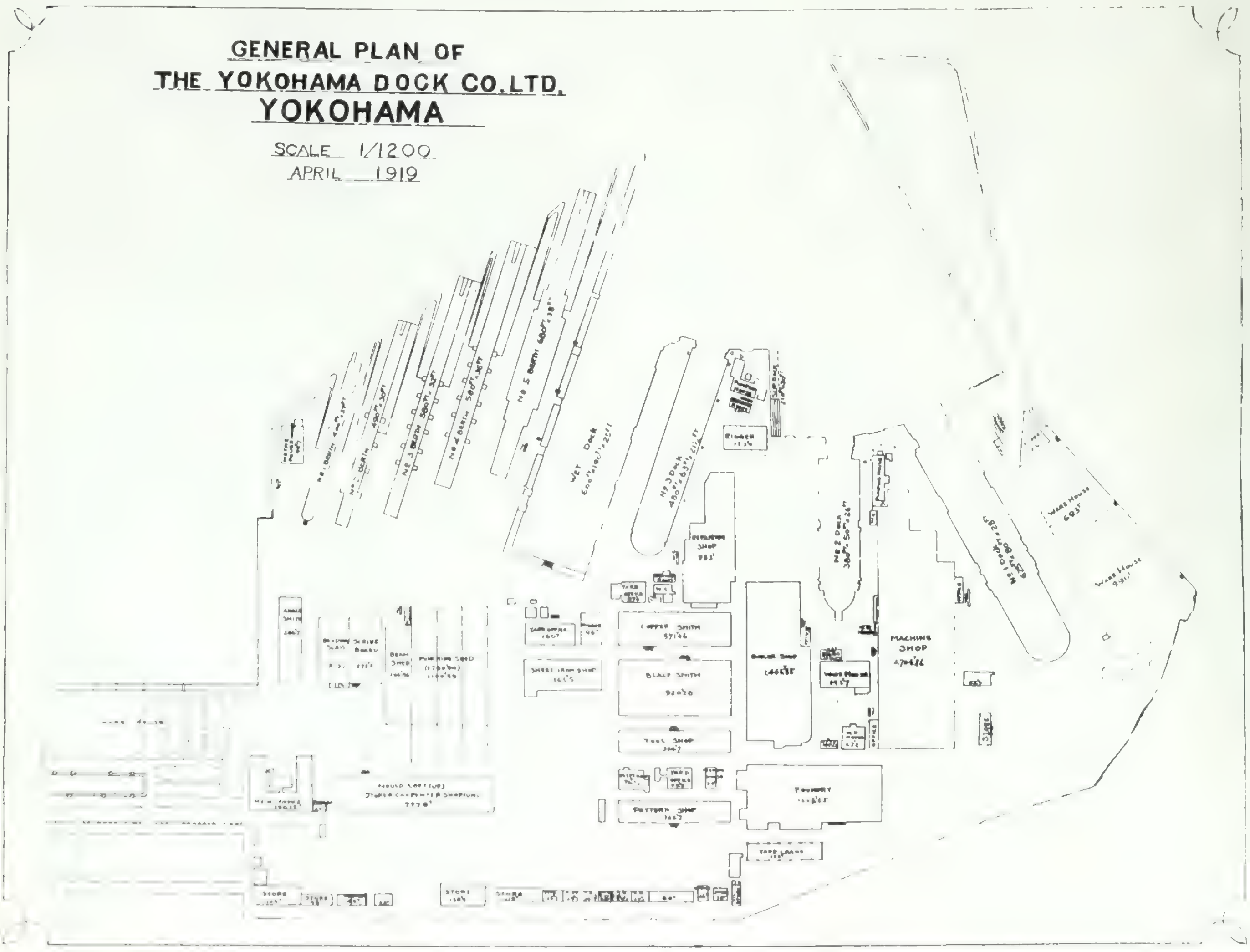
Human pile driver at the yards of the Yokohama Dock Company ber; the Eastern Crag, a month later; and the Eastern Coast, the last of the three, probably in November, all deliveries to be made at the Pacific Coast of the States. The Eastern Guide followed three 4600 - deadweight - ton vessels completed in January and February and sold to Japanese, and two 300 - ton car ferries, the first of which was launched late in May, for the Imperial railways, to be used between Moji and Shimonoscki. These are steel vessels, side-wheelers, and, it is interesting to note, the first car ferries built in Japan.

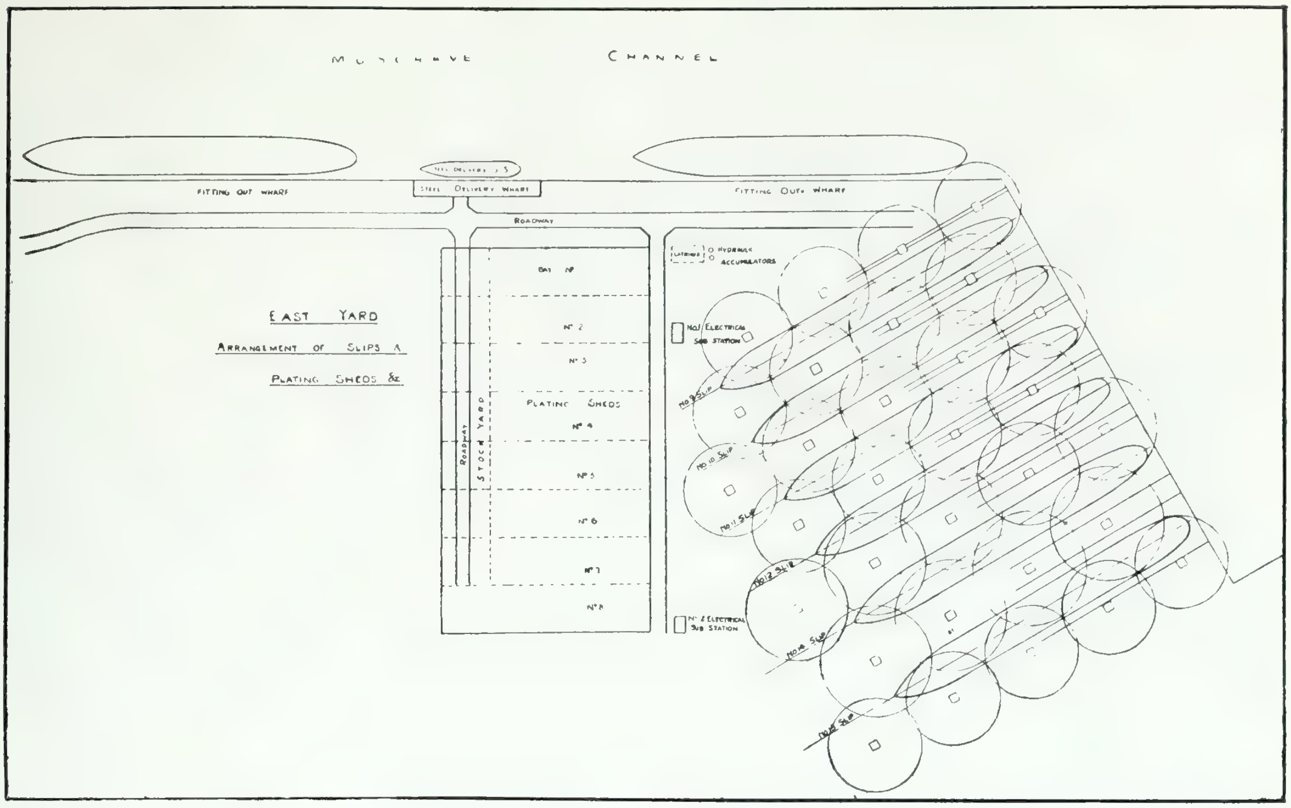
In 1875 the Nippon Yusen Kaisha opened an iron works near the Yokohama customhouse. Twenty years later the Yokohama Dock opened its No. 2 Dock and bought the N. Y. K. shops. For years it engaged virtually merely in repair work, building only a few tugs and other small craft, but it branched out otherwise in that it bought godowns (warehouses) fifteen years ago, and owns several now, all for storing merchandise. After the war began and the world became shipbuilding mad, the Yokohama Dock in 1916 began to build and has extended its yards since. The first concrete way was completed early in 1918 and the largest, No. 5, in April, 1919. The dimensions of these ways are: No. 1, 400 by 27 feet; No. 2, 490 by 30 feet; No. 3, 580 by 32 feet; No. 4, 580 by 36 feet; and No. 5, 680 by 38 feet. No. 1 Dock is 625 by 80 by 28 feet; No. 2, 380 by 50 by 26 feet; No. 3, 480 by 63 by 21½ feet; and the wet dock is 600 by 190 by 25 feet. There are, moreover, most of the usual shops found in any American yard.

However, this is not all. The first program of the Yokohama Dock has not been completed, work remaining to be done on some of the buildings which were to be finished in August or September. Thereafter, the company planned to erect an electric shop, a steel foundry at the end of the present foundry; a galvanizing shop and a welding shop, both for the ship department; another drydock, 450 by 65 by 23 feet, and to install new machines, eight having been ordered for the machine shop, and forty small lathes, etc., being still to come. Even as it stands today, the Yokohama Dock has an air of permanency, which is added to in no small degree by the concrete ways.

There are three five-ton cranes between Ways 5 and 4; one three-ton crane between Ways 4 and 3, and one between 3 and 2—five in all. Besides these, there is a fifty-ton floating crane for handling engines and boilers.

Five thousand, four hundred men are employed at the yard—4800 workmen, 400 officers and engineers, and 200 office men. To a surprisingly large degree, the technical experts received their training in Japan—the chief engineer, for example, having been educated at the Imperial University, although he spent three years at Fore River after being graduated. The chief electrician is a Stanford man, one of the few exceptions to the rule just laid down.





The new shipbuilding yard of Harland & Wolff at Belfast

The Most Modern of British Shipyards

DURING the last two years the great British shipbuilding corporation, Harland & Wolff, under the guiding genius of Lord Pirrie, has been quietly preparing a new modern shipbuilding yard at Belfast.

The new yard is situated at the east side of the Musgrave Channel and the site covers eighty-three acres of ground. When work was begun, this ground was all waste land. Thousands of men have been employed in clearing, excavating, leveling, piling and concreting until a shipyard has been evolved, which, at the present time, has six building berths capable of taking ships up to 1000 feet long.

The lower end of the berths faces toward the open sea and there is sufficient depth of water and ample space for launching vessels of the very largest type. Portable cofferdams are fitted at the sea ends of the slip ways for excluding the sea during the construction of hulls. . Reinforced causeways are built between the berths and the inside of these causeways is utilized to house the salt water and cofferdam pumps and the hydraulic, pneumatic fresh and salt water pipes and electric cables. The tops of the causeways are utilized as roadbeds to the hulls and ten-ton tower cranes are situated along these causeways which are capable of lifting and depositing material over the whole area of the building berths.

The plate shop is situated at the head of the building berths. It is an all-steel building with a cantilever saw-tooth glass roof. It covers an area of about seven and one-half acres and is divided into eight bays, each of which is equipped with overhead traveling cranes and the most modern and powerful machinery capable of dealing with plates up to forty feet long and one and one-half inches thick.

No. 1 Bay is used for fabricating and machining columns and plates for masts. No. 2 Bay is devoted to anglesmith work and to the production of liners. No. 3 Bay takes care of plates for decks and tank tops. No. 4 Bay takes care of the shell and keel plates; No. 5 Bay, of the plates for the bulkhead casings and bunkers. No. 6 Bay is devoted mainly to beams and girders; No. 7 Bay to frames and tank floors; and No. 8 Bay to special frames.

A stock yard for material is arranged at the south end of each bay and is fitted with special brackets for sorting and racking the particular material for its respective bay, the machinery being so placed in the bay that each successive operation facilitates the passage of the material toward the hull.

A system of reinforced concrete roadways joins each bay of the plate shop to all the building berths and connects with the concrete causeways mentioned above.

A steel delivery pier and conveniently arranged fitting-out wharves are practically completed at the east side of the Musgrave Channel. These will be fitted with huge overhead traveling cranes with a capacity sufficient to handle the largest engines and boilers used in merchant ships.

One of the special features in this new yard is the electric power and lighting system. All the cranes are electrically driven, as are also the air compressors, the pumping plant for hydraulic power and practically all the tools in the shop. The connected load for power purposes is over 3000-brake horsepower and that for lighting is over 375-brake horsepower. In the plate shop described there are not less than 288 lights of 2000 candle power each.

The International Millionth Map

Why It Is a Misnomer and Why It May Have Been Part of the Pan-German Plot to Conquer the World

By B. J. S. Cahill, F. R. G. S.

> "It is useless," says this writer in "Unsere Centurie," "to look for its name on the map. Even the great Atlas in 378 folio volumes by our eminent Tuchtigmann, in which every thicket and clump of trees in the old and new world are put in with such exactitude, even this noble monument to geographical science, designed for the use of sharpshooters, does not bear the least trace of Frankville."—THE BEGUM'S FORTUNE, Jules Verne (1872).

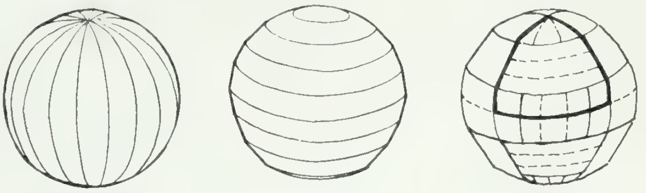


Figure 1—Decentralized projections: (1) On vertical gores for making globes, (2) On lateral strips for the conic projections and the Millionth Map, and (3) Where both systems are used in one octant of the Butterfly Map.

IN spite of our hundreds of thousands of public schools and our innumerable academies and colleges, there is no provision in any of them for the study of geographical projection; nor until quite recently was there a single Chair of Cartography in all our universities. Nonetheless, projection or stereotomy is taught to navigators, engineers, architects and mechanics for other purposes than map making, and, as a consequence, men of these pursuits know infinitely more of the subject as a class than professional geographers do. Although all teachers of geography as well as laymen have heard of the International Millionth Map, not one in a thousand could explain the principle of its projection!

As usual, the press reports of this undertaking are quite up to standard, for we are informed by the New York World that this "map" will be 150 feet by 100 feet in size, and that it will be on the "polyconic projection devised by Hassler, late of the Geodetic Survey, etc."

In the first place, it is not a "map" but a multitude of maps; in the second place, they were not designed even to make a map, that is, a single, if gigantic plan of the world. Therefore, it is absurd to define the dimensions of "a giant map" which was never the object or intention of its originators to produce. Lastly, it is not made on "Hassler's polyconic projection."

In the preceding paper we showed that the world, to be properly represented as a whole, must first be divided into parts and each projected independently. Thus we can map the world very accurately if we do it on thin longitudinal strips from north to south. On this principle a small globe is covered with twelve independent spindle-shaped gores. But these gores cannot be joined in one map on a plane, since they have only a touching or rolling contact with each other. They come together all along their edges only when pasted on to a sphere. But vertically, that is, from pole to pole, they form each a narrow but continuous map of almost absolute accuracy.

But the surface of a sphere can be mapped with equal accuracy on thin latitudinal strips from east to west, and just as the longitudinal strips are really groups of meridians projected on to a series of cylinders and forming a poly-cylindrical projection, so the latitudinal strips are really groups of parallels projected on to a series of cones—a polyconic projection, but not the so-called polyconic projection of Hassler. Now this is precisely the projection used for the series of two thousand odd small sheets called very erroneously "the Millionth Map," for these sheets, which can be united laterally in forty-four thin strips of varying curvature, cannot be united vertically at all, because the radius forming the north or south boundary of one sheet is never the same as the radius bounding the sheet above or below. However, a mechanical juxtaposition of about nine sheets—a central one and its eight neighbors—is possible, owing to the large scale, in which the divergence of the arcs between the different conic bands is negligible. A group of nine sheets thus assembled will include an average large state. It would cover Labrador or the Great Lakes. Beyond this, the sheets are in no sense intended for one map of the world, though they might well be called a World Atlas. Pasted on to a forty-two foot diameter sphere the sheets would, of course, form a perfect globe of astonishing completeness, but of little practical use, for no one could read the legends and see the globe at one and the same time. It would be like pasting the pages of the Bible on the side of a church and much less effective, for one could see and read the surface of a wall more easily than the surface of a sphere.

If it were intended to print sheets for a forty-two foot globe (one-millionth of the earth) it could be done equally well with sixty fusi-form gores; and indeed one wonders why this method was not adopted. The results would have been much the same, except only that the strips would run north and south and all be uniform instead of running east and west and all being different. No one rightly defines the longitudinal strips of a globe as a "map"; then why call the latitudinal strips a "map"? It is clear from this that the so-called "Millionth Map," however euphonic and alliterative it sounds, is plainly a misnomer.

Let us carry the parallel further. The twelve gores of a small globe we have shown imposed on Mercator's projection, where their only line of agreement was the equator. We quoted the humorous account of the New York reporter who accused the venerable cartographer of "filling in the gaps between these gores with fictitious land and water stolen from another planet." Now Hassler's so-called polyconic projection does a similar thing to the lateral edges of his world map that Mercator did to the vertical edges of his.

Figure 2 shows the principles of the so-called "Millionth Map." But for the sake of simplicity, seven wide conic strips have been drawn instead of twenty-one thin ones. The reader can easily imagine these, each strip coming of course closer together than on the diagram, but the lateral blank spaces in the aggregate being the same. Clearly the Millionth Map is not a modification of Hassler's polyconic projection, but a series of twenty-two different conic projections, plus the polar disc. We have seen that the whole world never has been and never can be shown on one projection satisfactorily.

Hassler's polyconic projection (another misnomer, for it is not developed on several distinct cones as the Millionth Map is, but on an infinite and continuous succession of cones) shows the whole world on one continuous projection from one favored center, namely, the Greenwich meridian and the equator. For 45° E. and W. and 90° N. and S., this projection is admirable; beyond this east and west it goes from bad to worse, and is, on the whole, quite impossible and ridiculous.

Clearly, the Millionth Map is not on this projection, nor is it on one continuous projection, nor yet designed to be assembled into one "giant map 150 feet by 100 feet."

Nevertheless, the sheets of the Millionth Map can be assembled in one giant group, though in a manner its originators never thought of. Figure 2 shows one-eighth of the sheets brought together, a curvilinear equilateral triangle of 90° latitude and longitude. If the gaps on the east and west (which should in reality be more numerous and smaller) were closed up by two upward thrusts, indicated by the arrows, and if the curved outlines were slightly flattened in the center, the result would be an actual octant of the Butterfly Map. If the sheets were printed on linen and assembled with a slight margin, they could, with a little warping and accommodating within this margin, be brought all together in one giant Butterfly Map, 144 feet across the wings.

However, it is unlikely that the Millionth Map will ever be completed. Hundreds and hundreds of its sheets would cover the unplumbed sea and would be beautifully engraved, annotated and margined imprints of just lines of latitude and longitude on a plain field of indigo! Realizing this, a good deal of the majesty of the idea, as presented in its grandiose title, falls away and leaves the fact standing out that after all the project merely means the pushing of topographic work among the nations who are anyway already engaged in this very work with as much dispatch as their respective finances will permit.

What particular interest was to be served by getting all the nations to map their territories to one horizontal scale and under one system for vertical scale? And particular stress was laid on this latter feature.

Mr. Bailey Willis, describing the International Millionth Map in the National Geographic Magazine, tells us that the method of exhibiting slopes on German and Austrian maps is done in a manner "peculiarly adapted to military purposes, since an officer can judge at a glance the nature of a declivity and whether it is passable by infantry, cavalry or perhaps artillery." And this leads us to inquire: Who were the prime movers in this apparently purely scientific undertaking, by which all the nations of the world should expedite their surveys and reduce those already made to a uniform system, "especially as to the hillside slopes"?

We find that the prime movers were Albrecht Penck and Eduard Brückner—Germans both. Dr. Penck began the movement in 1891, when comparatively young and unknown; but it is marvellous how any movement will flourish when it is favorable to the Powers that be. Penck, of course, had his military training, and at the eighth Geographical Congress at Washington he said apropos of several maps being made to the millionth scale: "One who is familiar with Cuba needs only to lay the French map of this island at the side of the German or French map of China to see at one glance that space which has been overwhelmed in the Russo-Japanese war."

At that time in the world's history scientific men of all nations except Germany had lofty international ideals as to science and its service to mankind. In Germany, however, as was made evident enough later on in the "manifesto of the ninety-eight professors," science was the handmaid of "Kultur," and in my own judgment there is no doubt but that the surprising progress of Penck's proposal was due to the subtle, invisible and far-reaching assistance rendered by the "higher-ups" of Berlin, for very soon we read that at another congress in London, called together by the British government itself in 1909 for the express purpose of launching the great International Millionth Map, "Professor Penck, the originator of the plan and

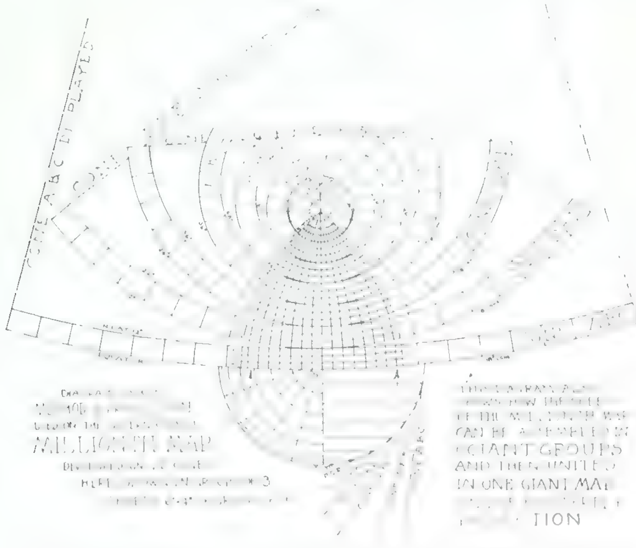


Figure 2—Method of projecting the sheets of the International millionth "map," so-called, on truncated sections of forty-four separate cones—a globe map on parallels instead of on meridians and in no sense designed for a single map.

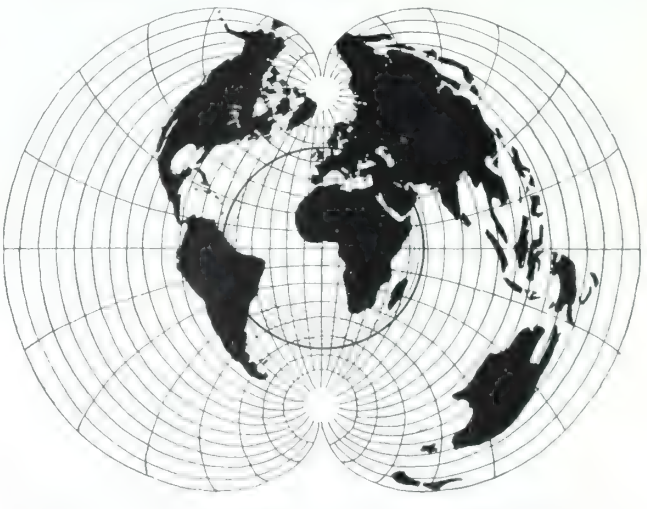


Figure 3—Map of the world on Hassler's so-called polyconic projection, a continuous projection on one principle from one view point and consequently a ludicrous failure at the edges though excellent at the favored central region.

now the representative of the Emperor William," was the leading figure.

Map making from established data is a comparatively cheap process, but acquiring the data is a matter of enormous expense, possible only to the world's governments. Could any organized undertaking possibly be more gratifying to the German General Staff, the Pan-Germans and the All Highest himself than this proposed expenditure of millions of foreign money, under the guise of a benevolent science, for supplying Germany with precise data upon which alone successful military operations can be conducted?

We have now no shadow of a doubt but that the Germans had world conquest in view. The will to conquer was there, and no people have ever put so much store on the "will to do" anything as the Germans. Schopenhauer has fashioned the idea into a philosophy, and the very phrase was one of the constant curiosities of the Berlin communiques during the war.

Not a little significant of the good-natured, unsuspecting way in which the peace-loving peoples of the world took up with Penck's proposal is the fact that Japan alone among the nations refused to join this map-making party. Seeing that the Japanese and the Germans at that time were the only nations cherishing dreams of military conquest, it is not surprising that the former were not willing that they should furnish topographical details of their islands "for the use of the German sharpshooters."

And this brings us to consider Jules Verne's wonderful allegory of the great war—his story called "The Begum's Fortune," published soon after the Franco-Prussian conflict.

I have drawn attention elsewhere to the number of prophecies accurately embodied in this symbolic tale. It should interest us of the Pacific Coast because the main incidents occur in Oregon. In this wonderful little book the German psychology is described to a dot, not as we imagined it then, but as we know it now. The use of poison gas is foretold and the giant gun of St. Gobain. "The Day" is most dramatically drawn and so is the spirit of "Schrecklichkeit," "Weltmacht," liquid fire and the German Gott. Last and not least, we get a witty forecast of the "Millionth Map" as quoted at the head of this article. But even Jules Verne, with all his prescience, could not give the Germans credit for more than the ponderous laboriousness of "Tuchtigmann's colossal atlas in 378 folio volumes," and its diabolical purpose; even Jules Verne could not imagine the sublime nerve of a project by which each nation is made to supply the data to aid its own invasion!

If the reader thinks all this far-fetched, let him reflect a moment on the amazing incident of the "devotion of Neuberg" to Thomas Carlyle, the author of "Frederick the Great," the eulogizer of Jean Paul Richter and the creator of "Teufelsdrohk," the greatest booster of Germanism in all English literature. Early in Carlyle's career, after it was known that he had a marked leaning to German philosophy, and in particular had made Frederick a subject of intense hero-worship, this mysterious German, Joseph Neuberg, presented himself to Carlyle and became thereafter a sort of literary slave to the Sage of Chelsea, translating, assorting, and when needed working for months among the state archives in search for necessary material in glorifying the greatest of the Hohenzollerns. The care and speed with which Neuberg dug up obscure state papers astonished Carlyle, who in his diary states that the man worked silently and incessantly for twenty-five years, yet "got no shadow of reward nor sought any."

At this day no one would doubt for a moment who paid for the labor of Joseph Neuberg! What more fruitful investment could a government make than "to maintain a subtle spirit at the elbow of a foreign philosopher where, like Mephistopheles at the ear of Faust, he would direct the thoughts of the superior mind by tiny, unobserved touches into desired channels."

However, Carlyle's "Life of Frederick the Great" and "The International Millionth Map" still remain most important contributions to history and geography in spite of the unseen German hand whose influence is now happily discounted.

Some hundred sheets of the 1: M Atlas have already been published, and when, if ever, complete as to the land only, the 1500 sheets alone will constitute a wonderful treasure-house of geographical information.

But even more necessary than this minute geographical information and analysis is the need of a succinct rational world map for co-ordination and strategic survey—a master map on which worldwide facts can be marshalled under the eye of the scholar and the statesman for purposes of constructive and fruitful synthesis.

The Butterfly Map aims to fulfill this purpose and function, and it is an odd coincidence that it was published in Edinburgh in the same year and season that the International Millionth Map was finally launched in London, namely, in the autumn of 1909.

Obviously the aims and purposes of each are antithetical and complementary, just as the hidden motives back of each were actually antagonistic. The Butterfly Map was an episode in an attempt to promote perpetual peace based on the actual world ascendancy of the English-speaking peoples. The Millionth Map was proposed to promote facility of warfare directed to the forceful world ascendancy of the Teuton. In the end let us hope that both projects will serve a broader purpose than either was originally intended for.

DRAKE LOCK-NUT COMPANY'S EXPORT TRADE

THE Drake Lock-Nut which was originated and first manufactured in San Francisco is now fast developing an export trade, having recently sold several large orders to Australia, New Zealand, Java, Siam, China, and other Oriental points, also South Africa.

An exclusive agency for the sale of Drake Lock-Nuts was recently placed with one of the largest concerns covering South Africa and another in New Zealand and still another in Australia.

The Drake Lock-Nut Company are enthusiastic about their device, which is manufactured in the San Francisco plant for the Pacific Coast trade and the Orient, and are also enthusiastic about building up the export trade from the port of San Francisco

In addition, they have a large plant at Cleveland that is supplying the automobile and machinery trade in that great industrial center.

An Odyssey of Hawaii

By Andrew Farrell

J. KALEPA KANEHAKU has returned from the house of death to his more material abode on the Island of Hawaii. By this time he doubtless has resumed the everyday life of the average Hawaiian, which, except for the occasional luau, is not likely to be overexciting. But Kanehaku, if he be a wise man, hereafter will crave most of all the feel of solid ground beneath his feet, whether that land be the barren lava slopes of Mauna Loa, a beach of Kohala, or the Kona coffee fields; and he will crave least of all anything that savors of adventure. He will give thanks daily that, when the day of his departure does come, his bones will rest with those of his ancestors and not in the deep-sea ooze of the Pacific.

Kanehaku arrived in Honolulu, December 13, aboard the Japanese sampan Kaiyo Maru. His coming awakened some such emotion as, in another time, did the return of Lazarus from death. That comparison is not unfitting in the case of a man who drifts for fifty-one days in a small boat, oarless, sailless; without water, except for what the skies give him; without food, except for what he can wrest from the sea; and who yet lives to tell his tale on the streets of Honolulu. And that city rubbed its eyes and leaned forward to listen to the story, fantastic, amazing, tremendous—Honolulu, which for a hundred years has seen and heard so much that is strange; which, as it watched the weaving of its own web of destiny, its eye ever on the scarlet thread of sugar, has turned an ear drowsy and forgetful to the shipwrecked mariner cast upon its beach from all corners of the Pacific.

Those castaways have come, and said their little say, and gone; from the old whalers, sandalwood traders and clipper ship crews, to Japanese, Norsemen and Americans of today; but never a one has come with such a tale as Kanehaku. For about those others clung the splendor of catastrophe: of vessels struck by lightning; of steel steamers that broke in two and foundered in the fierce gales of the North Pacific; of schooners piling up on reefs; of burning hulks bursting into fragments when their cargoes exploded. Kanehaku's story was of a small mischance, not of the huge and inevitable; yet in life, if not in novels, tragedies usually grow out of the little, wayward things.

This Kanehaku was not a seafaring man, even though the sea almost took him as its own. With the easy adaptability of a Polynesian, he was a plantation laborer when he was not a fisherman. He had a friend who carried mail in a small power boat between Kawaihae and Mahukona, on the west coast of Hawaii; and one day (October 22), when the friend was unable to go, Kanehaku went in his stead.

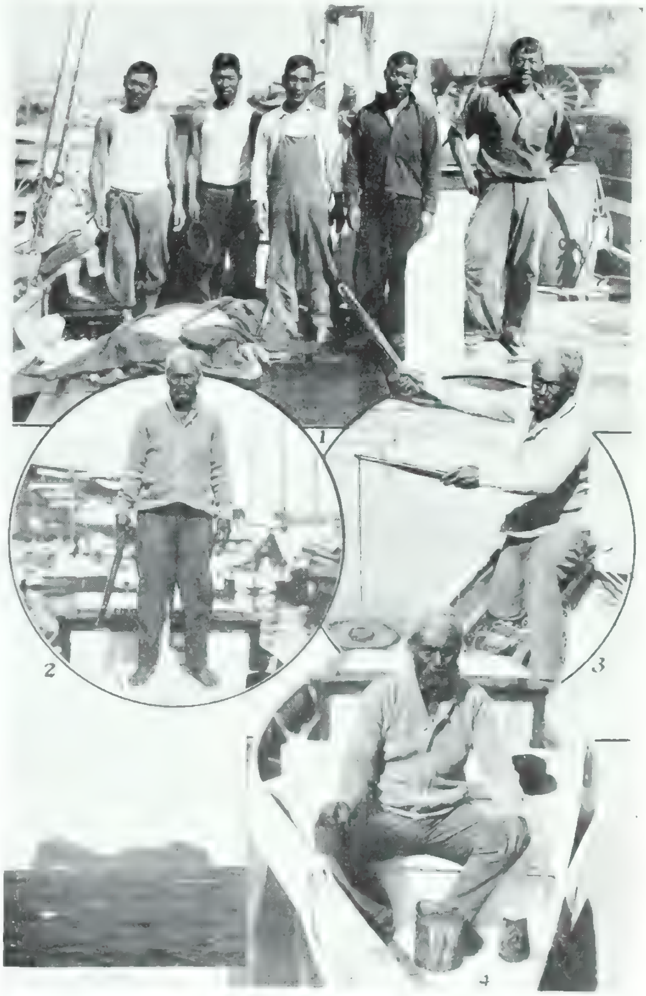
Mikaela Kaloa also was in the boat. Out of Kawaihae the engine behaved badly; and Kaloa went ashore in a small dingy that the power-boat had in tow, while Kanehaku worked at the engine. He persuaded the engine to run; Kaloa returned; and again they chugged toward Mahukona.

Again the engine refused to work; and again Kaloa went ashore in the dingy to seek assistance. And that was the last seen of Kalepa Kanehaku until the Japanese sampan Kaiyo Maru picked him up, fifty-one days later, off Nihoa, or Bird, Island, some 350 miles from Mahukona.

After Kaloa departed the second time, the power-boat was anchored, and Kanehaku worked at the engine. Engrossed or careless (either or both), he paid no heed to what might be happening, until at length he looked over the sea. The shore line of Hawaii had receded. The anchor line had parted, and he was being carried to the south, where, for thousands of miles, the only land is microscopic specks of atolls. Kanehaku had embarked upon his amazing voyage, in a small boat; without food, without water, without oars or sail.

For five days he thirsted—a thing easily told but not so easily comprehended: five days in a small boat, on the open sea, under a tropical sun, must have dragged as would five years to those who live softly ashore. Few white men could have endured even that time without tottering on the verge of madness.

But Kanehaku prayed for rain; and the rain came. In this he saw the direct act of Providence. And, because to him it was a direct act of God, he returned from the sea with the simple and unique faith of men whose experience has resolved all doubts. When the rain fell, he plugged the scup-



1.—The Japanese crew of the Sampan Kaiyo Maru. 2, 3 and 4 —Kanehaku in his small launch demonstrating his fishing methods. Lower left shows the lonely island of Nihoa.

per holes of the little foredeck; caught the water in a tarpaulin; and poured it into a gasoline tin. Then there was no more rain until the tenth day, when he caught more water; and at one time he had eight cans full. Still, however, he was without food. On the twenty-sixth day of his wanderings, he completed a fishhook or fish-spear: a fragment of iron bound to a piece of wood, the end of the metal turned back and sharpened by the slow labor of rubbing it to a point.

Probably Kanehaku owes his life to his skill as a fisherman, for, though he prayed, he also worked. Surely not one man in a hundred, beset as he was, could have matched so successfully his wits against the huge indifference, the blind malice, the dull treachery of the sea, which has witnessed the deaths of so many thousands of human ephemera; which gives little, and that grudgingly; but demands all.

No seafaring man, this Kanehaku, but a fisherman of parts. He tied rags to a cord; and, dropping this over the side of the boat, moved it to and fro, his hook poised in readiness. A mahimahi, a large fish, but wary, struck at the moving rag; and Kanehaku also struck. He caught the fish in the gills; and dragged it aboard. And so, for the time, his pilikia was pau, for what islander would not be content with raw fish? though doubtless a small bowlful of poi now and then would have been not unacceptable.

In the Eight Islands drought was becoming a commonplace: for Kanehaku, more rain fell. He caught another mahimahi, which he dried. On the thirty-first day (when other folk, afloat and ashore, were thinking of Thanksgiving), he consumed the last of his food; and no more fish could he catch that day. But on the thirty-second day he succeeded in impaling another.

And thus runs of the log of his voyage: enough water to stave off madness and death; enough fish (seven in all) to preserve life.

All the Eight Islands in the meantime had heard of the Hawaiian who had drifted out to the sea and death in a helpless boat. The United States lighthouse tender Kukui went in search of him. Twice the Kukui, or another vessel, passed him in the night; not sighting him (for his matches were useless); not hearing him (for he was to leeward); passed near this plaything of the sea and moved on; leaving the boat to toss alone within the iron ring of the ever-fleeing horizon, that fled and shifted, only to disclose waste beyond waste.

At length land dawned for Kanehaku. It was Nihoa, that scoured, solitary volcanic rock lying west of the inhabited island of Kauai. Nihoa's shores are cliffs, dropping steeply into the sea, which, broken by no fringing coral reef, beats directly upon them. When heavy rollers are running, the white spume and spray climb far up the walls of worn stone—a spectacle terrifying; where landings are made infrequently, and with great difficulty. As between remaining at sea and swimming for shore and trusting to a friendly wave, Kanehaku preferred his boat; although Nihoa is the breeding ground of hundreds of thousands of sea-birds, whose flesh would have been food (of a sort) and whose blood would have been drink, however nasty.

It is curious that Kanehaku should have been carried by the drift of the sea to Nihoa. One would have expected him to be dragged southward, before the northeast trades, as he was in the beginning from the shores of Hawaii. Instead, he was borne northwest. How steady was his progress there is no means of ascertaining; even a guess is impossible, because the currents of the Pacific, despite the pilot charts, are contrary-minded and not amenable to discipline. However one explains this, in it lay Kanehaku's salvation: had he drifted to the south he would have been upon wide and landless seas, where the few ships that do come sail solitary for days, weeks and months; where only flying fish, skipjacks and porpoises break the monotony of waters; where his chance of rescue would have been one in a million, or in ten million, or in one knows not what prodigious number.

Apparently caught in eddies that play about Nihoa, Kanehaku lay in sight of the island for six days, circling hither and thither, but held close to land; until the Kaiyo Maru, bound out of Honolulu for the fishing grounds to leeward, came upon him. The Japanese fishermen saw the Hawaiian leaning over the water trying to spear an aku. They cried out to him; he turned; and his epic adventure was ended.

The Kaiyo Maru was outward bound, her holds newly filled with ice for the expected catch; but the Japanese disregarded that; took Kanehaku aboard and his boat in tow (for that had to be returned to the friend in Hawaii): and so they returned to Honolulu. There was amazingly little troubling the fifty-four-year-old Hawaiian—of ailments physical, almost none; of mental, only anxiety for those on Hawaii, and desire that his wife be advised at once of his safety (and the friend that the boat had not been lost). For three days Kanekaku was the wonder of Honolulu, the hero of a stranger tale than the man who went to the Isle of Voices. Thereafter, he returned to Hawaii and the great mountains.

WEBBING BOX HANDLES—VALUABLE SHIPPING SPACE SAVED

IN export shipment, boxes loaded with 200 to 300 pounds are most easily manipulated when provided with handles. Usually such box handles are made of rope, inserted through holes in the ends of the box and secured with wall knots, or inserted in grooves under the cleats at the ends of the box and nailed. Both these methods take up useful space, thereby increasing the displacement of the box as well as the export rates, which are based on the cubical contents of the package.

To obviate these difficulties, the Forest Products Laboratory suggests using webbing about 1/8 inch thick and 1 1/8 inches wide, which has a breaking strength of 800 pounds. This may be inserted through saw-cuts made parallel to the grain in the ends of the box, turned down flat inside, and nailed securely with large-headed roofing nails.

Such a handle takes up no extra space either inside or outside of the box. It is easily made, and has a lifting strength with a large margin of safety. The results of this and of other experiments of this laboratory which have come to the attention of the National Foreign Trade Council indicate that work of great value to American exporters is being carried on in solving packing problems.

American Sailing Vessels

By C. O. Liljegren, Goteborg, Sweden

AMERICAN clipper ships were once the pride of the nation, American sailing yachts are still the world's champion, but the American auxiliary sailing vessel—is she a failure? So far as the Pacific type is concerned, the answer seems to be an unqualified "Yes."

Little has gone through the barbed wire of censorship, but from all accounts the underpowered and undercanvassed American auxiliary is a failure, not only as a ship but also as an investment. And that it must be so, the author foretold already in 1916 (see Pacific Marine Review, December, 1916).

How could it be otherwise? Not only underpowered and undercanvassed, but underdone in almost every way, with uneconomical twin-screws and small relative carrying capacity, how could the American auxiliary compete with the modern turbine steamer with superheater, watertube boilers and every modern appliance for maximum efficiency? Considering the tremendous advance in steam shipbuilding, it is indeed a wonder that sailing ships have not been driven off the seas altogether, like the inefficient steamer of the fifties or sixties. This proves conclusively the extraordinary vitality of the wind-driven cargo vessel, and vouches for its future superiority as an investment when once its improvement has begun in real earnest.

In order to make the proposition clearer, an illustration (Figure 1) is here shown, comparing the American Cup yacht Reliance, the big clipper ship Great Republic, and a recent Pacific auxiliary ship, all reduced to the same water line length. What a big difference in power and speed between the yacht and the clipper, and still more so between the yacht and auxiliary! The auxiliary chosen as example is one of the very best, but we notice that few of these schooners have topsails! Think what a ridiculous sail area with only lower sails on a big, hulky, full-bodied cargo vessel! How impossible it would be to make it go at a profitable speed! The sails would be blown into ribbons long before such a speed could be obtained, but unless a sailing ship is both speedy and can carry a big cargo, it is an investment at which capital will shy.

Careful estimates have shown that the yacht could carry its full sails almost as long as the clipper, and that the clipper is almost as fast as the yacht in light airs, and faster in a storm. Of course, the clipper or any square rigger could not compete with the yacht in a wind, so that taken all round the yacht is the faster vessel by far. But the clipper is, notwithstanding its small sails and heavy displacement, on account of its size not much slower than the yacht. Thus big size, sail-carrying power and weatherliness combined will make a sailing ship speedy enough for investment purposes. And investment purposes control all commercial activities.

Now, what makes the yacht so able and fast? It may be summarized thus: Easily driven form, i. e., small head resistance and large side resistance, artificial stability and well-shaped sails. In applying these characteristics to the cargo ship, a clever designer can get small head resistance with big displacement and carrying capacity—this has been proved time and again by model experiments. For obvious reasons, however, he cannot give the ship a heavy, deep lead keel; hence some form of sinking keel (centerboards) and water ballast to windward must be used to give the sailing ship side resistance against leeway, as well as artificial stability without breadth of beam. There are several advantages from a small beam—small head resistance, small building cost, seaworthiness and easy rolling. But the beam must be proportioned to the draft so as to get the smallest possible wetted surface for given displacement. Besides, a big sail area is of course required for speed, but not so big as that of the clipper which had no motor for use in light airs and calm. On the other hand, the clipper had its studding sails, ringtails, Jamie Greens and water sails, which are superseded by the motor and the propeller.

As to the type of sails, it is easily understood that no square sails can give speed on a wind where it is most essentially needed—anything can sail down the wind! Especially in conjunction with centerboards, gaff sails are necessary; but big gaff sails are very unwieldly and require a large crew. Hence by subdividing the gaff sails, in the manner of double foresails of a square rigger, we get sails easy to handle that can stand any wind, and can be operated by a small crew.

A type of cargo vessel has now been evolved embracing all the characteristics mentioned above. It is called a "motor clipper" in place of a better name, but it has little except speed in common with the overfine clipper ship of old, with its small cargo capacity, intricate and costly rig, and large crew. In point of speed, the new vessel will equal the clipper ship in medium breezes, while it will be faster in strong winds. In light airs and calm, the value of its motor comes in.

Figure 2 will give an idea of the motor clipper of 5000 tons deadweight. It shows five masts, four cargo hatches, two centerboards; its self-trimming hull and arrangements for artificial stability, for which patents are pending, are not shown. The respective sails are identical on each mast, thus simplifying the gear, reducing the cost and the spares.

Taken all round, the motor clipper should be 50 per cent faster than the old clipper ship, and should carry twice as much on the same net tonnage. In comparison with the present sailing ship, the motor clipper should be three times faster, and should carry 25 per cent more, besides getting very much quicker despatch in the harbors. Looking from the standpoint of cargo carried in a year, and the gross revenue, the motor clipper should be five times better than the ordinary sailing ship. Against this stands the cost of the motor, the fuel, the engineers, etc., but as most big sailing ships carry deck machinery, boilers and engineers anyway, the extra cost is not large. There will thus be a very handsome increase in the net revenue to flow into the pockets of the men who are far-seeing and progressive enough to invest money in the new motor clipper.

The speed and sea-going qualities of the new vessel have been proved by model experiments on a large scale, where the model was tested "to destruction" as no full sized ship ever could be. It may come as a surprise to most of our readers that the model proved uncapsizeable in contrast with the ordinary sailing ship that turns turtle at about 70 degrees. The centerboards and double gaff sails of the model worked to perfection.

The test of the full-sized motor clipper is thus looked forward to with the utmost confidence by all concerned. Whatever the outcome, one thing is sure: **as well try to win the American Cup races in a yacht without keel and ballast, as to sail a ship at profitable speed without double gaff sails, centerboards and artificial stability.**

But why, it may be asked, all this bother about the sailing ship, when steamers and motorships are plentiful and more efficient than ever? Because, firstly, coal and fuel are needed by industry, in land transportation and by passenger ships at sea; secondly, because statistics, rightly interpreted, show that the day of the wind-driven ship is coming again. The concise presentation of this matter must be left to a future article on "Ship Investment," but a short exposition of the matter may be given here.

The profit derived from a given ship is dependent on two widely different fundamental conditions: **the size, form and efficiency** of the ship with its motor and propeller, and the **general price level.** Part of the first condition has been indicated herein; it is the sphere where the skill of the designer and builder of the ship is paramount. But in the general price level, or state of the market, the action of man is practically excluded, at least as regards the individual. Only the concerted action of nations, as in great wars, has any effect on the price level. But thanks to the Swedish engineer, A. F. Enström, the general price level can now be forecast with great accuracy, although there are still enough uncertainties to satisfy the speculator and to make the game worth playing.

The basis of this price level forecast are Sauerbeck's Index and wheat prices in France, which have been recorded since 1250. Figure 3 shows the Sauerbeck index curve since 1800; the periodical fluctuations and the influences of the great wars can be plainly discerned. Besides these, small variations are found from month to month and year to year which do not seem to follow any law at all. However, everything in Nature is guided by laws, and in time we shall probably find all those that govern price fluctuations.

As seen in Figure 3, the index curve really forms a wave series of different heights; hence there must be a mean line or axis, representing mean or standard prices at a certain period. This line is shown dotted, and where the index curve is above the mean line, high prices rule, and vice versa. Thus, from 1853 to 1878, the prices are above the standard, and from 1883 to 1911 below the same. Mr. Enström has estimated a new elevation from 1914 to 1938, with the top in 1918, which so far has proved true.

Now the general question—wind-driven **versus** machine-driven ships—is clearly decided by the price of fuel and machinery. If coal and machinery

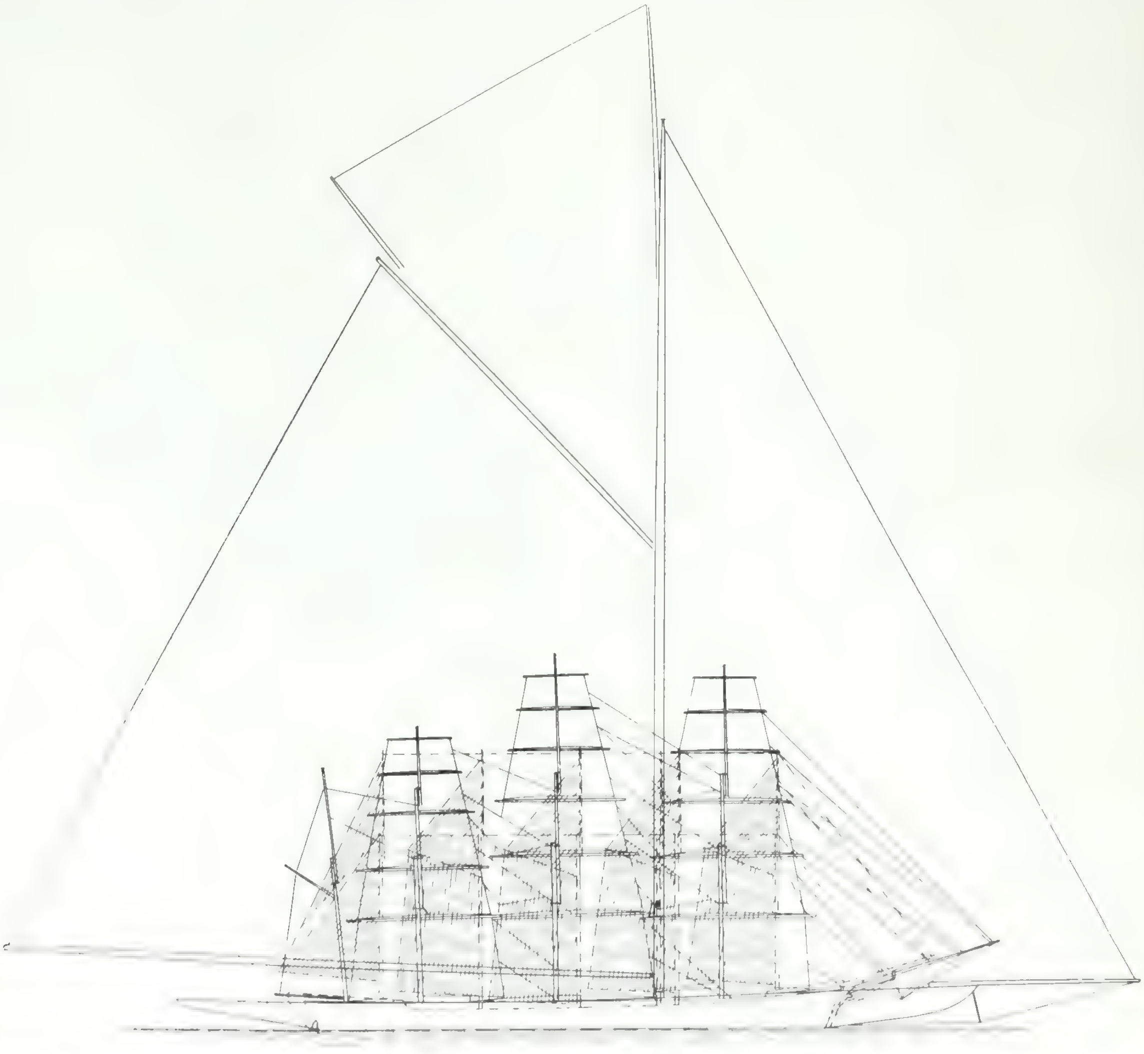


Figure 1 shows an American racing yacht, a clipper ship, and a Pacific Coast schooner reduced to the same load water line. Note relative spreads of canvas

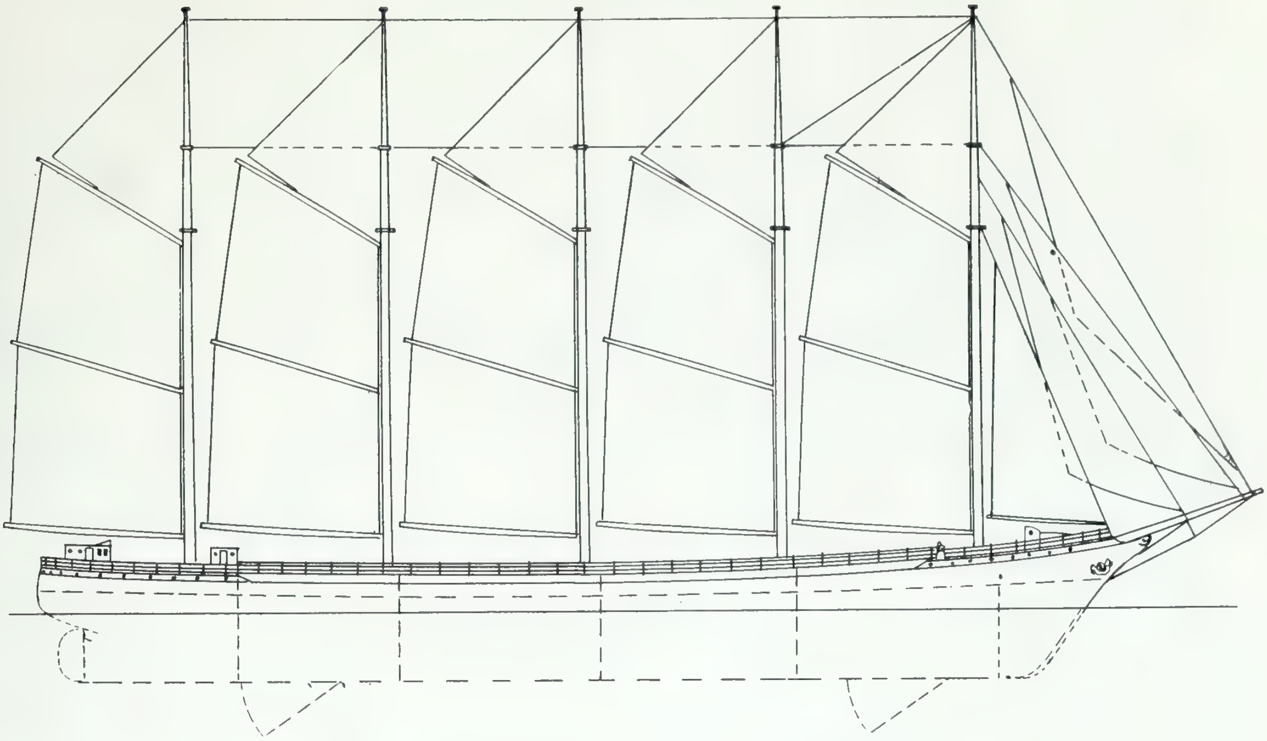
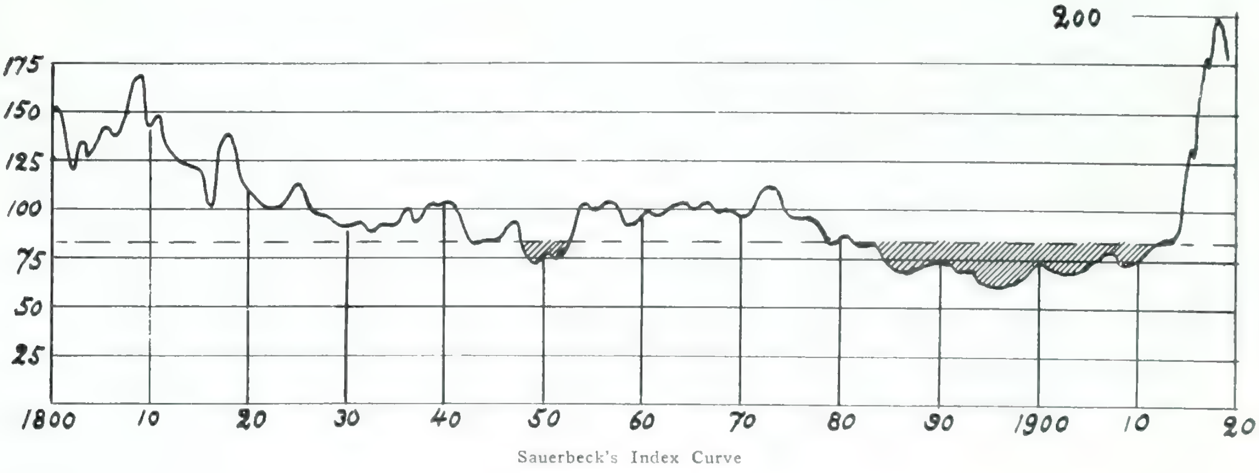


Figure 2.—Outward profile and sail plan of proposed motor clipper

were cheap enough, no sailing ship could exist; on the other hand, high price level means high cost of fuel and machinery. At a certain point, machine-driven ships must be operated at a loss and laid up, unless freight rates rise too. This has generally been the case up to date; but with the labor unrest, the scarcity of fuel, and the tremendous consumption, coupled with the rapid increase of tonnage, fuel prices are bound to soar beyond estimate. And just here is the chance of the sailing ship—of the **right kind** of sailing ship.

Looking at the matter in this light, we find from Figure 3 that the steamer really was invented at the very worst period imaginable (in 1806), and that the first steamship, the Savannah, in 1819, crossed the ocean at a most unlucky time for the development of the new invention. Up to 1848, the sailing ship had the ocean almost to itself; then followed a depression in prices to 1853, which, however, the steamship could not use to advantage. From 1853 to 1878 the sailing ship had its sway, owing to the high price level, and it was really not until well into the seventies that the steamship competition became threatening. With the depression after 1883 came the amazing development of the machine-driven ship, which the index curve shows to have lasted to 1911. The war has only temporarily changed the course of events, but it can safely be predicted that 1911 saw the **eclipse of the machine-driven ship,** for about twenty-five years. After that, will there there be fuel left?

Of course, many shipowners will scoff at this statement, just as every new idea always is scoffed at. But the open-minded shipowner will remember the American clipper ship at its heyday, and the big riches it made, while the steamers only have brought losses, and he will think of the motor clipper as the coming American sailing vessel.



Sauerbeck's Index Curve

Novel Launching Method in Georgia Shipyard

THE Terry Shipbuilding Corporation launched the 7500-ton tanker Darden into the Savannah River at Port Wentworth on November 8, 1919. At this launching some novel methods were used. In this yard ribbands are bolted to the side of the standing ways and toggles hold the sliding ways to these ribbands. The toggles are removed after all wedging is finished. The sliding ways are bolted through tie plates to blocks on the standing ways, and these tie plates are burned through with torches to release the ship.

The snubbing arrangements for checking the speed of the hull and turning the stern up stream were quite elaborate and very interesting.

By referring to the snubbing diagram shown herewith, it will be noted that the river is quite narrow at this point, being only 600 feet from end of ways to opposite bank. As the ship was 405 feet over all, the space in which to swing the ship was quite limited. This was accomplished very successfully in the following manner, using Bower anchors:

No. 1 Anchor, 4025 pounds, attached to 150 feet of 7-inch manila hawser led through forward starboard chock to towing bitt on forecastle deck.

No. 2 Anchor, 7400 pounds, attached to a 270-foot stud link chain, which was lashed to side of ship, the end of chain shackled to releasing gear; this gear was bolted to side of ship at second deck between frames supporting watertight bulkheads and arranged to release chain from the upper deck; this anchor was held in place by rope passing through after starboard chock to towing bitt on forecastle deck, the ropes holding Anchors Nos. 1 and 2 were passed over chopping block to be cut as explained later.

No. 3 Steel Cable, 1 , inches by 400 feet long from forward chock on starboard side of poop deck to first anchor, weighing 4025 pounds; a second anchor weighing 4725 pounds was attached to this cable with a 90-foot chain laid so that first anchor would drag 75 feet before taking up on the second anchor.

No. 4 Steel Cable, 1¼ inches by 500 feet long from stern frame, through which it passed to after chock and towing bitt on port side of poop deck, to first anchor weighing 4025 pounds; a second anchor weighing 7400 pounds was attached to this cable with 90-foot chain laid so that the first anchor would drag 20 feet before taking up on the second anchor.

No. 5 Steel Cable, 1¼ inches by 500 feet long from stern frame, through which it passed to forward chock and towing bitt on port side of poop deck, to first anchor weighing 7400 pounds; a second anchor weighing 4725 pounds was attached to this cable with 90-foot chain laid so that the first anchor would drag 20 feet before taking up the second anchor.

Anchors Nos. 6 and 7, lashed on port side ready to cut loose, were emergency anchors, but were not used.

At the instant the ship left the ways, shown in dotted outline, Anchors Nos. 1 and 2 were cut loose and Cables Nos. 3, 4 and 5 were pulled up tight on first anchors, as shown in the dotted outline. When the ship swung around and came to a stop, shown in solid outline, her bow was about in line with the ways and had moved less than her length; all anchors dragged to points shown by double circle, except those attached to Cable No. 5; the first anchor on this cable forming the pivotal point on which the ship swung moved less than three feet; the second anchor was not disturbed.

Floats were attached to all anchors and cables to readily locate them after being cut loose from ships.

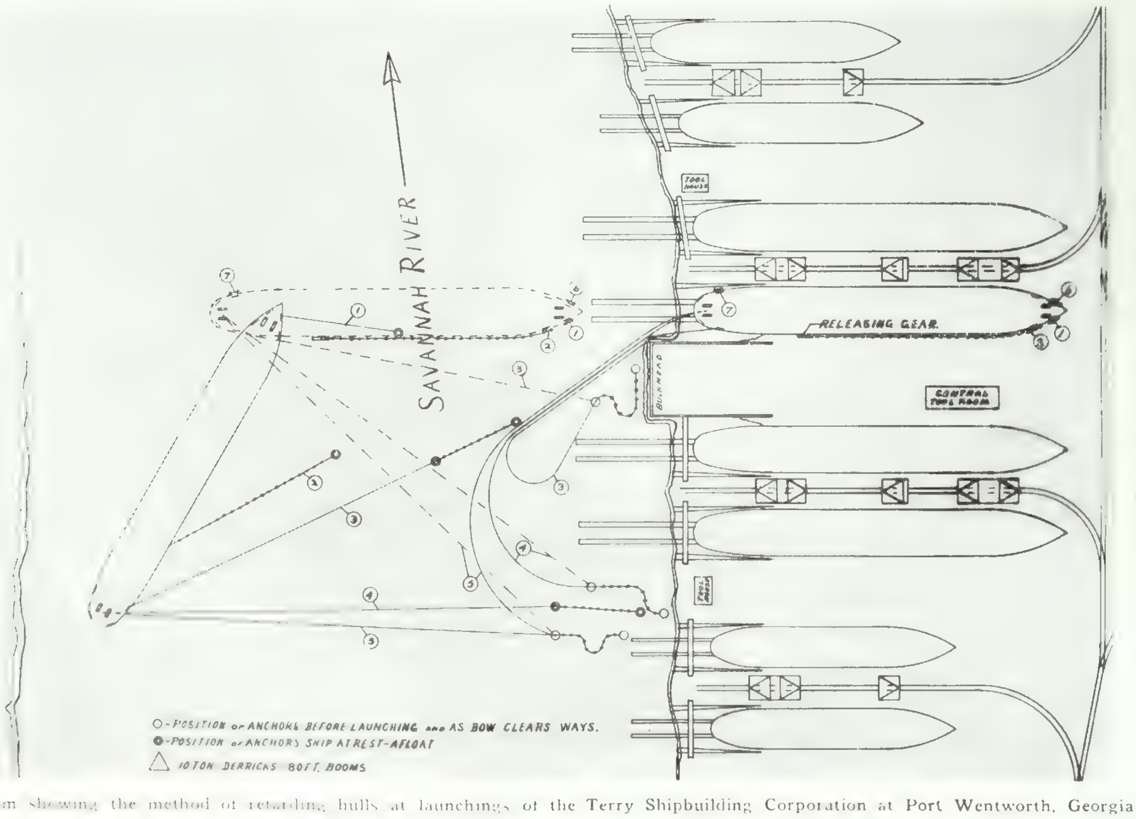
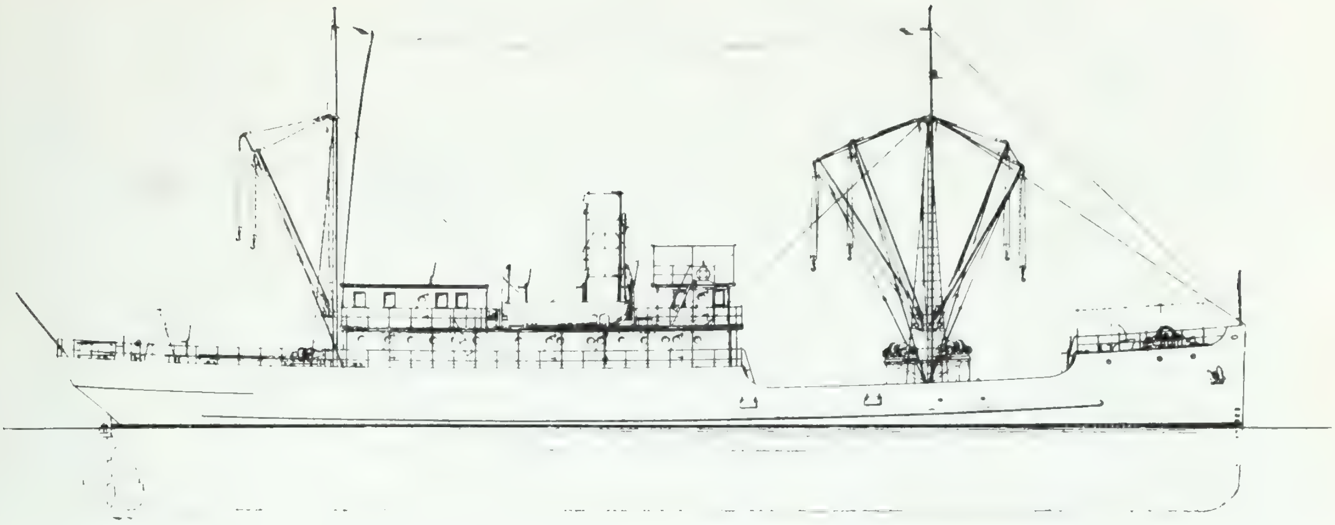

SAVANNAH RIVER
TOOL HOUSE
RELEASING GEAR
BULKHEAD
CENTRAL TOOL ROOM
TOOL ROOM
1
2
3
4
5
6
7
○-POSITION OF ANCHORS BEFORE LAUNCHING AND AS BOW CLEARS WAYS.
●-POSITION OF ANCHORS SHIP AT REST-AFLOAT
△ 10 TON DERRICKS 80 FT. BOOMS

Diagram showing the method of retarding hulls at launchings of the Terry Shipbuilding Corporation at Port Wentworth, Georgia



Outward profile of cargo steamer E. D. Kingsley

A WELL-DESIGNED SMALL CARGO STEAMER

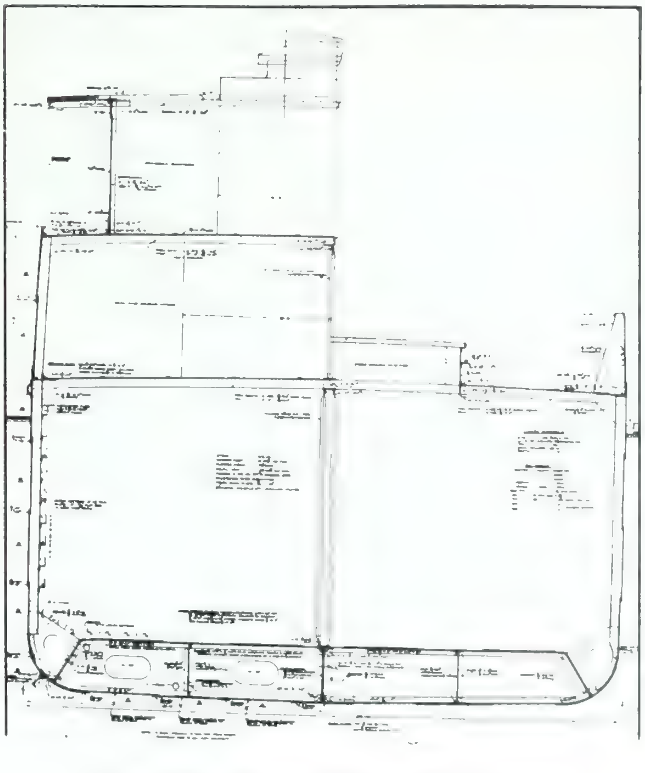
THE outboard profile in the illustration above shows the very neat lines of the steamer E. D. Kingsley, designed by Cox & Stevens and built by the Canadian Car & Foundry Company for the Kingsley Navigation Company.

This vessel is of 1260 tons deadweight capacity. She has a length over all of 210 feet, a length between perpendiculars of 200 feet, beam 32 feet, molded depth at side 17 feet, extreme draft 15 feet 9 inches. She is built to specifications for A1 rating in Lloyd's Register, with transverse framing and a cellular double bottom with tanks arranged for fuel oil.

The power plant consists of two three-furnace Scotch marine boilers, 11 feet 3 inches in diameter, built for 109 pounds' working pressure, and a triple expansion steam engine with cylinders 17 by 25 by 43 inches, and 30-inch stroke with a rating of 860 indicated horsepower. The engines are equipped with a condenser of 1200 square feet cooling surface, and a Worthington simplex air pump 17½ by 14½ by 8 inches.

The other power plant auxiliaries are a Reilly No. 6 feed water heater, a Reilly No. 6 evaporator, an 8-inch Morris Machine Works centrifugal circulating pump; Davidson vertical main and auxiliary feed pumps; and Worthington horizontal duplex, fire bilge and general service oil transfer, sanitary, fresh water and evaporator feed pumps. Coen & Company of San Francisco furnished the oil-burning system and Engberg supplied the electrical generating set.

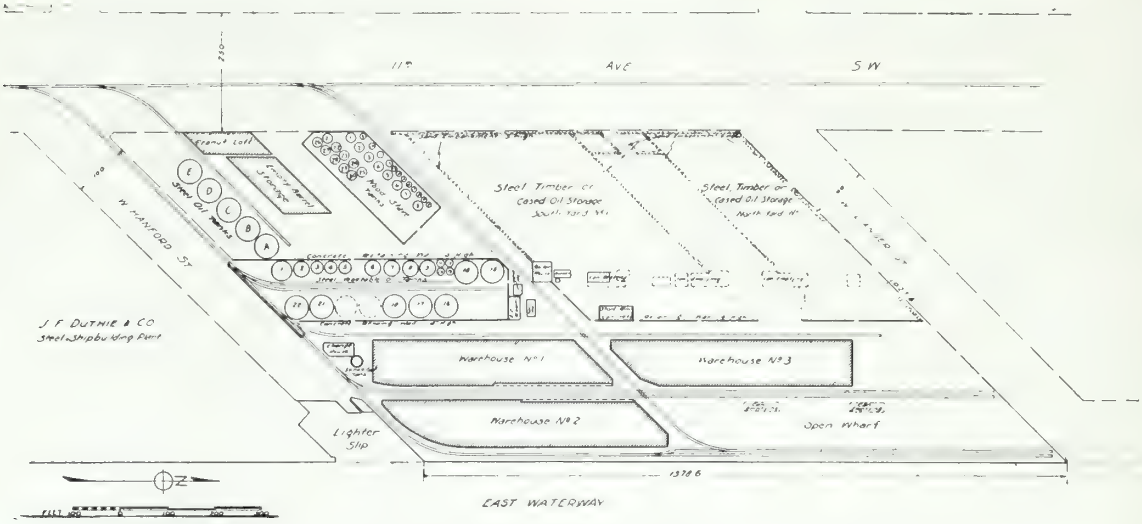
The power plant drives the ship at a speed of ten knots in full load. The vessel has a displacement of 2095 long tons. Her cargo capacity is 69,000 cubic feet for grain; 63,300 cubic feet for



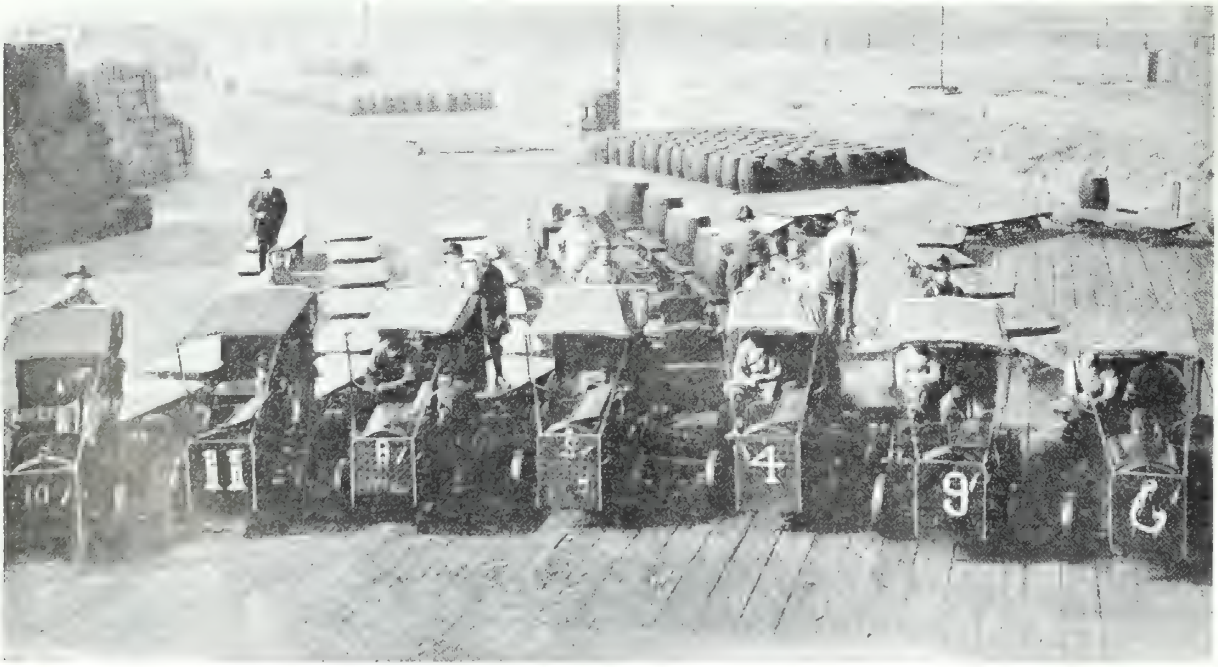
Sections showing framing of steamer E. D. Kingsley

Launch of the tanker Bethelridge at the Baltimore Shipbuilding & Dry Dock Company

S. S. Kermanshaw (ex Himalaia), a 4948 gross tonnage freighter of the Kerr Navigation Corporation

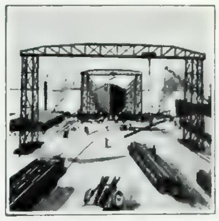


Plan of the Harbor Island terminal of the East Waterway Dock and Warehouse Company



Battery of Tractor Trains at the Harbor Island terminal

Material Handling



Harbor Island Terminal, Seattle

THE East Waterway Dock & Warehouse Company of Seattle have recently issued a very handsomely illustrated booklet describing their terminal facilities at Harbor Island, Seattle.

This booklet in its introductory pages sets forth in very masterly fashion the wonderful advantages of Seattle as a commercial gateway and distributing center to and from the Orient, Siberia and Alaska. This portion of the book may be briefly summarized in two statements—that the Washington Customs district, of which Seattle is the chief port and largest city, has gained the second place among the districts of the United States in foreign trade values; and that Seattle will inevitably become one of the great cities of the world.

Harbor Island terminal occupies a quadrangle of about twenty-five acres, with 1400 feet frontage on the East Waterway, and a like frontage on the Harbor Island yards of the Union Pacific Railroad. The layout of the terminal is in four parallel divisions of structures and service equipment, separated by railroad lanes. These divisions are:

1. Wharf and cargo shed group.
2. Warehouse group.
3. Bulk oil storage tanks.
4. Case and barrel oil storage yards.

For 625 feet at its southern end, the wharf is covered by a substantially-built, metal-covered cargo shed 125 feet wide. The balance of the wharf is maintained as an open pier 775 feet in length. Both cargo shed and open pier are served by parallel railway tracks at ship-side and at shore-side, and locomotive or derrick cranes and tractor trains are provided in abundance to facilitate the quick handling of cargoes.

Inshore from the pier and parallel with it is the warehouse group, consisting of two wood-frame, metal-covered buildings, each about 125 feet wide by 500 feet long. These buildings are separated from the pier by a railroad alley with depressed tracks. This arrangement enables cargo designated for warehouse storage to be transferred directly by the shortest possible transverse lines. An interesting detail of the handling equipment in connection with these warehouses is a special truck sling with which a truck and its load may be transferred bodily from ship to pier or pier to ship.

The storage tank division has a double row of steel storage tanks, thirty in all, some of which have a capacity of 10,000 barrels each. This battery of tanks is entirely surrounded by a concrete wall four feet high. Just behind these is an auxiliary group of wooden water-jacketed tanks, also surrounded by a concrete wall, and used principally for fish oil. The total storage capacity is 5,502,000 gallons. Tracks and filler pipes are provided of sufficient capacity so that if necessary sixty tank cars could be loaded simultaneously in forty-five minutes. Very elaborate bulking equipment has been installed for the bulking of case oil. This consists of one hand-operated and seven electrically-operated machines for cutting, dumping, draining, rolling and baling the tin cans, which are mainly of the rectangular five-gallon variety, in which much of the Oriental vegetable and other oils are shipped to the United States. These bulking plants have a combined capacity for 12,000 cases of Oriental oil a day.

The open-case and barrel-oil storage yards have accommodation for 40,000 barrels, or for 1,000,000 cases of oil. All of the areas used for this purpose are surrounded either by concrete walls or by substantial dirt dykes. In the liberal spaces always left between separate lots of stored oil, there is available space for the storage of 25,000 tons of structural steel or material of that class.

The miscellaneous equipment of the terminal includes several service shops, such as a carpenters' shop, a plumbing and pipe shop, a blacksmiths' shop, and an electricians' shop, all adequately prepared to meet any ordinary emergency in the service of the terminal or its customers. There are also several well arranged tool houses and store houses liberally supplied with necessary hand tools and materials for repair work.

Mechanical appliances for handling cargo are supplied in great variety and profusion, as the following partial list will show:

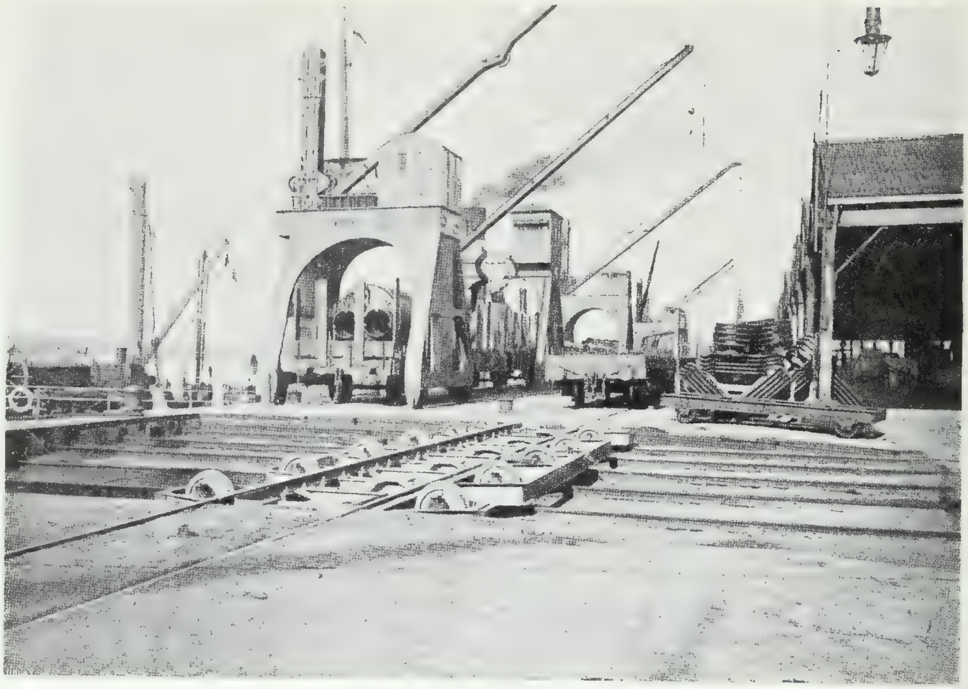
Ten Prescott tractors.
Two Galion dynamic electric tractors.
One hundred heavy-type, four-wheeled trailer trucks.
Twenty-five Reynolds trucks.
One hundred stevedores' trucks.
Two electric bale tiering machines.
One 20-ton Browning locomotive crane.
One mechanical barrel hoist.
One 50-ton stiff-leg derrick.

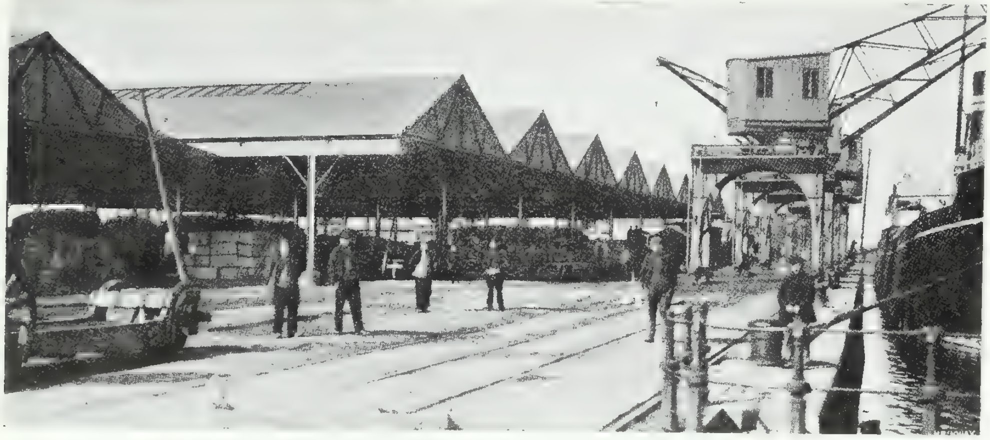
The terminal has "perfect fire protection"; its fire department employs forty firemen and is equipped with:

Ten 40-gallon Pyrene extinguishers.
Seventy-five 3-gallon Pyrene extinguishers.
Three thousand feet of 2½-inch hose.
Fifteen city hydrants.
A $75,000 sprinkling system.

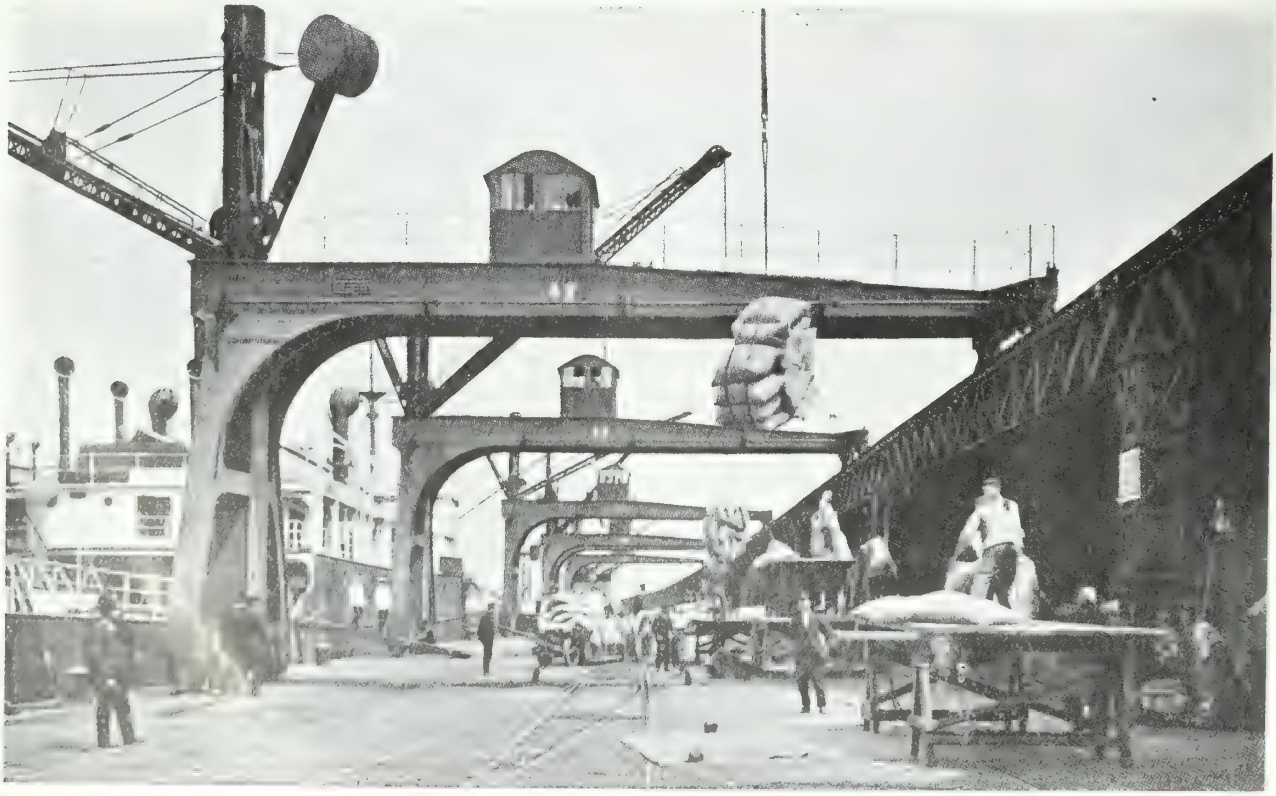
Liberal provision is made for illumination and a battery of searchlights is maintained at strategic points, so that for protective purposes the whole terminal may be flooded with light. These precautionary measures have resulted in a very favorable insurance rate.

A Few of the Cranes at the Port of Antwerp





Above: Hydraulic traveling portal cranes and electric-capstan operated railway transfer table. At left: Electric portal gantry jibs on New North Docks. Note the open storage sheds. Below: Half-arch hydraulic gantry cranes, spanning three lines of railway on the South Quays.



Cargo Handling Machinery at Antwerp

Antwerp Quay in 1520, from a drawing by Albert Durer

ANTWERP, or Anvers, on the Scheldt is the chief port of Belgium, and for many years has been one of the most important foreign trade ports on the continent of Europe.

Since legendary times in European history, the Scheldt River has been a very important avenue of commercial navigation from the sea to the interior. At the present location of Antwerp this river bends at right angles, and it is related in the legends surrounding the origin of the city that at this bend there resided, in days gone by, a terrible giant by the name of Druon-Antigonus. This giant claimed ownership of the river and levied a tax amounting to half its value on all merchandise passing his castle. In order to inspire respect and terror in the minds of river shippers, Antigonus cut off and threw into the river the right hand of any person who attempted to resist the imposition of this tariff. It is this legend which gives rise to the coat of arms of the city of Antwerp, wherein is shown the giant's castle with two severed hands over the walls at the right and left of the shield. This giant is said to have been defeated by Salvius Brabo, a lieutenant under Julius Caesar, who took possession of the castle of Antwerp, beheaded Antigonus, and then, as a symbol that thereafter river navigation would be unhampered, he also cut off the giant's right hand and threw it into the Scheldt.

"Silly fable," says the wise modern reader, yet we cannot help wishing that every port in America might be visited by some modern Brabo who could as simply cut away the red tape and burdensome restrictions which so often hamper the free movement of our commerce.

It was not, however, until the sixteenth century that Antwerp achieved a prominent place among northern European ports. Between 1500 and 1560, practically every foreign maritime nation had established business houses and factories in Antwerp. In 1564 the famous Hanseatic League erected at Antwerp the "Hanseatic House," a building which still stands, facing the Bonaparte dock. This building was an immense structure for the time in which it was built, covering an area of almost an acre. Our insert illustration shows the port of Antwerp at this period, as depicted by the celebrated artist, Albert Dürer.

It is stated by writers that on some days there were more than 2000 ships in the port, and during the Holy Week of 1581, forty ocean-going ships, consisting of Venetian galleys, Genoese carracks and Spanish and Portuguese caravels, came up the river on a single tide.

From 1600 to 1795 the Scheldt River was officially closed and the history of the town of Antwerp was one of lethargy and decadence, but in the latter year the Treaty of The Hague opened the river again to free navigation, the city was aroused from its long sleep, and from that time to the present day the development of Antwerp as a port of world commerce has gone steadily forward. This development, as far as piers and docks are concerned, has been along the same lines as the great majority of the river ports in Great Britain and along the northern shores of the European continent, where the flat, marshy stretches in the bends of the river are used for the construction of wet dock basins, and as these dock basins are necessarily of limited proportions, the effort in all these ports has been to offset that disadvantage by a very liberal provision of cargo-handling equipment.

The study of this development is of very great interest to American shipping men and port authorities who are faced with the problem of determining how best to achieve a quick turnover at American ports. At Antwerp the river is bordered by quay walls with wide open quay space. This forms what is known as the river port and is divided into old river quays and new river quays. These quays offer a mooring frontage of about three and one-half miles. They are served by railroads and fitted with various kinds of cargo-handling machinery. The anchorage depth at the foot of the quay wall is from 26½ feet to 40 feet at low tide. The average rise in tide is about 13 feet and the crown of the quay wall stands about 8½ feet above the average high tide. The width of the river at these quays is about 340 feet.

Old River Quays

That part of the docks known as the "Old River Quays" is about 11,500 feet long and was built during the period from 1878 to 1884. The width of these quays is generally about 325 feet and the metallic sheds erected on the quays cover a total surface of about twenty-six acres. Two or three lines of railway run between the edge of the quay wall and these sheds. Between the city and the sheds there are five lines of railway. Electrically-operated capstans are provided for shifting tables which transfer cars from one track to the other. These are placed at frequent intervals so as to facilitate the rapid movement and loading of cars. On this 11,500 feet of quay there are provided ninety-one arch cranes of one and a half and two tons' lifting capacity, with a vertical lift of about fifty-eight feet. These cranes are of the Armstrong hydraulic type, and it is a great credit to this type of machinery, and the excellence of this installation in particular, that it is still operating efficiently after thirty-five years of strenuous service. This crane equipment provides one crane for every 135 feet of quay wall, so that it is an easy matter for the port of Antwerp to concentrate six to ten cranes on the loading or unloading of one vessel. The arrangement of the cranes allows a railway line to pass under the arch ways of the crane portals, which run on tracks of about 13 feet gauge.

The 120-ton Sheer-legs

The New, or South, River Quays have a frontage of 6500 feet and are provided with sixty-five electrically-operated portal jib cranes, giving one crane for every 100 feet of quay. The new quay is considerably wider than the old, large portions of it being as wide as 800 feet. On the river side of the new quay a space has been reserved, fifty feet in width, where three lines of rails are placed, and where the cranes are made of the half-arch type spanning all three of the rails. Cranes of this type are fifty-one in number. The shed opposite these half-arch portal cranes is nearly 200 feet in depth and has a length of 4400 feet, thus covering a space of over eighteen acres. Two lines of railroad run under this shed; and behind the shed, on the city side, there is a network of rails forming a small shunting station for each berthing space.

The various docks at Antwerp furnish a berthing space of almost ten lineal miles and the total length of railways serving the river quays and the docks amounts to nearly 100 miles. At frequent intervals, along the docks, there are hydraulic and electric cranes of the following numbers and dimensions:

- Sixty-five movable hydraulic cranes of 1½ and 2 tons' capacity.
- One 120-ton electrically-operated sheer legs.
- Two 40-ton cranes.
- One hydraulic coal tip for lifting and discharging into bunkers or lighters an entire car of coal.
- One ore-unloading barge with steam-driven apparatus capable of weighing, loading or unloading 800 tons of ore a day.

In addition to the above, there is an electrically-operated one-million bushel grain elevator and warehouse and numerous electrically and hydraulically-operated capstans, movable bridges and dredges, and several steam towboats, all operated by the port authorities.

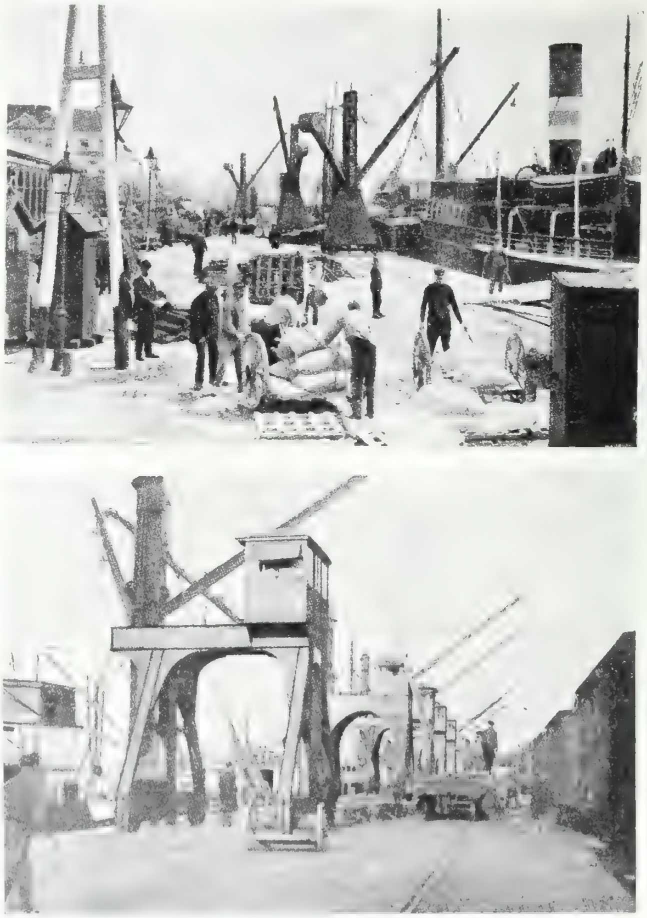
New North Docks

It is, however, to the new North Docks and the extensions which are to follow them, that the Antwerp merchant points with the greatest pride, for these works, and the improvement of the channel in the Scheldt River to the northward of the city, are to be the foundations of Antwerp's increased prosperity in the coming new era of world commerce.

The North Docks were opened for use in 1907, and it is very refreshing, after having heard so many complaints from harbor authorities in America that they could not find out what was the most economical machinery to install for handling general cargo, to read that the Antwerp board of harbor directors held a competition between all the various classes of power and types of machinery, and as a result decided on the use of electric full-portal traveling gantry jib cranes, and to observe that they not only so decided, but immediately ordered eighty of these cranes of two-ton capacity each, arranged to run on a 16½-foot gauge track.

On the piers of the new North Docks and on the quay walls there are closed and open sheds covering an area of approximately six acres. Railroad tracks run all through these sheds and an interesting feature of their construction is that all the columns supporting the roof have been so calculated that they can be displaced ten feet in any direction, so that any changes which may become necessary in the direction or location of the tracks inside the sheds may be easily effected without changing the main structure.

These docks have a mean depth at low tide suitable for steamers with draft up to thirty feet. The lock communicating with the river, works at all tides, and as locking only takes ten minutes, these docks may, for all practical purposes, be consid-



Types of hydraulic cranes at Antwerp. Above: Narrow gauge pillar cranes at the Laurent Dock. Below: Full arch gantries on the River Quay

The fifty-ton electric crane on the South Quay

ered river quays into which ocean vessels can now steam straight away without having to lighten cargo in the stream. All the walls of the Canal Dock in these works are so built that the bottom of the basin can be deepened to allow a draft of thirty-five feet. A 30-ton electric traveling crane has been installed on one of the quays for handling heavier pieces of cargo.

Management of the Port

The administration and management of the port of Antwerp lies in the hands of the municipal council, which in this city is composed of the burgomaster and aldermen. This corporation is intrusted with the management of all maritime establishments and with the police superintendence of the docks. The board of engineers and the captain commander of the port, with his officers and staff, are under control of this corporation. The river police, pilot service, the management of the quay railways, the customs service, and all lighthouses, beacons and buoys are under control of the Belgian government.

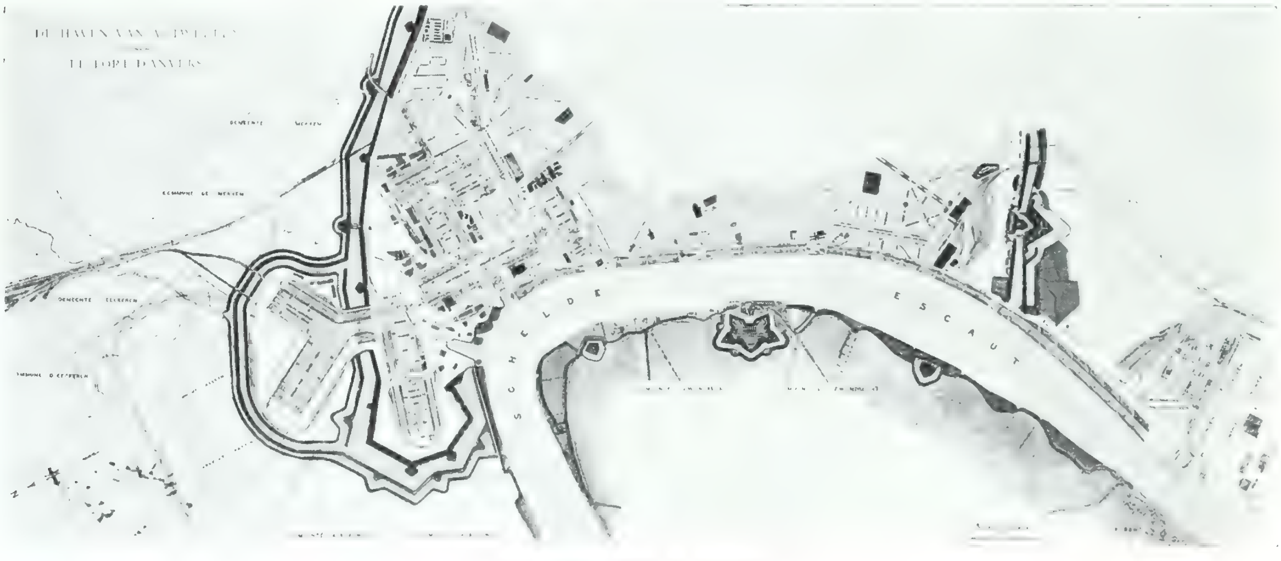
The port is divided into two distinct parts: First, the "New North" maritime installations which are the property of the corporation and largely built at the exclusive cost of the citizens; and, second, the river quays and barge and maritime docks along the river which have been largely constructed by the Belgian government, but are operated and managed by the City Corporation according to the terms of a special agreement.

In 1909 the port authorities of Antwerp handled 6470 ocean-going vessels with a tonnage of 11,940,332 gross tons, and 39,705 river vessels with a deadweight capacity of 8,169,754 tons of 1000 kilograms each. For ten years prior to that time the volume of both sea-going and interior tonnage had shown a very healthy growth and the city had in contemplation in 1910 a ten-year program which by 1920 would have trebled the length of berthing space, multiplied by five the dock surface available, and by seven the area of storage sheds. Much of this work was under way at the time of the opening of the war, and undoubtedly, although delayed, it will now be pushed to completion. When this work is complete, if the new berthing space is provided with machinery in the same proportion as that which now is operating, there will be at the port of Antwerp close to 1200 electric and hydraulic cranes of from one and a half to two tons' capacity each, and Antwerp will be the most completely equipped port for the economical handling of general cargo, not only on the continent of Europe, but in all probability in the world. Certainly there is no indication that any port on this side of the Atlantic is awakening to the necessity of installing handling machinery on any such lavish scale.

The facts, figures and illustrations of this article are taken from a beautiful booklet issued by the port of Antwerp authorities and they substantiate the boast made by the corporation that "the work in course of construction on the harbor is intended to make of Antwerp our commercial metropolis, the first and foremost port of the continent."

NEW NORFOLK DRYDOCK

Construction is proceeding rapidly on the railway drydock for the Colonna Marine Railway Corporation, Norfolk, Virginia. This drydock will be capable of handling vessels up to 4000 tons' displacement. It will increase the drydocking facilities of the port of Norfolk by 40 per cent and will double the size of vessel which may be handled. This dock is being designed and constructed by the Crandall Engineering Company, drydock engineers, East Boston, Massachusetts.



Map of the Port of Antwerp

Mechanical Cargo Handling at Marine Terminals

Extract from Paper Read at Society of Terminal Engineers by James A. Shepard

HIGHLY paid labor at our marine terminals unassisted by handling machinery means an addition to our already high cost of living.

Highly paid labor, co-operating with modern handling machinery, affords not only the possibility but the certainty of lower costs for handling than heretofore and corresponding relief in the way of lower prices. It is the only solution of our problem, how to maintain both the American standard of wages and the American standard of living. It is the process which has proved efficacious in production; it is the one resource on which we may depend to secure the necessary relief in transportation.

As the use of handling machinery has geen gradually extended in the manufacturing plant, until it is prevalent over all areas where materials are handled, so it must also be extended at marine and ultimately at railway terminals.

The rate of transition alone remains in doubt. Prompt appreciation of the inevitable displacement of human muscle, wherever the forces of nature can be brought to bear successfully, may reduce the period to a comparatively short one.

If we look squarely in the face both the humanitarian and economic aspects of the subject as it is today, we shall refuse to tolerate anything that means delay. If, however, the present process, one of almost fixed habit, of jogging along in our rut continues, the road will be a long and costly one.

We have built, and are still building, piers that are too narrow to afford room for the necessary equipment rapidly and economically to move cargoes. We have built, and are still building, the transit shed as a mere protection from the weather, lacking the structural strength to carry handling machinery in the form of cranes of the types proved by experience in manufacturing plants to be efficient, lacking height to afford room for tiering of cargo, and cluttered by columns, knee braces and folding doors, to an extent which precludes the possibility of employing handling machinery.

An examination made recently of two new transit sheds designed for the reception of semi-portal cranes for cargo handling between the ship and pier and overhead traveling cranes for tiering and interior handling, developed the fact that horizontal clearances between the runway rails and walls and vertical clearances to roof trusses, which were originally inadequate, had been reduced by projecting window frames, leader props and projecting bolts, until the installation of the cranes was rendered absolutely impossible. This was an especially aggravated case, yet typical of conditions more or less prevalent everywhere.

The vicissitudes of commerce render almost every marine terminal liable to handle general cargo. The transit shed should therefore present no details of construction which would become a bar to the installation, if desired, of that most versatile and adaptable of all material handling machines, the overhead traveling crane. It is of course possible that no cranes will ever be installed, but it is also just as possible that with the rising rates of pay for manual labor and a shortened day's work, the installation of cranes may become an absolute necessity. Why not, therefore, provide foundations and columns which will bear the load imposed by handling machinery if ultimately called upon to do so? The difference would really be one of the factors of safety employed. Buildings have been successfully designed and constructed without knee braces. If we do that in the case of our next transit shed, we can install a traveling crane if it should be finally considered necessary. A few feet additional clear height will add something to building costs, but it will add vastly to its capacity when high tiering becomes standard prictice, as is inevitable.

Provision of sufficient area outside the transit shed for the installation of semi-portal cranes may be against accepted precedents today in a given port, but what will be accepted practice one or five years hence? We have specified for foundations, walls and roof, materials which will endure; why not consider the matter of durability in the design also? Physical durability without forethought which will, under the vicissitudes of time, perpetuate the usefulness of our constructions, simply raises a monument to stupidity.

The art of material handling in manufacturing plants has occupied a great many years for its development; no single factor has been more active in retarding progress than unsuitable building construction which has either prevented the use of handling machinery entirely, or discredited it, through fatal modifications in equipment or method employed, forced because of unsuitable conditions for installation.

The same process will be active in the development of mechanical handling of cargo at marine terminals; those who have capital invested in piers which cannot be readily modified so as to employ handling machinery will hesitate to admit that they are antiquated, and even when it is no longer possible to conceal the fact that a pier which does not permit the installation of handling machinery is inefficient, the process of reconstruction will be a long and costly one, for which the public must ultimately pay.

The relation between prevention and cure will never vary greatly; hence the advantage to be derived from employing for all current pier construction relatively inexpensive precautions against obsolescence is beyond question.

The future of efficient material handling at marine terminals is hanging in a delicate balance. Opposing forces are aroused to activity because of investment in property, not now obsolete perhaps, but inevitably destined to obsolescence. Spacious arguments such as have been presented from time to time designed to discredit engineering opinion are to be expected; the virtues of practical opinion which concerns itself principally with questions of the wherewithal to pay the rental exacted are to be expected. But any arguments which fail to do full justice to the interest of consumers who ultimately pay the bills bear their own stamp of fallacy and insincerity.

The subject of mechanically handling cargo at the port of New York has recently been discussed pro and con in the daily press; such opposition as has developed regarding the use of modern handling equipment for piers in New York harbor is traceable directly to shipping interests, or those who have investments in piers of the conventional New York type. Those interests of course are entitled to a patient hearing and any statements, either of fact or opinion, should be given all the weight they deserve. In order, however, to illuminate the situation as far as possible, the following facts should have attention:

The introduction of improved facilities capable of better or more economical performance causes obsolescence and consequent loss of value in older and unimproved equipment. That is an inevitable and legitimate expense of doing business. It is perhaps not unnatural that some should strive to escape such expenses where the item runs into large figures, as in the case of a marine terminal, but it is hardly to be expected that intelligent public sentiment should be influenced or long deceived by such an effort.

The City of New York has doubtless secured an excellent bargain with the lessees of prospective new piers; 7½ per cent return upon the investment is ample, and perhaps accounts for a disinclination upon the part of lessees to swell the original investment and consequently the annual rental, so long as the public cheerfully pays the charges for transportation. The question of final obsolescense in the new piers can be disregarded by the lessee because the loss will fall upon the owner, the City of New York.

The following extract from the paper read by an eminent Canadian engineer, Mr. A. D. Swan, before the convention of the American Association of Port Authorities at Boston, September 20 and 21, 1918, casts an interesting sidelight on the situation:

"In the latter end of 1913, I had some discussion with the directors of the Hamburg-America Line in regard to port equipment, and one point I raised was: 'What was the reason that their company did not advocate or desire mechanical equipment at any of the American ports, such as New York, Boston, etc., while to my personal knowledge, in discussion of the same question a few years before with their representatives in Great Britain, they advocated that ports be equipped with all the most modern machinery possible?' In those days, comparatively speaking, labor was cheap in England compared with America, and if their views had been the very reverse and they advocated equipment in America, where labor was expensive, I could have understood the matter, but eventually it transpired that their steamers were so well equipped with up-to-date ship equipment that they hoped to be able to capture the trade of Boston and other ports by out-stripping the rival lines who might depend more on port equipment supplied by the harbor authorities. It seems to me the reason was very subtle, and I believe I am correct in stating that the German company actually advised the Boston port authorities that it did not desire permanent shore equipment established, as of course, if the port authorities supplied the equipment, then all the steamship lines would have been competing in the open."

In the light of the facts enumerated, it is hardly to be expected that there should not be some who would disapprove any program of improvement in the terminal facilities of New York City. Neither is it to be expected that the general public, who will be the chief sufferers by a reactionary policy, will be deceived because of opposition from interested parties.

ANCIENT PORT OF ROME REVIVED

THE Italian Minister of Public Works has submitted to the Chamber of Deputies a proposal for creating a seaport at Ostia which would be capable of satisfying the needs of Rome and would encourage industrial development in the Roman district. As far back as 1876 the question of providing Rome with a suitable outlet to the sea was brought up and an appeal in its favor was made by Garibaldi at that time. It now appears probable that definite action will be taken after many years of unprofitable discussion. At the present time the nearest port to Rome is Civitavecchia, fifty miles distant, whose facilities leave much to be desired. Ostia, at the mouth of the Tiber, is but fourteen miles from Rome.

For the construction and operation of the new port, it is proposed to create a special semi-official body which will be able to relieve the State to a large extent of the responsibility of providing the funds necessary for carrying on the work through its power to contract loans and make other financial arrangements on its own account. In view of the difficult financial position of the State, this method of shifting the financial burden has been adopted in many instances.

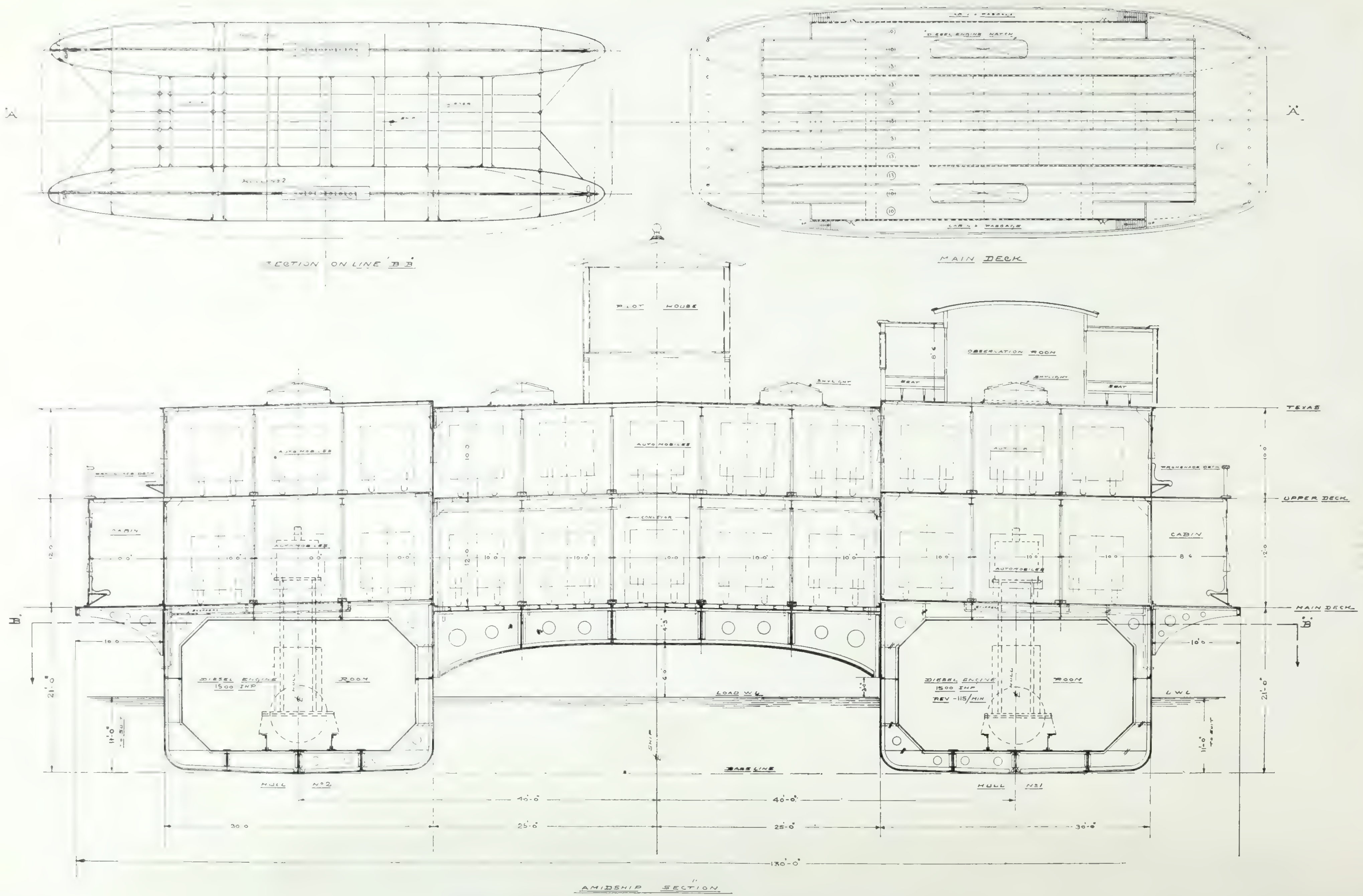
In addition to the construction of port works, a canal will be dug in connection with the Tiber which will provide direct water communication with Rome. A new railway line to Rome will be constructed and an industrial zone will be created.

The expense of carrying out these plans has been estimated as follows:

	Lire
For the original port works	47,000,000
For initial railway facilities at the port	8,200,000
For the canal	6,000,000
For the railroad, Rome-Ostia Nuova	27,800,000
For the industrial zone	25,000,000

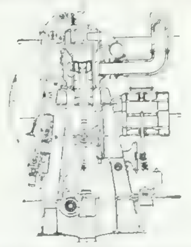
The share of the State is fixed at 50 per cent of the amount required for the port, 60 per cent of that for the canal, 60 per cent for the railroad, and 40 per cent for the industrial zone and the terminal railway facilities.

There is every reason to believe that if proper connections with the sea can be provided, industrial activity in the Rome district will be greatly stimulated. At the present time, owing to its inconvenient position with regard to transportation facilities, little interest has been taken in manufacturing, with the exception of the paper mills located in the near-by hills and small establishments producing articles for local consumption.



Sections and deck plan of proposed Diesel engine driven automobile ferry

Oil Engines and Motorships



Novel Automobile Ferry Design

By Jonas F. C. Von Rosen, N. A. and M. E.

THE problem at hand is to design a ferry vessel for the purpose of transporting automobiles from San Francisco to Marin county. As on Sundays and holidays at certain hours of the day automobiles are waiting by the hundred for transportation, it is obvious that the "peak load" is the one to consider; therefore, it is necessary to provide exceptionally large deck space to accommodate a large number of machines. Consequently we have introduced new methods and features. First, the employment of two hulls connected by bridge-like girders into a unit; and, second, the use of the upper deck for automobiles, the machines being elevated by means of inclined conveyors or planes—a scheme already suggested by the writer for the ferryboat Ukiah. The vessel is constructed entirely of steel and is fire-proof throughout. The only wood used is in the superstructure. The hulls proper, as well as the upper deck and the Texas, are constructed in the conventional manner of ship construction, and the hulls are joined together by a series of girders, as shown on accompanying plan. Longitudinal beams are laid across these girders and a steel deck riveted on top. In designing the main girders it is assumed that one hull is fixed and the other hull with its proportional weight of machines and passengers supported only by the connecting girders. A factor of safety of five is used in the calculations and the girders as thus proportioned are well able to take care of the maximum bending moment to which they might be subjected should one hull be lifted clear of the water.

It is obvious that such a severe test will never occur, and therefore a wide margin of safety is provided. Furthermore, the girders are properly braced laterally and all provision is made for bending, shearing and buckling.

By providing 3000 I. H. P. for propulsion, the vessel should attain a speed of fourteen knots.

In case of fouled or broken rudder, this vessel would be able to steer by the propellers alone. The Diesel engines are of the marine direct-reversing type with through line shaft.

The main and upper decks are arranged with alleys for the accommodation of the automobiles and the upper deck is reached by inclined planes on the dock or by a conveyor system either on land or on the vessel itself. The arrangement of alleys prevents confusion when the machines enter or leave the boat. In addition to the automobiles carried in the deckhouses, a number of machines may be carried outside, thus allowing over 300 automobiles to be transported simultaneously on a vessel of 300 feet length. Liberal accommodation is provided on all decks for passengers and a restaurant on the Texas. All decks have spacious passages for leaving and entering automobiles during the transportation. Due to the great beam of the vessel it is necessary to build slips to suit or remodel old ones and to construct inclined planes on the dock to suit the vessel.

The principal advantages of the double hull construction over other types are as follows:

1. Large deck space on the main deck.
2. Large deck space on the upper deck.
3. High speed obtained due to the finely-shaped hulls.
4. Consequently good fuel economy.
5. Good transverse stability.
6. Great saving in fuel consumption, using full Diesel engines.
7. First cost of building vessel smaller than two vessels of same carrying capacity.
8. Fine steering qualities, due to the location of the rudders.
9. Running expenses low, as only one crew is needed.
10. Easy transfer of automobiles, on and off the ship, without any confusion, due to the arrangement of alleys.

The principal dimensions are:

Length over all, 320 feet.
Length between perpendiculars, 300 feet.
Breadth over guard, 130 feet.
Breadth of hull, 30 feet.
Depth of hull, on side, 21 feet.
Distance between the center lines of hull, 80 feet.
Distance between hulls, 50 feet.
Draft, loaded (about), 11 feet.
Freeboard, loaded (about), 10 feet.
Displacement, loaded, 3250 tons of 2240 pounds.
Indicated horsepower, two Diesel engines, a 1500 I. H. P. and a 3000 I. H. P.
Carrying capacity, 314 automobiles plus 1250 passengers.

All told, by building a vessel of the suggested type with a double hull, a better and more economical vessel is obtained at less cost than by building two vessels of the conventional type with the same total carrying capacity.

Motor Shipbuilding in Europe

MUCH interest has been aroused in shipbuilding circles in Great Britain in the launch of the first large motorship built by Vickers since the armistice. It is known that it is the intention of this firm, now that the orders for naval vessels have diminished considerably, to adapt a large part of its works to the manufacture of mercantile oil engines for installation in large ships. Vickers have, of course, had long experience in the construction of submarine Diesel engines, up to 1200 b. h. p., but have previously only built the machinery for one large merchant ship, the Santa Margherita, a somewhat novel 10,000-ton oil tanker with hold capacity for about 2000 tons of general cargo.

The new motorship, which is named the Narragansett, is designed for a deadweight carrying capacity of about 10,500 tons of fuel oil, and is constructed to the order of the Anglo-American Oil Company, who, it is understood, have fixed a contract for a second similar vessel. Twin-screw machinery is to be installed, as in the majority of existing motor vessels, comprising two six-cylinder sets, each developing 1250 b. h. p. at about 110 r. p. m. The cylinder diameter and stroke of these engines is 25 inches and 36 inches, respectively, and to the engineer the chief feature of interest lies in the employment of the well-known Vickers solid injection system. The fuel is injected through the atomizer at a pressure of between 3000 and 3500 pounds a square inch, by means of a pump instead of utilizing compressed air, as in the normal design of Diesel motor. Vickers are so convinced of the success of this system that they intend adopting it on all mercantile engines they may build in the future, and as it dispenses with the air compressor, which is always a possible source of trouble, the development is one of considerable interest, both to motorship owners and engineers.

A New 13,000-Ton Motorship

Another interesting launch which has just taken place is that of the largest motorship yet constructed, the Afrika, built by Burmeister & Wain at Copenhagen, to the order of the East Asiatic Company, who are already owners of thirteen large motorships and who have sixteen similar vessels now under contract. The Afrika is one of several sister ships, and is similar to motor vessels which were under consideration by the United States Shipping Board, but were not laid down, although it is understood that some ships of this class may shortly be ordered. She is 445 feet in length and carries 13,000 tons of cargo, the machinery being of sufficient power to give a maximum speed of twelve knots and a speed at sea of eleven knots. The propelling engines are installed, each of 2250 i. h. p. (about 1800 b. h. p.), having six cylinders with a bore of 740 m. m. and a stroke of 1150 m. m. Curiously enough, they are the exact duplicate of the two engines which have been despatched to America for installation in a motorship, ordered by the United States Shipping Board.

There are signs of a rapid increase in the output of motorships in Great Britain, and Lord Pirrie, who is the pioneer motorship owner in the United Kingdom, and also head of the firm of Harland & Wolff, now building Diesel engines on a large scale, recently announced that his firm was in a position to turn out a complete motorship equipped with twin-screw oil engines every six weeks. It is indeed planned to deliver from Harland & Wolff's yard at Glasgow nine large motor vessels during the course of 1920, four of these ships having a deadweight carrying capacity of just over 13,000 tons each. They will be the highest powered motorships yet constructed, being fitted with two four-cycle Diesel engines of 3200 i. h. p. and will represent what may be termed the last word in modern cargo ships, with their large tonnage and their unusually high speed of about thirteen and one-half knots, under normal conditions. The remaining vessels being built at this yard are smaller ships, carrying 10,000 tons of cargo, and are to be equipped with two six-cylinder engines of about 1500 b. h. p. each. As an indication of the demand for motorships, Harland & Wolff have orders on hand and contracts for many years to come, despite the fact that they have very greatly enlarged their engine-building shops during the past year or so, and have thus increased their facilities for turning out standardized motors, in the shortest possible time. It is rumored that the Glen Line, which has gained a considerable amount of experience in the cost of operating steam and motor ships, has resolved upon a program of about twenty-five motor vessels, trading on all routes, throughout the world, following the policy which has been adopted by the East Asiatic Company with these motor vessels.

William Doxford & Sons of Sunderland, who have had a 3000-horsepower four-cylinder engine under construction for a cargo vessel for some time, have just commenced upon the manufacture of a second engine of exactly similar type, also to be installed in a single-screw cargo boat of about 11,000 tons. This firm has spent £100,000 in experimental work, and is so convinced of the future of the large oil engine that in spite of the present demand for boilers they have converted a large part of their boiler shops to oil-engine manufacture. With their big experimental sets, the design of which is being copied in the engines now under construction, they have achieved some remarkable results, one of which is that a degree of flexibility has been obtained which is equivalent to the best steam engine. This motor, which has a maximum speed of 77 r. p. m. and is thus very similar in this respect to the average reciprocating steam engine, giving a high propeller efficiency, will run continuously at 18 r. p. m day in and day out without any attention whatever. As it is generally considered that a Diesel engine will not run steadily below about 45 r. p. m., it will be seen that this is a distinctly noteworthy achievement. In this design, which is of the opposed piston type, the head of the piston is maintained at a temperature of 1000 degrees Fahrenheit and the compression is reduced to the low figure of 300 pounds a square inch. Solid injection of fuel through two fuel valves is adopted, the pressure in the oil pipes being 8000 pounds a square inch. The installation of the first engine in a ship is awaited with much interest, as it is thought in some quarters that this type will prove quite as successful as any Diesel engines now in service. The only disadvantage it appears to possess is that it is necessary to circulate hot water around the cylinder jackets before starting up, but this can hardly be considered a serious obstacle.

DIESEL ELECTRIC TRAWLER

THE Mariner, a trawler now building for the Marine Trawling Company of Massachusetts, is to be the first privately-owned vessel fitted with Diesel electric propulsion machinery. This method of propulsion has many advantages, as shown in the following description of the vessel:

The craft is built of very best selected oak, hard pine and Douglas fir, and put together by the skilled workmen of Essex. Length over all 150 feet, beam 24 feet 6 inches, draft 15 feet.

The machinery will be built and installed by the New London Ship & Engine Company and the General Electric Company, who are sparing no expense to make this the latest and best thing in Diesel-engined and electrically-operated vessels in the country. The reputation of these concerns is sufficient to guarantee success.

Installation will consist of two eight-cylinder Diesel engines, direct-connected to electric generators which produce power to drive an electric motor direct connected on the propeller shaft. This electric power will, at the same time, operate the deck winch to raise the trawl and also drive deck winches, furnish lighting for ship, etc.

The benefits and economy of electricity are many. Take, for example, the flexibility of control of ship. The entire control of the ship is from the bridge by the captain, thus preventing misunderstanding of signals between captain and engineer, as the captain by a short lever can stop, start, reverse, go fast or slow, and reverse propeller from full speed ahead to astern in the short time of five seconds.

Another benefit is that when the ship rides a sea there is no racing of the propeller as on a steam-driven ship.

An important economy in an electrically-driven ship is the great saving in hold or cargo space and in weights of machinery and fuel. In a ship the size of the Mariner, if fitted with steam engines, the weight of the machinery would be 115 tons, as against a weight of 56 tons when electrically driven. The weight of fuel and water for a cruising radius of 5000 knots would be 398 tons for a steamship, against 46 tons for the Mariner. This gives an electrically-driven ship a greater carrying capacity with a smaller hull than with steam, and the original cost will be in proportion of 7 to 9 in favor of electricity and oil.

SWEDISH MOTORSHIP ACTIVITIES

ACCORDING to a Goteborg newspaper, the Stockholm firm of shipowners, Aktiebolaget Trans-Atlantic, is pushing a building program which contemplates the construction of vessels totaling 120,000 tons. It is reported that this company has ordered eight new motorships of 9400 gross tons each from the Göta Works, and also a tanker of 7300 tons. Four steamers of 8000 tons each are reported to have been ordered by Aktiebolaget Trans-Atlantic from the Lindholmen Shipyard, and two of 3500 tons each from the same yard.

The old tonnage which the company purchased during the war is being sold as rapidly as possible. When its building program is completed, it is said that Aktiebolaget Trans-Atlantic will have a modern fleet aggregating 275,000 tons.

During September 188 ships arrived in Stockholm from abroad, as compared with 159 in July and 182 in August.

Sweden's trade with the Levant in increasing, and the Svensk Handelstidning reports that prospects for good business with that part of the world are excellent.

It is announced that the Johnson Line has started a direct line of Swedish motorships between Finland and South America. The Svensk Handelstidning says of this new line:

"The Johnson Company has begun operations after a thorough study of conditions and intends to maintain regular traffic. It has not been decided how many boats are to be operated. That there will be no lack of freight in either direction can be taken for granted. The Finns, as it is known, have no access to any tonnage suitable for trans-Atlantic traffic.

"Great masses of paper, box board and wood pulp are stored in Finland for export. The country's need for imported goods is enormous. The plans and activities of the Johnson Company have been received by Finnish business men with the greatest satisfaction, especially as the importance of direct shipment is now fully appreciated."

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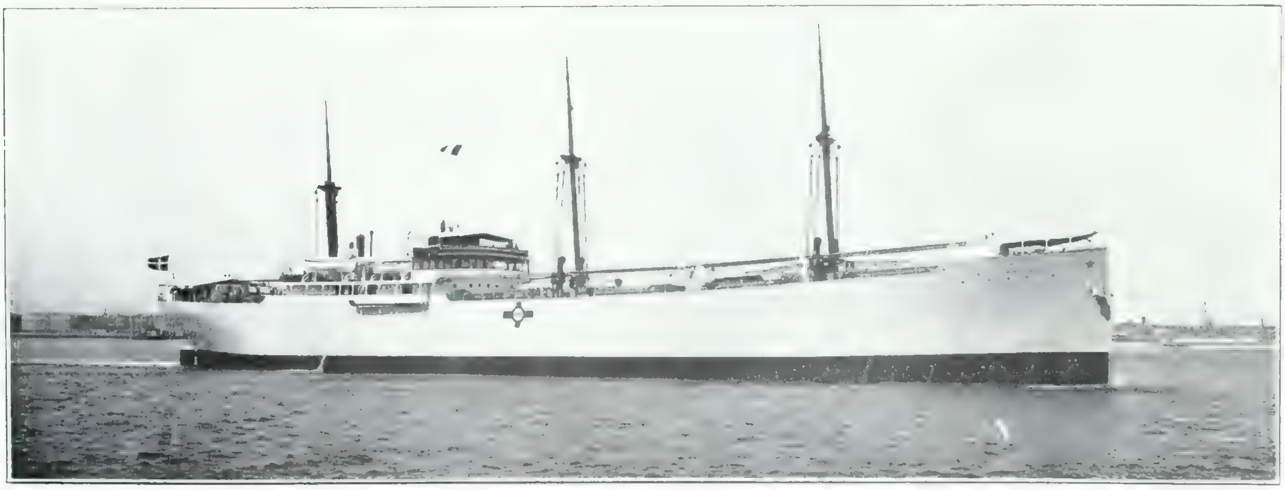


Shipfitting Department at Moore's Yard

IN any construction work there is necessarily a nucleus craft around which all other crafts revolve or are dependent on. In the steel shipbuilding industry this nucleus craft is shipfitting. Without the shipfitter the material construction of a vessel could not even begin, since it is he who initiates the preparation of the material and follows it through to its completed form in the ship's structure.

In a highly efficient and specialized plant, such as the Moore Shipbuilding Company of Oakland, California, one can readily follow the work step by step and note how completely every phase is handled. What is true of the shipfitting department is true of every other department of this plant, that is, maximum results with minimum effort.

After the final working plans and material lists are received from the engineering department and drafting room, the lines of the ship are laid down on the mold loft floor, these lines being nothing more than a full-sized skeleton plan of the vessel. From these lines, wooden templates for nearly the entire ship are made. Some of this work is quite complicated, as the templates are made so that the material can be laid off on the flat plates and straight shapes, which, of course, requires development of curved surfaces and their projection on flat surfaces. However, a complete discussion of the work of the mold loft would be too technical for the average reader to grasp, so the details of this portion of the work will be dispensed with.

Each template, after it is completed, is cataloged, numbered and sent to the template storage loft. A description of each template—i. e., number of holes, scarphs, amount of shear, amount of planing, etc.—along with its catalog number, is then sent to the template storage loft, the shape and plate parks and finished material department, where complete indexed records of the required templates are kept.

The work is then laid out in rotation, or in the order in which it will be used during the construction of the vessel.

It is aimed to duplicate the material far enough in advance so as not in any way to retard the progress of the work during the construction of the hull, but not so far in advance that the material might be lost or its marking become illegible.

When the actual laying out of the work is to begin, the quartermen in the duplicating parks issue requisitions on the material department for the plates and shapes required for the particular portion of the work. With this an order is given to the duplicator who is to lay out the work, stating what pieces are required and their respective template numbers.

After the material department receives the requisitions for the necessary plates or shapes, these are then located and are marked for the crane crews, who in turn place them on the "horses" for the duplicators. While the material is being set up, the duplicators check out their required templates from the template storage loft and are ready to begin their work by the time their required plates or shapes are placed on the "horses." The work is issued far enough in advance so that there is no delay in waiting for material or other causes.

After the piece is laid out—i. e., center-punched, stenciled and painted with the required description of the piece, size of holes, countersink holes, hull number, etc.—it is taken either to the plate shop or angle punches, as the case may be. If it be a plate, it is punched, countersunk, planed, rolled, flanged or scarphed as required; or if it be a shape, it is sheared, punched or countersunk. Bars are planed for caulking or shaped before they are laid out, so as not to obliterate their marking and stenciling.

The finished piece is then sent to the storage racks of the finished material department or directly to the various assembly parks where it is to be used. Here it is cataloged and kept until such time as it is needed on the hull.

As the material is required on the hull, it is ordered by requisition on the finished material department and is delivered to the erecting booms which serve that portion of the hull on which it is to be used.

Lifted work, or work that is laid off from templates made directly on the ship, is gotten out in the regular routine, except that it is generally followed then by the fitters who lift the templates, and, of course, this work is always given the preference over other work and is rushed as much as possible. In the Moore Shipbuilding Company's plant, lifted work has been reduced to an absolute minimum.

Bounding shoes, anglesmith and slab work is gotten out as needed, being ordered and made by the fitters in charge of this portion of the work. Both the blacksmith and laying-off templates are kept in racks adjoining the angle shop, in order that they shall not be handled more than is absolutely necessary, as this portion of the work is particularly hard on templates.

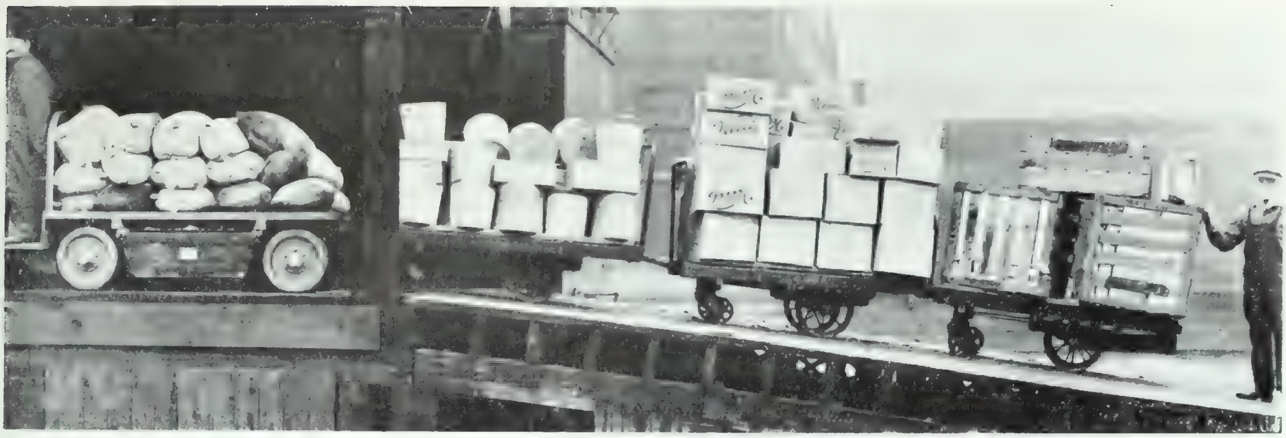
"Liners," unless they are of special shape and thickness, are gotten out in advance and are laid out and punched as needed. This portion of the work is handled by specialists who do nothing but lift and fit liners.

All the built-up sections of the hull, such as floors, transverses, bulkheads, fore and aft peak frames, hatch girders and beams, superstructure houses, etc., are assembled and riveted in the various assembly parks, the material for this work being laid out and sent directly to the storage racks at the parks. The various sections, after they are assembled, bolted and riveted, are then stored and later taken to the hulls and dropped in place, as needed.

Masts, booms, fresh water tanks, stack breeching, etc., are gotten out and assembled at the boiler shop and are delivered to the hulls complete, as needed.

Outside of the common shipfitting work, all special and intricate work is done by experts, who handle a particular portion of the work, and move from one hull to the next, as they complete their work. This naturally allows the work to be done with much greater dispatch and far more accuracy than would ordinarily be the case.

It is the aim of the shipfitting department to turn out the maximum work with a minimum effort, thereby accomplishing the greatest efficiency possible.



Lakewood model "B" electric storage battery truck hauling miscellaneous freight

Recent Developments in Storage Battery Haulage

THE ever increasing demand for quicker and more efficient methods of dock and shop haulage due to increased labor costs, and the realization that every rehandling of material is wasted labor, time and money, has brought forth many methods of stopping this waste and reducing costs.

The freight congestion at piers, docks, depots, terminals and other points, as well as the piles of raw and finished products spread over valuable ground space in shops and manufacturing plants, are sights familiar to all.

To enlarge these terminals or storage spaces is usually a physical as well as a financial impossibility, and the most economical way to relieve this congestion and increase storage space is by a liberal equipment of electric storage battery tractors and trucks. This provision is especially desirable in the planning of new terminals or storage spaces as a study of the plans of many proposed projects will show.

In general, storage battery haulage may be divided into three classes by the three types of machinery used, viz.: Tractors and trailers, straight trucks, tier lift trucks. All of these types of trucks, as they are generally called, can be operated by the average man after a short period of instruction, as they are furnished with every fool-proof device possible and cannot be injured except by collision or very careless operators.

Each type has its own field in which it is best adapted to the work to be done. In its own field each type can save much money when compared with the older method of hand trucking. Every man, therefore, who has any handling of material, raw or finished, to be done, should get expert advice on his particular problem and install the type of truck best suited thereto.

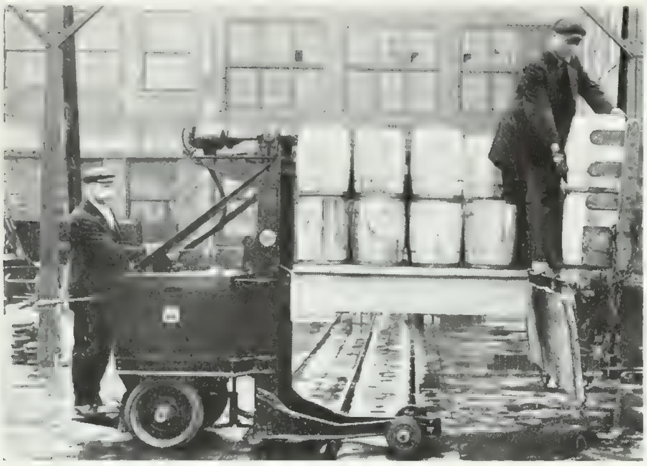
The tractor with its trailing load of warehouse trailers, dump cars or whatever type of trailer is best, is perhaps the best known of all types and needs little introduction or mention. The truck, too, has its own field of usefulness, as it can carry deck loads or can be equipped with dump body for bulk material or with end gates and also draw a trailing load. It is essential in tractor or truck hauling that the machine be of the four-wheel steer, four-wheel worm gear drive type arranged to operate with equal power in either direction.

In some haulage problems the tractor will, with its trailing load, prove to be far in advance of other methods. In other cases of straight haulage the truck will prove to be the better; but in addition to economical haulage of material there is the question of rehandling and storage. The majority of rents are, in the last analysis, based on so many cents a square foot, whether the material is piled or tiered in one layer or ten.

It is when material is to be stored or delivered to a height above the ground, in addition to being hauled over a distance, that the latest type of storage battery truck comes into use. Tiering goods four high will cut down the floor area to one-fourth, so that if ten thousand feet storage space at three cents a foot a month is needed for single tier storage, then with four tier storage there would be a rent saving of $225 net, as the material must be handled in either case. But in addition, when the material is tiered with a tier lift truck, there is less rehandling, which means additional saving in dollars as well as less congestion.

This machine will quickly and economically pick

Tier-lift truck depositing loaded skid for the top course, selective tiering



Tier-lift truck handling barrels of nails on skid for loading motor truck

up and carry loads to destination and then elevate these loads to heights sufficient for piling in box cars, tiering in stock rooms and other places where cranes are not available, and combines all the good features of a load-carrying truck and a tiering machine.

The material is loaded on wooden platforms, such as are in common use, and the truck runs under these platforms and carries them to their destination, one man doing with electric power the work formerly done by several men with a crane and hand trucks. When material can be kept on skids or platforms during shipment, the skids and their loads can be put directly into the motor trucks or freight cars by the tier lift truck and at the receiving point removed by another lift truck, carried to proper place, stacked into piles, elevated into tiering racks or stored, as conditions may require.

Some indication of the possibilities may be had when it is shown that the truck will elevate a four-thousand-pound load to seventy-six inches, or any intermediate height, above the floor or ground.

The application of this type of truck to your business problems may or may not be self-evident, but the manufacturers, through their distributors, are ready and anxious to go over your situation with you and recommend the methods which will increase your efficiency of haulage and storage to the highest degree.

The truck here illustrated and described is known as the Tier-Lift Truck, and is manufactured by the Lakewood Engineering Company of Cleveland, Ohio, and distributed in California by Smith-Booth-Usher Company with depots at San Francisco, Taft and Los Angeles.

S. S. GUIMBA HITS A MINE

DESPITE the strenuous efforts of the mine sweepers, navigation in certain localities still remains extremely hazardous. The colossal tonnage loss sustained during the war is being added to daily, and prevailing weather conditions do not help to remove this menace. Some idea of the danger that our ships have to contend with may be formed when it is stated that one ship alone reports having seen some seventy drifting mines within a comparatively small radius.

Of five United States ships that have struck mines since September of last year, the S. S. Guimba was the only one saved, and this, it is said, is due to the fact that she was sailing only under sand ballast.

This ship is a steel refrigerator steamer of 6149 gross tonnage and was built by the Moore Shipbuilding Company, Oakland, California. Her length over all is 416 feet 6 inches, beam 43 feet, depth 34 feet 6 inches, and the motive power is obtained from Westinghouse compound turbines of 2800 shaft horsepower with two compressors of 80 tons' capacity, used for refrigerating purposes.

The Guimba sailed for Hamburg on September 26, 1919, and after unloading her cargo of frozen meat left that port on October 18, 1919, on her return trip for the United States.

At half-past two on the morning of the nineteenth, when some eighteen miles from the mouth of the River Elbe, a mine was encountered and a severe explosion took place. No. 1 bulkhead at her bow immediately filled with water, but fortunately No. 2 bulkhead was undamaged, and despite the darkness and confusion the ship was at once headed about and succeeded in making port at Hamburg. Here she was put in dry dock and it was discovered that a hole of about 18 feet by 24 feet on the port side and two smaller holes of about 3 feet by 4 feet each on the starboard side had been blown in.

Repairs were made in eighteen days and eventually the Guimba sailed for New York, where she is now docked.

Considerable credit is reflected upon Chief Engineer E. A. Partsch, a member of M. E. B. A. No. 13, for his energy and ability in contending with the emergency, and it is certainly a matter of congratulation to all concerned that it was not necessary to write this ship off as a complete loss.

Lumber haulage with electric storage battery trucks

Japanese Marine Notes

By Special Correspondent

WHAT had dawned as a threatening year for the Japanese shipowners and shipbuilders has turned out to be a most profitable one generally, as the reports now being made at the annual meetings of stockholders and the dividends being declared for 1919 testify most emphatically, while the plans of the shipping companies and the dockyards, as announced, demonstrate that 1920 is looked forward to with the utmost confidence.

The Nippon Yusen Kaisha, which announced a net profit of $9,000,000 in 1919, as compared with $15,000,000 for the previous term, has declared a dividend of 100 per cent, half as a regular dividend and half as a special dividend, the latter coming out of its reserve fund.

The Toyo Kisen Kaisha has not yet announced its dividend for the last six months of the year, but it is believed that it will be 20 per cent, as was declared for the first six months, when its net profits for the term were $715,000, sufficient for 16 per cent, the other four coming from accumulated profits in reserve.

The Osaka Shosen Kaisha is not in so good a position to keep up its dividends, but a 40 per cent dividend is looked for. This corporation's net profits, allowing for a 20 per cent falling off in its freight receipts, is estimated at $10,250,000 for the year. Last year, besides paying 40 per cent the company set aside a reserve fund of $3,000,000. It is expected that it will continue its dividend but will not be able to add to the reserve. The meeting of the shareholders will be held on January 24. One of the important matters to be submitted for the shareholders' endorsement is a proposal to double the capitalization to $50,000,000 by the issuance of a million new shares, of which 900,000 will be offered to present stockholders in the ratio of nine new shares for every ten now held, with the probability that the directors will be authorized to assign the other 100,000 shares to present employes of the company. The accounts to be presented to the annual meeting show gross receipts this year of Yen 53,440,000, as compared with Yen 73,710,000 last year, and gross expenditures of Yen 34,920,000 this year as compared with Yen 47,660,000 for 1918.

These are the three largest Japanese shipping corporations and the above is a fair indication of the general condition of the year.

Among the dockyard corporations the year has been a good one, despite heavily increased costs of materials and labor. The Yokohama Dock Company, for instance, has declared a dividend of 20 per cent, an increase of 5 per cent over the last terms. The net profits of the company practically trebled, being Yen 1,543,155, as against Yen 590,885.

The Kawasaki Dockyard, the great shipbuilding concern of Kobe, has realized a net profit of Yen 12,185,959 and a dividend of 10 per cent ordinary and 30 per cent extra dividends will be declared, while nearly Yen 5,000,000 will be set aside in special, legal, depreciation and dividend equalization reserves.

Some of the smaller dockyards, however, especially those which sprang up as a result of the war's shipping boom, have done well to come out with small profits or to break even, while one has recently gone to the wall and been sold out to satisfy its creditors. This is the Yoshiura Shipyard of Korea, which was bought in at forced auction by the Osaka Ironworks Company for Yen 125,000 for building and plant. The site was taken over by the Kawasaki Bank, which held it previously as a mortgage pledge. It is believed that the Kawasaki Dockyard, which is closely allied with the Kawasaki Bank, will eventually take over the yard, enlarge it and use it for government contracts in the building of destroyers and submarines, under special arrangements with the naval authorities. It is reported that the plans for the extension are already worked out and that the development will be completed by the beginning of 1921.

Some big developments have been announced at the annual meetings so far held. Baron Kondo, president of the Nippon Yusen Kaisha, who has just returned from Paris, where he represented the Japanese shipping interests at the Versailles Peace Conference, at the annual meeting of his company stated that the N. Y. K. is to be greatly enlarged, giving this largest Japanese company an even greater preponderance over its nearest rival, the Osaka Shosen Kaisha. It was also announced that arrangements are being made whereby this company will co-operate closely with certain British steamship companies in its Liverpool business, the arrangements having been made by Baron Kondo during his visit in Europe. In announcing its building program, Baron Kondo said:

"During the war, when there was such a jump in the price of steamers, the Nippon Yusen Kaisha refrained from building new ships, but followed the policy of chartering new ships to meet the requirements of the business, which increased with an extension of its operations overseas. The policy elicited some criticism, but it had a good reason behind it, and, as a matter of fact, we could obtain as good business results as any other shipping company. The price of steamers, however, has now returned to a normal level and we should no longer persist in the charter policy. We have accordingly arranged for the construction of sixty ships, totalling some 500,000 tons deadweight, in addition to several superior ships reserved exclusively for the passenger service. These ships are to be completed during the next five years. The expenses for this program will be met from the reserve funds, but if these be not enough, the company will make a new call on its capital stock. But it is believed that the reserve funds which have been set aside in the past and those which will be provided in the future will be sufficient to meet the purpose. The ideal of a business company should be to carry on as large operations as possible with as little capital as possible, and this will always be kept in our minds in shaping the course of the company."

Following this important announcement of Baron Kondo, what was even a more important announcement was made by Mr. Yonejiro Ito, the managing director of the N. Y. K., to the effect that the company proposes to place orders for some of these ships with foreign yards, which should give the American builders a chance to bid on some big contracts.

"We shall first build passenger ships of a superior type," says Mr. Ito. "If all these ships could be built in Japan, it would do much good to the Japanese shipbuilding industry, but it is rather difficult to get ships of 8000 tons with a speed of twenty knots in this country, so that half the number will be ordered abroad. This will also be the case with our freighters, although so far we have placed orders only with our home yards."

This company, the Nippon Yusen Kaisha, has attracted some unfavorable comment from the Japanese press by following its announcement of a 100 per cent dividend with a request upon the Department of Communications for permission to increase its passenger rates. Fares for the American run were raised in October, from Yen 400 to Yen 500 for a first-class passage, and the company now proposes to raise its rates on all its other lines by twenty to forty per cent. This will increase the fare from Yokohama to Shanghai from Yen 57 to Yen 80, and the fare to London from Japan from Yen 720 to Yen 900. The main reasons advanced are increased costs of operation and increased demand for passenger accommodations. At the booking offices of the N. Y. K it is stated that all their steamers are booked full until next July, with second-class bookings extending into May.

The Osaka Shosen Kaisha, which is following the lead of the other companies in the raising of passenger rates, has announced also that hereafter fares will have to be paid for infants. Babes in arms heretofore have traveled free, but from now on, on the O. S. K. steamers they will be charged for at the rate of one-tenth the price of an adult's ticket.

The Nippon Yusen Kaisha has put into effect a new passenger rate on its Bombay line, the prices quoted being an increase of ten per cent. This brings the first-class fare from Yokohama to Bombay to Yen 300.

A number of new services are being announced by the various Japanese companies. The Nippon Yusen Kaisha proposes a fast passenger line to China, under a government subsidy. At present the N. Y. K. operates a 3000-ton passenger steamer between Yokohama and Shanghai, by way of Nagasaki. The new line is to have five new 7000-ton steamers, of high speed, primarily for passengers, between Nagasaki and Shanghai, the announcement being received with great favor at the former port as it will help to restore Nagasaki to something like its former importance. The new service is to be inaugurated in about a year, as soon as the liners are commissioned. The choice of Nagasaki as a terminal was made on the understanding that the government will proceed without delay in a number of long planned harbor improvements.

The Osaka Shosen Kaisha has despatched the Peking Maru from Yokohama to Singapore, Javan ports and Bombay and on the success of the trip depends the inauguration of a regular service. Much depends upon the amount of sugar to be shipped from Java to India. This year the tonnage in sugar only reached 240,000 tons, as compared with 800,000 a year before the war. As British buyers have contracted for a large part of the 1920 grind in Java, it is believed that the Indian shipments may be resumed, in which event the Japanese bottoms stand a chance of getting their share of the freights. In that event the Peking Maru will be followed by other steamers on a regular schedule.

A new Seattle line is announced by the Mitsui Bussan Kaisha, with regular sailings monthly after May 1. The Mitsui steamers will operate between Dairen and Seattle, by way of Japanese ports. Prior to the regular sailings, which would become operative at once were it not that the ships being launched in Japan for the United States Shipping Board are providing plenty of bottoms now for all the extra American business, the Mitsui Company will despatch two extra steamers, the Kensan Maru, 6176 tons, which is now on the way, and the Mantayama Maru, 7240 tons, in February.

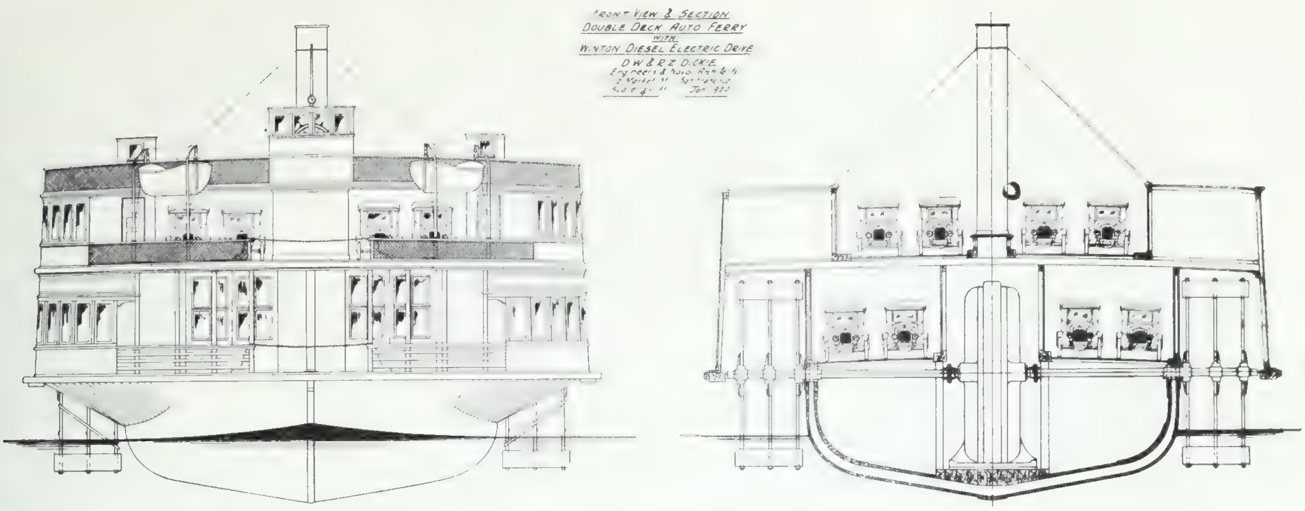
There is marked activity of late in all the Indian lines, despite the allegations being freely made by Japanese shipowners that the British port authorities in India are trying to make things unpleasant for the Japanese ships. Japanese exports to India are increasing, especially in glassware, enamel ware, paints and cottons, while the Japanese are buying larger quantities than ever of Indian raw cotton. The N. Y. K. is sending an extra steamer a month on this run and the Osaka Nisshin Kaisha is increasing its fleet in the Kobe-Bombay service from six to eight on the regular run, with an occasional extra steamer.

The movement of Formosan raw sugar to Japan is also commencing, with steamers of the Yamashita Kisen Kaisha, N. Y. K., O. S. K. and Mitsui Bussan Kaisha sharing the business. This season the Formosan crop is short, but there will be a total of 200,000 tons to be moved. The shipping companies, when things were looking blue last June, bid against each other disastrously for the freight contracts, landing these at a rate of 39 sen a picul, or approximately $3 a ton, which is just half that the rate is in the open freight market today. At the increased costs of operation, this business will all be done at a loss.

Of the eighteen ships of more than 1000 tons launched from Japanese yards in November, every other one was for the United States Shipping Board, the tonnage of these nine being 51,270 gross out of the total of 96,570 gross for the eighteen ships.

The Kawasaki Dockyard Company has just announced an ambitious program, which includes the building of fifty ships between now and the end of December, 1921, including a number of 9300 and 9700 tons each. Including the steamers now on the ways, thirty steamers, totaling 300,000 tons, are to be launched during 1920. In order to provide the working capital, the stock of the company is to be increased to a total of Yen 50,000,000. Among other plans, the Kawasaki directors are also intending to launch a new marine insurance company.

Shipbuilders generally are recovering from the fear entertained some months ago as to the future of the industry, although the shares of the various companies have not as yet regained their strength on the exchanges.



Bow view and section of double-decked automobile ferry

A Double Decked Automobile Ferry With a Winton Diesel Electric Drive

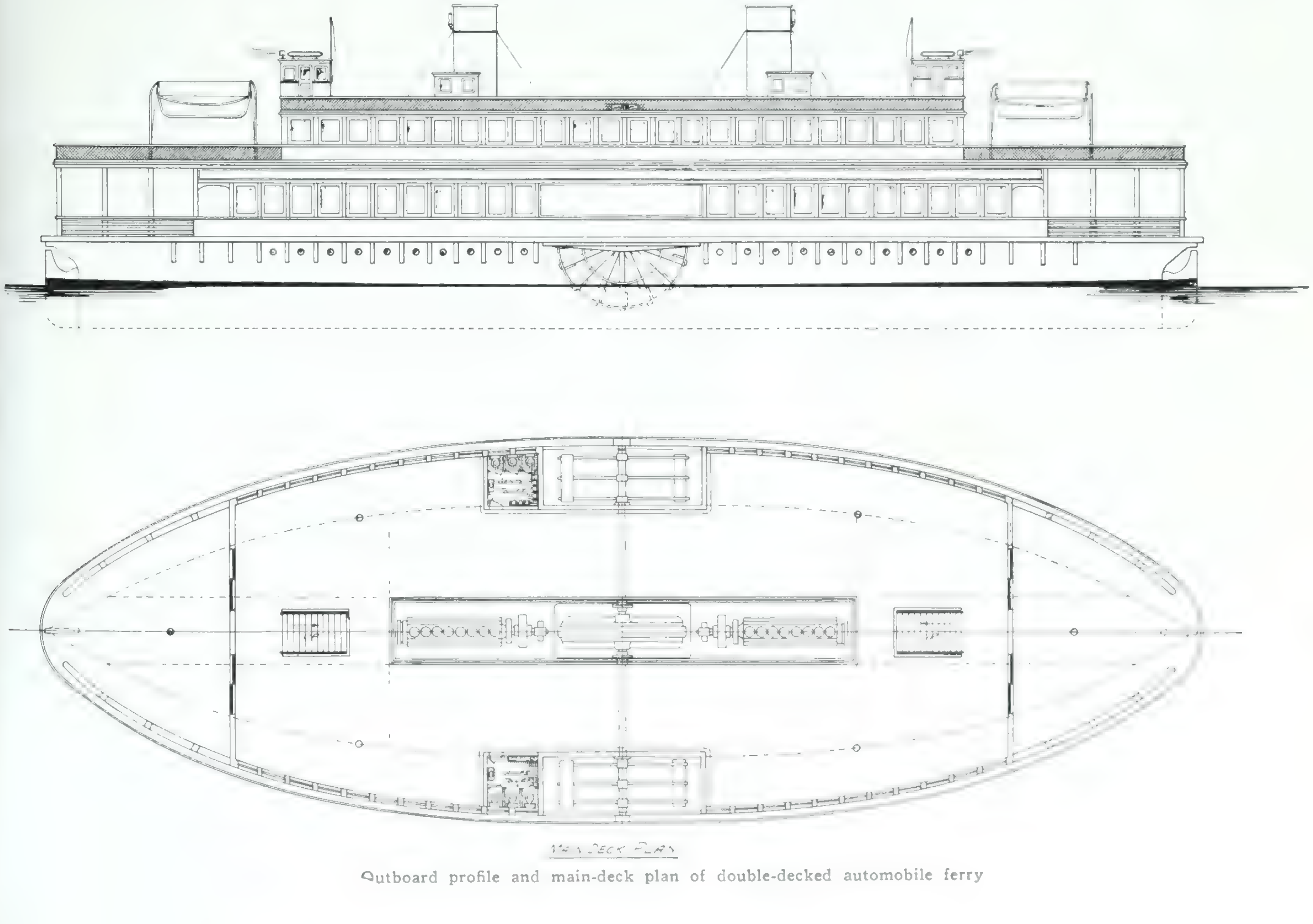
By Renwick Z. Dickie

THE problem of automobile transportation over water is becoming acute and much interest is manifested in the design of vessels for the carriage of motor vehicles.

Up to the present time no radical departure had been made in the design of these vessels or their power plant, as in most cases boats that were formerly used for other services have been converted into automobile ferries.

From the standpoint of the hull a vessel of certain fixed dimensions could have its capacity increased nearly 100 per cent by the addition of another deck designed to carry machines, and for the sake of safety it would be well to carry the machines in the middle of this upper deck with the cabins on the side, so that it would be impossible for any driver to make a mistake and drive off the boat.

This would mean specially designed slips with double aprons, which could be arranged to work simultaneously. The main deck should be made to fit the slips which are now in use, so that the



Outboard profile and main-deck plan of double-decked automobile ferry boat could be used temporarily on another route if necessary. To thus double the capacity of the boat would involve a 20 per cent increase in the cost of hull, decks and houses, while the increase in cost of the slips would be about 50 per cent.

The old high-pressure beam engine has not been departed from except in the case where an inclined compound engine or propeller boat has been used, and from a point of economy a paddle wheel drive given by a large electric motor would show a marked improvement over the beam engine.

The Winton Engine Company of Cleveland, Ohio, in collaboration with Westinghouse, are prepared to furnish the power plant for this purpose, and the cost would be about the same as that for the steam plants now in use on the ferries.

The sketches show a double deck auto ferry, 205 feet over all, 191 feet between perpendiculars and 44 feet beam, with a breadth over the guards of 68½ feet.

It is proposed to install 1000 H. P. in two 500 H. P. stationary non-reversible Diesel engines of the eight-cylinder type direct connected to a generator, both of which will feed a large driving motor, direct connected on the paddle wheel shaft.

The motor will be large enough in diameter to give a lineal armature speed, which would be obtained by a fast running motor of a smaller diameter. This motor will be designed to handle an overload of at least 50 per cent when starting and stopping. The control of the field current of the motor will be arranged for prompt reversal and if deemed advisable this control can be under the hand of the navigator in the pilot house.

The motor will be arranged for powerful generative braking and an auxiliary mechanical friction brake will be provided for emergency purposes. The large armature diameter of the motor as proposed in these plans will give a propulsive torque effect equal to that of the large beam engines, and, with this torque practically under the control of a push button in the pilot house, the ferry as here outlined will show very remarkable maneuvering qualities.

All the auxiliaries, such as steering gear, sanitary, fire and bilge pumps can be handled from the main power plant, as they will all be motor driven.

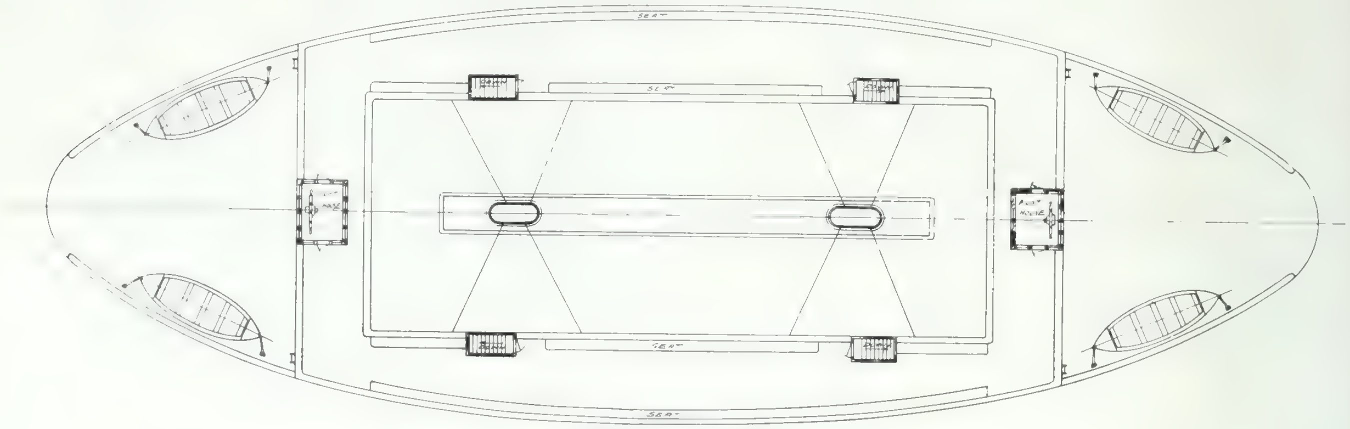
An auxiliary generating set of 30-kilowatt capacity will be fitted to take care of the lighting and pumps while the vessel is in the slip.

Accommodations for crew, not shown in sketch plans, will be arranged in the under deck space adjacent to the engine room bulkhead. Upper deck is shown open on plans but can be easily roofed over if found advisable.

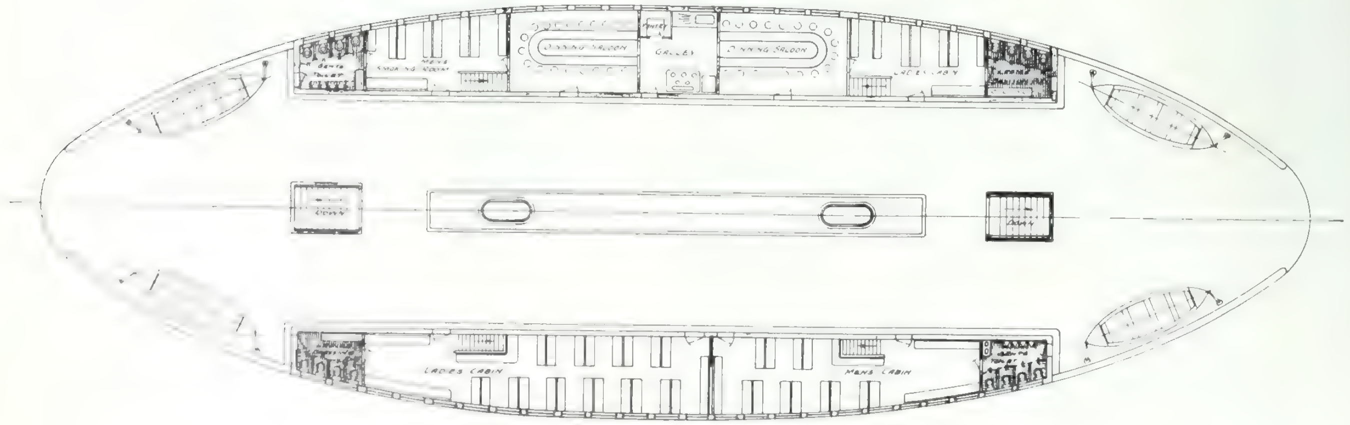
In comparing this electric installation with propulsion by a steam beam engine, it is assumed that two electricians can properly care for the plant, and that their wages would just offset the wages of the firemen in the steam plant.

For the sake of comparison it is assumed that the boat will be in operation for sixteen hours a day and will be in the slip about eight hours.

	Diesel Electric Drive	Beam Engine Jet Condensing Plant
Indicated H. P.	1,000	1,000
Weight of plant installed	200 tons	250 tons
Fuel used per hour, per h.p.	.45	2.
Fuel used per hour, barrels	1.7	4.7



PROMENADE DECK



UPPER DECK

Promenade and upper-deck plans of double-decked automobile ferry

Fuel used in barrels per day running 16 hours	27.2	75.2
Fuel used per hour in slip, barrels	.25	.25
Lubricating oil used per day 16 hours' running	18 gals.	6 gals.
Lubricating oil used per hour in slip	.75 gals.	.25 gals.
Hours running	16	16
Hours in slip	8	8
Cost of lubricating oil per gal.	.29	.43
Cost of lubricating oil per yr.	$2540.40	$1255.60
Cost of fuel oil per barrel	$1.85	$1.60
Cost of fuel oil per day running	$50.32	$120.32
Cost of fuel oil per day in slip	$3.70	$3.20
Water used per day for power plant		25 tons
Weight of water carried in tons for power plant		50 tons
Cost of water at 10 cents per ton, per day		$5.00
Fuel used per year in barrels	10,658	28,178
Water used per year for power plant, tons	00	912
Cost of water per year		$912.00
Total cost of fuel, water and lubricating oil for 1 year	$22,240.40	$47,267.60

It will be seen that there will be a saving of about $2000 a month in the cost of operation of the power plant, through the saving in fuel, water and lubricating oil, and besides this the boat can handle nearly twice as many machines as a single decked auto ferry.

Shipping Trade to the Far East

By Captain J. S. Marshall

BEFORE the great war the shipping trade with China and India was done principally by way of the Suez Canal. Little, if anything, was known of the route by way of Vancouver, Seattle or San Francisco, or even the Panama Canal. People going or coming to Europe or America never gave a thought to any other route than by Suez. The Pacific Ocean seemed so far distant that it did not seem worth while bothering about, consequently the Suez route was catered to by all classes of ships. It was quite common for passengers bound to the Eastern States of America to go from, say, Calcutta to Europe by Suez and transfer to an Atlantic steamer and so to their destination. Great palatial steamers of various European nations catered for this trade and did well. Not a single American passenger boat made a direct sailing from Calcutta to America.

Since then great changes have taken place. Thousands of people who never dreamed of visiting China, India or Burmah have been to these countries and learned the great possibilities of trade that can be done to advantage, especially with America. Business men of all kinds have had their eyes opened, and are on the lookout for business, making diligent inquiries as to quantities, prices and especially cost and means of transportation.

When speaking to merchants who send goods to America or Canada in boxes and cases, complaint is made that the necessary handling in transshipping in the Orient breaks up the boxes and great loss is incurred. When considered calmly, there is no doubt that merchants have just cause for complaint. At port of trans-shipment, goods are taken from ship's hold and placed on lighters, from lighters to warehouse, then from warehouse to lighters, and thence to the other ship. All this handling cannot be done without damaging cases, especially in these days of hurry and bustle, but it could be avoided if some shipping company would put on a service of really good boats from the west coast of America or Canada direct to Shanghai, Hongkong, Singapore and Calcutta. There is no question about it, the trade is there and only needs going after. Twin-screw steamers of, say, 10,000 or 12,000 tons cargo space and good bunker capacity, with accommodation for about 100 one-class passengers, no others, and a speed of not less than sixteen knots, would do well. A monthly sailing would take four steamers, and any shipping company, with a good, capable manager who has a thorough knowledge of shipping business, could increase this trade to large proportions in a very short time. Bunker coal in Calcutta is as good as Japanese and much cheaper. It would be no use getting some old 10 or 12-knot steamer, painting her up, changing her name and putting her on the run. She would not earn her salt, so to speak, and would only give the Pacific route a bad name for many years to come. Quite a number of shipowners say they are willing to put on boats, but the price is so high, and they would rather wait till vessels are cheaper. If the other man can afford to pay for steamers at today's prices, surely these same shipowners can. But if something is not done, and done quickly, the other fellow will certainly have the business, and when too late it will be found that hundreds of thousands of dollars will be paid away yearly to foreigners that should be spent in America or Canada. Ships can be bought today that would suit the trade. The price must be paid. The day of "cheese-paring" with steamers is gone and no longer can vessels be sold or built for $30 and $35 a ton. The man who is waiting for prices to go back to pre-war days is going to be left behind; also the cheap man who will put on some old steamer with everything cut down to the bone, low wages and inefficiently manned, will only get the leavings and rough cargoes that the first-class boats will not take.

Nowadays people have learned what comfort means when traveling; merchants have learned what fast transportation means; they are willing to pay for it and will have no other. It is a well-known fact that large shipping combines are getting together in Great Britain to capture all kinds of trade all over the world and once more assert the position they held as the greatest shipping nation in the world. Trade follows the flag, and it is necessary that America and Canada should carry their own goods in their own ships. The question is now, "Who will do it—Great Britain, America, Canada or Japan?" Merchants are crying out for ships to carry their goods, passengers are waiting for ships to take them to America and Canada. Who is going to do it?

A Steam Turbine Schooner

RECENTLY there has been wide discussion and consideration as to the merits of the ships powered with internal combustion engines, and it is not our desire to detract from the many notable successes of the oil engine, but it is probably a very appropriate time to consider the steam turbine and its relative economy in connection with modern water-tube boilers.

The S. S. C. A. Smith, recently built for the Coos Bay Lumber Company, was the first wooden ship powered with steam turbine and reduction gear. The owners have for many years operated several reciprocating steam powered lumber schooners carrying lumber from Coos Bay to San Francisco, and since the installation of the turbine ship, they have kept accurate record of the fuel consumption on this vessel, and cost of upkeep, as compared with other ships which are propelled by triple expansion reciprocating engines. The ships of this firm also furnish a comparison between Scotch fire tube boilers and water tube boilers, and the results are of general interest to marine engineers.

Before examining the tests as to fuel economies, and in order to remove any of the prejudices against turbines and reduction gears that may still linger in the minds of those of our readers who are wedded to "the clanging chorus", "the orchestra sublime" of the reciprocating engine, we quote an opinion recently expressed by the operators of this turbine-driven coaster steamship C. A. Smith:

"We have just completed thirty-six round-trip voyages between Bay Point, California, and Marshfield, Oregon, with the S. S. C. A. Smith, covering a total distance of 29,600 miles. The turbines and reduction gears have given no trouble whatever. Repairs to date have consisted of one removal of carbon packing in each turbine and nothing else."

The Nann Smith is a steel three-masted steam schooner built by the Newport News Shipbuilding & Dry Dock Company in 1907, and operated by the Inter-ocean Transportation Company with registry at Marshfield, Oregon. She is 277 feet long, 43 feet beam and 17 feet molded depth, with a gross tonnage of 2009 and a lumber cargo capacity of 1,480,000 board feet. She has two Scotch marine boilers and triple expansion reciprocating engines of 1250 indicated horsepower. This vessel requires eight days on an average for a round-trip voyage between San Francisco Bay and Marshfield, and consumes on the voyage 647 barrels of oil.

The C. A. Smith is a wooden steam schooner built at North Bend, Oregon, for the Coos bay Lumber Company and registered at Marshfield, Oregon. She is 257.2 feet in length, 50.5 feet beam, 15.4 feet molded depth, with a gross tonnage of 1871, and a lumber cargo capacity of 1,450,000 board feet. Her power plant consists of two Babcock & Wilcox water tube boilers and two 750-horsepower De Laval turbines connected to the propeller shafts through double reduction gearing. The C. A. Smith requires seven days for the round trip between San Francisco and Marshfield, Oregon, and consumes 450 barrels of oil. Figuring these records on a basis of cost of lumber delivery per 1000 feet board measure, we find that on the Nann Smith this cost is 40 per cent higher than is the cost on the C. A. Smith. This cost is figured on a basis of operating charges only and in using these figures it should be kept in mind that these are comparisons between a wooden vessel and a steel vessel. A comparison between a reciprocating and a turbine drive in two identical wooden vessels would probably give results much more favorable to the turbine installation.

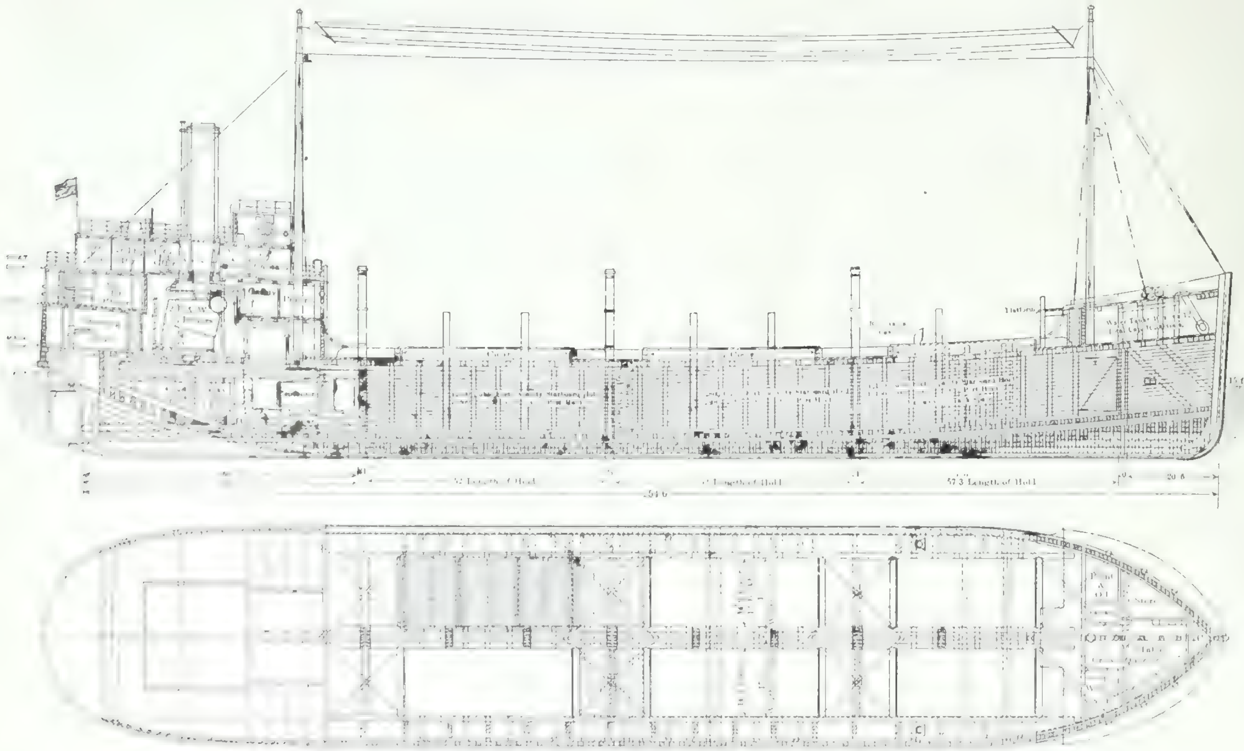
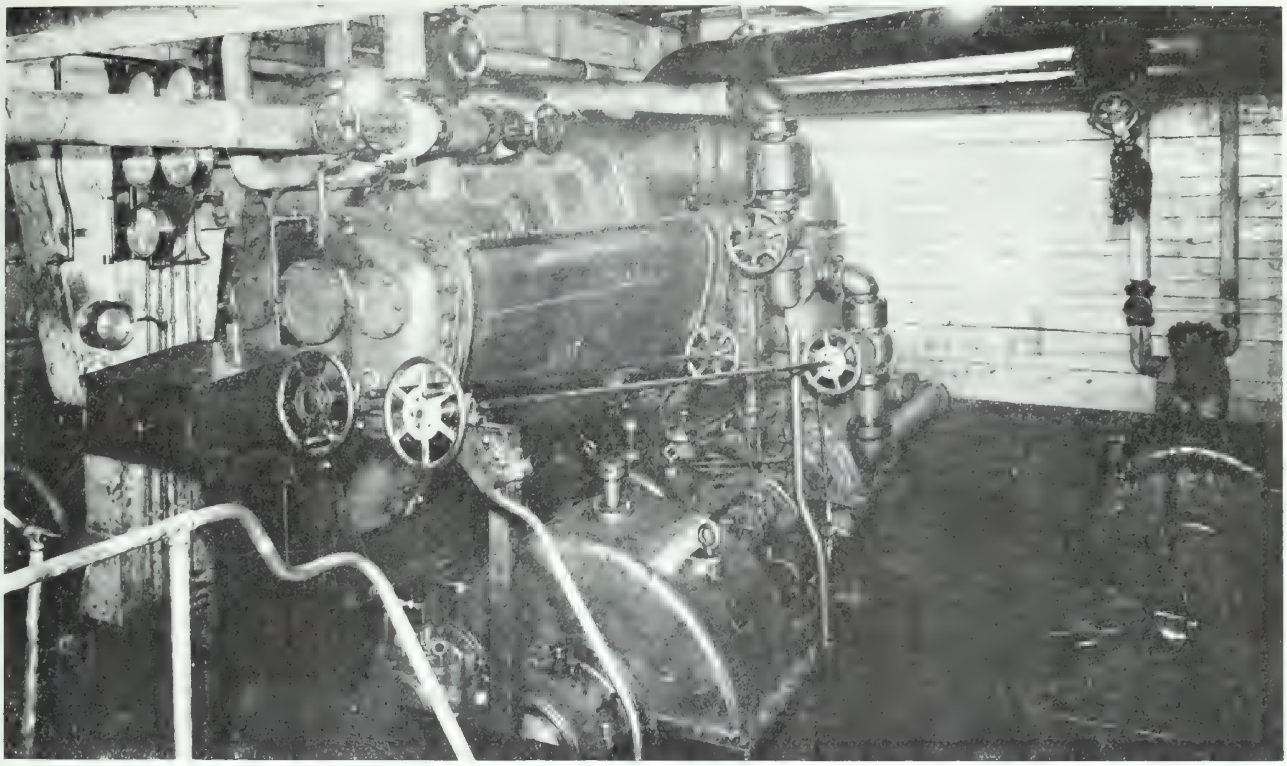


Fig. [illegible] Inboard Profile and Hold Plan of Wooden Cargo Steamer *Johanna Smith* Designed by Edward S. Hough, Consulting Engineer, San Francisco, Cal.



One of the De Laval Turbines with its condenser and double reduction gear, on the wooden cargo steamer C. A. Smith

In the C. A. Smith the turbines are built by the De Laval Steam Turbine Company and supplied by the Herzog Electric & Engineering Company. These turbines operate at 5000 revolutions a minute. The first set of gears reduces this speed to 750 revolutions a minute, and the second set of gears transmits the power to the propeller shaft at 130 revolutions a minute.

The Babcock & Wilcox boilers generate steam at a pressure of 225 pounds with 60 degrees superheat. The main steam line pressure is 205 pounds, the operating pressure on the turbine nozzle is 200 pounds, and the exhaust pressure 0.98 pounds. A condenser vacuum of 28 inches is maintained. The temperature of exhaust is 100 degrees Fahrenheit and that of the feed water 206 degrees. This plant drives the hull at a speed of 10 knots an hour on a fuel consumption of 4½ barrels an hour.

These comparative records certainly reflect great credit on De Laval turbines and on the Herzog Electric & Engineering Company, who furnished them for the ship. Incidentally they also show a notable economy effected by the use of water tube boilers, and the possibilities of economical operation in wooden hulls. So well pleased were the owners with the operation of the C. A. Smith that they installed a similar turbine plant on the Johanna Smith, which has been operating with great success.

Both the C. A. Smith and Johanna Smith were designed by Edward S. Hough, marine architect of San Francisco. Before selecting the power plant for these ships, Mr. Hough made an extensive trip throughout the East and visited various plants manufacturing reciprocating steam engines, internal combustion oil engines, as well as turbines. Consideration was given turbo-electric drive, as well as the Diesel electric drive. That Mr. Hough made a wise selection is shown by the very fine economical records of these ships.

Considerable discussion regarding the great number of wooden hulls which are offered for sale by the United States Shipping Board has brought out the fact that geared steam turbines with water tube boilers will make ideal power equipment for these ships. The bare hulls which have been launched and are ready for machinery offer fine advantages to ship operators who recognize the marked economy effected by steam turbine propulsion.

Due to the added cargo-carrying capacity which is possible because of the light weight of the power plant, small amount of space occupied, and minimum fuel consumption, together with its reliability and greatly-reduced maintenance costs, and time lost in expensive repairs, the modern steam turbine offers the practical solution of the question of propelling equipment for small wooden ships as well as steel vessels.

The C. A. Smith and Johanna Smith are fine examples of what may be done by equipping the Shipping Board hulls with this type of drive.

CONGESTION AT BRITISH PORTS

There was a complete stoppage of all work at British ports for four days from Christmas to the 29th. As the 26th and the 27th of December were declared public holidays by the British authorities, no ships entered or cleared. A congestion is reported by Cardiff and Swansea. At Liverpool there are twenty-six vessels awaiting berths, of which six are American. The congestion is due to the Christmas holidays. In London seven American vessels are awaiting docks, 246 vessels of all nationalities lying in stream awaiting docks, 215 in docks. Reports from Dundee are to the effect that shipbuilding is stopped owing to shortage of steel plates, for which orders are going to America.

HONOLULU

By Special Correspondent

HONOLULU has a brilliant maritime outlook for 1920. Based on reports that emanate from the Federal Government bureaus at Washington—such as the Shipping Board and the Army and Navy Departments—all of which have planned for developments which will have a direct and lasting value for this port, the prophecies for a record year in marine circles are neither ill-timed nor unjustified.

The Shipping Board continues to build speedy passenger and cargo carrying vessels and has sanctioned the allocation of a large number of these to the Pacific with Honolulu as a port of call, and already work has commenced on the erection of a great oil-supply station to provide fuel here for these steamers on their way to the Far East.

The War Department plans to station 30,000 troops on the island of Oahu and this means more frequent visits of transports bringing supplies. The transport service in the Pacific already has been increased with the placing of the big transports Great Northern, Madawaska, Mount Vernon, South Bend and Marica on the route to Vladivostok, Guam and Manila by way of Honolulu, besides the old standbys, Thomas, Sheridan, Dix, Sherman and Logan.

The Navy is operating its own vessels, the Pensacola and the Newport News. Secretary of the Navy Daniels has announced that the Pearl Harbor Naval Station near Honolulu will be visited frequently by the warships of the Pacific fleet and already there have been stationed here the cruiser Chicago, monitor Monterey, submarine tender Beaver and six modern submarines. The Naval Board has recommended the expenditure of $27,000,000 at the Pearl Harbor station in addition to large sums for contracts now under way.

The Hawaiian Territorial Government has plans under way for covering the triple piers, 8, 9 and 10, giving cargo space of approximately 360,000 square feet. The Harbor Board is building and will complete this year a new pier on the site of the old Channel wharf, and the dredging of the Kewalo Bay for a wharf will also be finished during 1920. The extensive area off Fort and Allen streets, formerly the Allen & Robinson property, has been acquired by the Territory and will be transformed into a continuation of Pier 10. The harbor will be widened considerably between Pier 9 and the old quarantine wharf on Sand Island by dredging the concrete posts and coral on the quarantine side. The eastern end of the harbor will be developed by elaborate plans adopted by the Inter-Island Steam Navigation Company.

The arrival of G. N. Ivory, representing the United States Shipping Board, in the latter part of November, resulted in a lease being made to the government by the Oahu Railway & Land Company for property in the eastern section of the harbor, and work on levelling the land for the erection of three 50,000-gallon capacity fuel oil tanks already has begun. These tanks will supply Shipping Board trans-Pacific vessels with fuel. As the result of the leasing of this property, the Inter-Island Company will shift much of its ship handling and coal bunkering work to the eastern end of the harbor, where the company has constructed a great floating drydock.

With the return of the Maui and Matsonia last month and the coming of the Wilhelmina during January, the Matson Navigation Company will have its entire fleet of passenger vessels back in the service and during the year will be supplied with more than a dozen freighters by the Shipping Board to handle the transportation to San Francisco of more than 600,000 tons of sugar in 1920. By 1921 this company will have completed two new freighters, with a cargo-carrying capacity of 15,000 tons each, and also will place on the Honolulu-San Francisco run a $2,000,000 passenger steamer capable of carrying 750 passengers.

The Pacific Mail has been promised at least ten big freight-carrying vessels to ply between San Francisco and the Orient by way of Honolulu, and already has begun the operation of a new schedule between the Pacific Coast and China, Japan and India.

The Oceanic Steamship Company announces that during 1920 a new passenger steamer will be put on the run to take the place of the Sierra, which was sold at New York after the return from war service in the Atlantic, and the Toyo Kisen Kaisha, Japanese line, has made public the fact that it has three big freighters building in Japanese shipyards.

The China Mail Steamship Company and the Canadian-Australasian Royal Mail line, operating between Sydney, Australia, and Vancouver, each will add another vessel to their fleets.

From December 18 to December 24, inclusive, Honolulu harbor experienced the busiest period in her history. During the six days thirteen vessels of heavy tonnage, the majority of them passenger liners, arrived and departed this port. They were: December 18, China Mail liner Nanking from San Francisco; December 19, Matson liner Maui from San Francisco; December 20, steamer Strindar from Panama and steamer Marshfield from San Francisco; December 21, T. K. K. intermediate liner Nippon Maru from Yokohama; December 22, Oceanic liner Ventura from San Francisco and T. K. K. liner Korea Maru and Pacific Mail liner Venezuela from Yokohama; December 23, United States army transport Sheridan from San Francisco, Oceanic liner Sonoma from Sydney and steamer Glyndon from Seattle; December 24, Pacific Mail liner Colombia from San Francisco and Canadian-Australasian Royal Mail liner Makura from Vancouver.

The American schooner Okanogan went aground on December 26 at the entrance to Ahukini harbor, Island of Kauai. The vessel is a total loss. Her cargo of nitrates from Iquiqui, Chile, was valued at $80,000 and the loss of the schooner is placed at $90,000. The Okanogan was bound for Port Allen, Kauai, but in a heavy storm she was blown ashore at Ahukini. She was built in Port Blakeley, Washington, in 1895 and owned by the Fife Company of San Francisco. The cargo was consigned to Alexander & Baldwin, Honolulu, for delivery on Kauai.

Necessity for more wharf space in the harbor was illustrated in the week following December 31, when the United States army transport Marica arrived from San Francisco and unloaded 4000 tons of army supplies on the triple piers 8, 9 and 10. These piers were built expressly for the Matson Navigation Company, but cannot be used by the company until they are covered. The cargo from the Marica completely filled the entire space on the three piers. The Matson vessels bring between 4000 and 10,000 tons of freight on each trip from San Francisco.

Japanese merchants of Hilo, on the Island of Hawaii, have petitioned the Toyo Kisen Kaisha to provide them with at least one vessel a month from Yokohama. Under the present schedule the company sends one of its South American steamers to Hilo about once every three months, but the merchants declare that the quantity of goods which they export from Japan is large enough to warrant increased service. Under the present system the bulk of this freight is landed in Honolulu and must be trans-shipped to Hilo.

On December 15 the shippers of Honolulu voluntarily granted an increase in wages to Hawaiian stevedores. The new schedule calls for fifty cents an hour for regular time and sixty-five cents for overtime.

Testimonial dinner given by the Division of Operations of the United States Shipping Board to Captain Frank E. Ferris

Popular Shipping Man Honored

CAPTAIN FRANK E. FERRIS, who recently severed his connection with the United States Shipping Board to assume the managership of the Export Steamship Corporation of New York, was tendered a testimonial banquet by his associates of the Shipping Board and friends in the shipping and ship building business.

This banquet was served at the Pennsylvania Hotel December 13, 1919, and a very enjoyable evening was spent. The following gentlemen were present:

George E. Eggers, assistant director of operations; Major J. E. Cushing, director of operations; Bruce Gibson, manager engine department; Ryland Drennan, manager deck department; R. L. Hague, manager C. & R. department; General Andrew Moses, U. S. A.; T. J. Miggins, assistant comptroller, U. S. S. B. New York; J. J. Nevin, ex-comptroller U. S. S B.; Captain Geo. S. White, chief of employment, supercargo department; J. Mendenhall, general auditor; General Wm. H. Black, consulting engineer; J. C. Stewart, deputy collector, port of New York; Darragh De Lancey, chairman Industrial Relations Committee; J. W. Mason, assistant chief inspector; E. H. Abadie, general comptroller U. S. S. B.; Captain C. L. Arnold, commandant, Third Naval District; M. J. Gillen, assistant to chairman U. S. S. B.; W. L. Bunker, chief inspector, Department C. & R.; W. H. Todd, of Todd shipyards; Frank Crane, of Frank Crane & Sons Company; James Shewan, of James Shewan & Sons; E. W. Morse, of Morse D. D. & Repair Company; Fred Fenwick, American Marine Paint; Henry Herberman, Pennsylvania Railroad, and George J. Remington; as well as representatives of all steamship companies in the New York district.

Some Shipping and Shipbuilding Notes

A LOOK INTO THE NEW YEAR BY THE NEW YORK SHIPBUILDING COMPANY

A SURVEY of the situation at the New Year is entirely in order. In 1919 we launched 87,580 gross tons of shipping and delivered 86,727 tons; the corresponding figures for 1918 were 72,032 gross tons launched and 77,283 delivered. These two years are by far the best since the yard was established, which is only as it should be in view of the extensions, the yearly average to the end of 1917 being 36,050 launched and 34,700 tons delivered.

Up to the end of 1919 we have launched 228 vessels of a total length of 13.4 miles, 772,518 gross tons and 1,272,500 horse power.

Our tonnage delivered during the war—years 1915 to 1918 inclusive, was 240,000 gross.

Lately we have been more accustomed to talk in terms of deadweight carried, i. e., the weight of cargo, fuel and stores which the vessels carry. This method is satisfactory only when discussing straight cargo vessels. The deadweight tons delivered in 1918 totaled 122,018 and in 1919 it was 65,050; it is to be noted that 1919 saw the delivery of ten destroyers, which rank very low on a deadweight basis. With our output tending more toward warships and passenger ships, the deadweight basis of comparison will be less of a true guide to the output of the plant.

Having referred to 1919, what of 1920?

The outlook is full of promise as regards the volume of business on hand, likewise as far as quality is concerned. The list includes one battle cruiser, two battleships, twenty destroyers, sixteen passenger and cargo steamers (nine of them 535 feet long, 18 knots speed and seven 502 feet long, 14 knots speed) and three oil tankers.

To keep up the well established reputation of the plant will require the combined energies of several thousand men; the problems of management are considerably more complicated than in the past and there are ample signs around the plant to indicate that these problems are receiving increased attention. Given the old healthy spirit of getting jobs done there is no question as to our standing in the shipbuilding world. We are being watched as never before and it will be well for us to keep up the record of the yard. In this way only can American shipbuilding, on a scale proportionate to our position as a world power, be retained.

Our somewhat ancient legislation pertaining to shipping is under scrutiny. With government control centralized in one department, instead of being spread over three or four, with the passage of pending legislation bearing on shipping questions and the clearing of the air which will follow the belated declaration of peace, we shall be in such a position to face the future as never before in the history of the plant.

NINETEEN - NINETEEN SHIPBUILDING RECORD AT MOORE'S YARD

THE Moore Shipbuilding Company of Oakland, California, holds the record for the number of vessels delivered to the United States Shipping Board from the Southern Pacific District during the year 1919. Within the twelve months the company delivered thirteen vessels with a total deadweight tonnage of 122,800 tons, the second place being held by the Bethlehem Shipbuilding Corporation with ten vessels to its credit, totaling 112,000 deadweight tons.

This showing of the Moore Shipbuilding Company was made in spite of two labor strikes during the year which paralyzed the shipbuilding industry of the Pacific Coast. That the company had outstripped its eight competitors was ascertained through an official communication received from the United States Shipping Board, carrying an itemized statement of the steel ship tonnage delivered by the various shipyards of the Southern Pacific district during the calendar year that has just closed. Following is the record for the nine shipyards in the district during 1919:

Moore Shipbuilding Company, 13 vessels, 122,800 deadweight tons; Bethlehem Shipbuilding Corporation, 10 vessels, 112,000 deadweight tons; Los Angeles Shipbuilding & Drydock Company, 10 vessels, 88,000 deadweight tons; Southwestern Shipbuilding Company, 10 vessels, 88,000 deadweight tons; Western Pipe & Steel Company (Schaw-Batcher Shipyard), 8 vessels, 70,400 deadweight tons; Long Beach Shipbuilding Company, 6 vessels, 44,400 deadweight tons; Pacific Coast Shipbuilding Company, 3 vessels, 28,200 deadweight tons; Union Construction Company, 2 vessels, 18,800 deadweight tons; Hanlon Drydock & Shipbuilding Company, 2 vessels, 10,700 deadweight tons.

RECORD OF SHIPS LAUNCHED AND DELIVERED FOR YEAR 1919, AMERICAN INTERNATIONAL SHIPBUILDING CORPORATION, HOG ISLAND

Boats launched, 1919	66
Boats delivered, 1919	64
Total tonnage—"A" launched, 485,150 deadweight tons; "B" launched, 32,000 deadweight tons	517,150
Total tonnage delivered, deadweight tons	500,800
Total working days	278-1/5
Total working hours	2,228
Deadweight tons launched per 8-hour day	1,850
Deadweight tons delivered per 8-hour day	1,798

One ship launched every 4¼ working days, or 34 working hours.

One ship delivered every 4⅓ working days, or 35 working hours.

HARLAND & WOLFF BUSY

THE British shipbuilding firm of Harland & Wolff, Ltd., during the five years of the war period, delivered a gross tonnage of 589,000 with 794,000 indicated horsepower.

In addition to this new tonnage, the firm has, during the war, overhauled, re-conditioned and repaired an enormous number of large ships and it is at the present time re-conditioning for commercial work, both in passenger and freight, many of the ships that were changed over for war service, most important among these being the White Star liner Olympic, 46,400 tons. Several thousand men are employed on this vessel alone and she is expected to be ready for trans-Atlantic passenger service early in the spring.

The following table shows the ships launched by Harland & Wolff, Ltd., at their various plants during the year 1919:

Ships Launched by Harland & Wolff, Ltd., During the Year 1919

NAME	DESCRIPTION	Port of Registry	Board of Trade Gross Tonnage	I.H.P.
BELFAST—				
Otira	Steel, twin screw	Southampton	7,995	7,000
Nasmyth	Steel, single screw	Liverpool	6,509	3,200
Newton	Steel, single screw	Liverpool	6,509	3,200
New Brunswick	Steel, single screw	Liverpool	6,529	3,200
Yorkshire	Steel, twin screw	Liverpool	10,500	5,250
New Georgia	Steel, single screw	Liverpool	6,566	3,200
New Mexico	Steel, single screw	Liverpool	6,566	3,200
New Texas	Steel, single screw	Liverpool	6,568	3,200
New Toronto	Steel, single screw	Liverpool	6,568	3,200
Arundel Castle	Steel, twin screw	London	19,600	15,000
Philadelphian	Steel, single screw	Liverpool	6,570	3,200
New Brighton	Steel, single screw	Liverpool	6,570	3,200
Maine	Steel, single screw	Belfast	6,570	3,200
New Brooklyn	Steel, single screw	London	6,570	3,200
Effingham	(Machinery only)		.....	70,000
			110,190	132,450
GLASGOW—				
Glenade	Steel, twin screw	Glasgow	6,802	3,200
Trelissick	Steel, single screw	St. Ives	5,265	3,100
Treveal	Steel, single screw	St. Ives	5,243	3,100
Glenariffe	Steel, twin screw	Glasgow	6,795	3,200
Glenluce	Steel, twin screw	Glasgow	6,800	3,200
Boma	Steel, single screw	Liverpool	5,265	3,100
Treverbyn	Steel, single screw	St. Ives	5,265	3,100
Glentara	Steel, twin screw	Glasgow	6,800	3,200
Somerset Coast	Steel, single screw	Liverpool	1,330	.....
Bata	(Engines)		.....	3,100
			49,565	28,300
GREENOCK—				
Bathurst	Steel, single screw	Liverpool	5,253	3,100
Biafra	Steel, single screw	London	5,327	3,100
Siris	Steel, single screw	London	5,242	3,100
Dromore Castle	Steel, single screw	London	5,242	3,100
Dundrum C'stle	Steel, single screw	London	5,242	3,100
			26,306	15,600
Grand Total			186,061	176,250

The principal item to be noted in this table is the Arundel Castle, the largest ship launched during the year. The majority of the vessels listed under the Glasgow works are motorships with Burmeister & Wain engine installations.

WESTINGHOUSE GEARED TURBINES TO BE USED IN NEW SHIPS

THE Westinghouse Electric & Manufacturing Company announces that the Merchant Shipbuilding Corporation has awarded to it the contracts for the propelling machinery for two new ships being built at the company's Chester, Pennsylvania, yards, for the Shawmut Steamship Company.

These ships, which are designed for general cargo service, will be of about 10,000 tons deadweight and are to have a speed of thirteen knots. Propelling equipment of each will consist of a 4200-shaft horsepower cross-compound Westinghouse turbine, of the latest type, which will drive the single propeller through double-reduction gears. An oil relay governor will be provided which will prevent the propeller from racing, even in heavy seas, but will at no time shut the turbines down. As there will be two separate turbines, high pressure and low pressure, and either can be operated independently in an emergency, the danger of crippling the ship by an accident to the machinery is very remote.

The gears are to be of the floating-frame type, which automatically keep in exact alignment in spite of errors or changes in adjustment that would be disastrous to rigid gears.

The main condensing equipment is of Westinghouse make, including the condensers, Leblanc air ejectors and condensate pumps. The system is designed to maintain a vacuum of greater than twenty-eight inches in 70 degree sea water.

The entire propelling system will be highly efficient and especially economical in fuel consumption.

There are now in commission, or being built, over two hundred and fifty ships equipped with Westinghouse geared turbines, and among them are several operated by the Shawmut Steamship Company.

JAPAN'S MERCHANT MARINE

Government reports on the Japanese merchant marine, up to the first of December, show a total of 752 ships of 1000 tons and upward, totaling 2,414,549 gross tons. Of these 397 were on coasting or near-sea service and 329 in ocean service, with twenty-one under repair and five aground. Of the ocean-going ships, the following division is noted:

Japan-Pacific Coast of North America service, 15 ships, 85,300 tons.

Japan-New York service, 7 ships, 33,683 tons.

Hongkong-Japan-Pacific Coast America service, 16 ships, 140,462 tons.

Japan-Australia service, 18 ships, 69,479 tons.

Japan-East Coast South America service, 13 ships, 74, 682 tons.

In the South Seas, 39 ships, 117,795 tons.

Japan-Europe service, 139 ships, 724,495 tons.

Japan-Straits Settlements service, 3 ships, 7127 tons.

Japan-India service, 26 ships, 100,107 tons.

India-Mediterranean service, 10 ships, 29,522 tons.

In the Mediterranean, 3 ships, 9164 tons.

Japan-West Coast South America, 3 ships, 24,862 tons.

Japan-South Seas-India service, 8 ships, 20,587 tons.

Japan-Calcutta-New York service, 12 ships, 67,125 tons.

Japan-Mediterranean service, 17 ships, 58,952 tons.

These figures show an increase of seven ships in the Australian trade, four to the East Coast of South America, seven on the Japan-India run, four to New York via Calcutta and three additional in European service. A decrease of six ships, of a total of 29,009 tons, in the Pacific Coast trade is shown, and a decrease of ten in the South Sea trade.

U. S. SHIPPING BOARD

Summary of Construction Work to Dec. 31, 1919

	Keels Laid		Launched		Delivered	
	No.	DWT	No.	DWT	No.	DWT
Steel	1637	11,014,461	1379	8,941,740	1200	7,717,394
Composite	18	63,000	18	63,000	18	63,000
Wood	594	1,904,200	571	1,851,700	519	1,767,050
Concrete	12	73,500	7	[illegible]	3	10,000
Total	[illegible]	13,055,161	1976	[illegible]	1740	9,557,444

DELIVERIES FOR 1919

Steel	741	4,838,673
Composite	1	[illegible]
Wood	403	1,338,650
Concrete	3	[illegible]
	[illegible]	[illegible]

Great Activity in an Eastern Yard

The twin-screw steamer Sol Navis, 12,800 ton D. W. capacity, built by the Sun Shipbuilding Company. This picture was taken just after the launching of the hull

THE yards and shops of the Sun Shipbuilding Company at Chester, Pennsylvania, have been as busy as any of the yards along the Delaware. During 1919, they finished four 12,800 deadweight ton transports, two 11,500-ton shelter deck freighters, five 10,600-ton tankers, in addition to a great bulk of general repair work, the reconditioning of passenger and freight steamers, and building several marine engines for steamers built elsewhere.

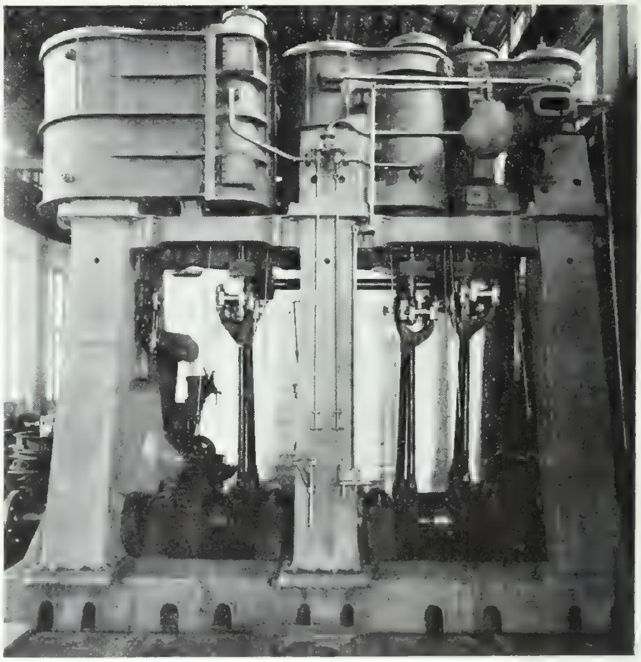
The pictures shown herewith indicate the class of work being turned out and give some idea of the equipment of this splendid modern shipyard.

In addition to the work already mentioned, a number of freighters and tankers have been laid down on the ways and are under various stages of construction. One tanker for the Gulf Refining Company was delivered January 10, 1920.

The new work under contract and construction includes two tankers for the Sun Company, one for the Gulf Refining Company, four for the Atlantic Gulf & West Indies Company, two for the Mexican Petroleum Company, two for the Standard Oil Company of New Jersey, two for the Union Oil Company, and one freighter for private account in Holland.

The Sun Shipbuilding Company build a very efficient triple expansion engine, standardizing on 3200 horse power size for their standard 10,600 tankers. This engine has cylinder diameters 27 inches x 45½ inches x 76 inches with 51-inch stroke. They also manufacture Scotch boilers, 15 feet 10 inches diameter, 11 feet 11¼ inches long. With one 3200 horse power engine working on an efficiently designed single propeller, three of these boilers will drive the 10,600 ton deadweight tankers of the Sun Shipbuilding Company 11 knots an hour, on a consumption of not more than 30 tons of oil a day.

The company has had a very successful experience with the installation of oil burners on the White system, and has converted many large steamers to this system with a saving of many thousands of dollars to the owners.



A Sun Shipbuilding Company standard 3200 horsepower triple expansion marine steam engine

The shelter deck cargo steamer Hanover, 11,500 ton D. W. capacity, built by the Sun Shipbuilding Company

The 10,600-ton d. w. tanker Sunbeam, built by the Sun Shipbuilding Company

The plant is located on the Delaware River at Chester, Pennsylvania, and the site consists of 80 acres with a water frontage of 2000 feet on deep water. The property lies high and is well drained. The yards are served by three railroad systems, the Philadelphia & Reading, the Pennsylvania Railroad and the Baltimore & Ohio, and are located in a section of the country that is well fitted to furnish an abundance of skilled labor. The entire plant is worked out on the principle of balanced production, the raw material being taken in at one end and moved continuously in one direction until it finds its place in the hull of a ship. The fabricating shops have overall dimensions of 540 by 600 feet, and have been built in the shape of the letter "H."

These fabricating shops are quite remarkable for the wide, open spaces around the large punching, plate planing and riveting machines. The spaces are arranged with special roller tables for handling large plates, and the tables travel on rails laid in the concrete floor. Ample provision is made with overhead traveling cranes for the expeditious handling of plates and heavy shapes, and it may confidently be asserted that in this department, which is the key department in all shipbuilding operations, the Sun Shipbuilding Company has as economical and efficient equipment as any shipyard in the United States.

There are five ship ways, built entirely of steel and concrete and fitted to accommodate hulls up to 600 feet in length. Each shipway is provided with two overhead cranes having a span of 125 feet and additional facilities are provided for handling material on the ground by a railway track running down each side of each shipway.

The wet dock at the shipyard is 600 by 200 feet in extent, thus providing outfitting berths for two large vessels, and the wharves are equipped with 100-ton, 100-foot span hammer-head cranes for expeditiously handling and installing machinery and boilers into the hulls of vessels.

When the Sun Shipbuilding Company was first established in 1916, it acquired the Wetherill Engine Works at Chester, completely equipped for the manufacture of large marine engines. The firm immediately erected a fine, new boiler shop, equipped with every mechanical facility for the rapid and economical manufacture of Scotch marine boilers, so that it is an independent, self - contained shipbuilding plant, prepared to equip vessels with everything necessary to the modern freighter. All machine tools are electrical driven, and a 3000-kilowat power house is maintained for providing the necessary power.

View of the docks at the Sun Shipbuilding Company, Chester, Pennsylvania, December 23, 1919, showing the steamship Bergensfjord, largest Norwegian liner afloat, which is being converted for the use of the White system oil burners.
Note also five other steamers under repair

Pacific Coast Port Notes

ONE important result brought about during the last month by the representation of the United Pacific Coast ports at Washington is the announcement by the Railroad Administration of a reduction in the freight tariff on steel from Pittsburgh to the Pacific Coast. This rate has been \$1.375 a hundred pounds for several years past and is now reduced to \$1.10 a hundred pounds. This reduction was brought about through the showing made by the Pacific Coast shipbuilders of the unfair discrimination in favor of Japan; the through rate from Pittsburgh to Yokohama being only \$1.20 a hundred pounds.

Difficulty is still experienced by travelers in securing passenger accommodations for trans-Pacific travel, and all first-class cabins are booked many months ahead. There is, therefore, a great deal of interest attached to the announcement repeatedly made by the operating division of the United States Shipping Board, that the converted troopships of the 535-foot class are to be allocated to Pacific Coast routes as soon as they are ready for service. Illustrations and descriptions of these splendid new liners will be found in the leading article in this issue of Pacific Marine Review.

Victoria

THROUGH the efforts of a special delegation to Ottawa, the Dominion government of Canada has passed an order - in - council lending money to a new company for the building of wooden barkentines in the Cholberg Shipyard. The loan will be up to 75 per cent of the value of the ships. The new concern, Victoria Shipowners, Ltd., will be operated along unique lines and will not only build vessels but will operate them also. The lumber is being supplied through the Bainbridge Lumber Company of Port Alberni, the head of which, Mr. Clarence Hoard, is vice-president of the new firm. Other equipment and material will be supplied by concerns which must take out a certain proportion of their receipts in stock. Not only have various supply houses been asked to contribute in this way, but every man employed in building the barkentines must also purchase shares. The amount is laid down specifically in a wage scale recently drawn up. The individual investments will run from four fifty - dollar shares by the highest paid men down to one share by the laborers. Payment can be made over a six-months' period if desired.

The order-in-council authorizing a loan to Victoria Shipowners, Ltd., sets out that 60 per cent of the men employed must be ex-service men and must be obtained through the government labor bureau. This will necessarily mean an open shop. Mr. Chris Cholberg, head of the shipyard in which the barkentines will be built, held an open-air meeting recently to lay before his former workmen details of the new plan. Those willing to serve the yard under the conditions laid down were asked to register and did so to the number of about 400.

J. W. Spencer, a prominent Victoria merchant, is president of Victoria Shipowners, Ltd.; Clarence Hoard is vice-president, as above mentioned, and Edwin Tomlin, secretary-treasurer.

Present plans call for the building of four wooden barkentines of 2400 tons. The Cholberg yard is a three-way plant and three vessels will be laid down practically simultaneously, the first launching being scheduled to take place in six months, and the succeeding two at one-month intervals. The fourth keel will be laid down when the first launching takes place. The barkentines will have the following dimensions: length, 250 feet over all; beam, 45.6 feet; moulded depth, 22.3 feet. The new boats will have a number of unique features. The use of forged steel knees in place of wooden ones will give greater strength, less weight, and make room for 75,000 feet more lumber. One million and a half feet is the designed capacity. For the prevention of dry-rot, the timbers will be bored and salt run in. It is asserted by Mr. Cholberg that this method is better than that which is usually employed.

The Dominion government took over the control of British Columbia pilotage on New Year's Day. The pilots were not shown the new conditions under which they were to work until only a day or two before the change, and they refused flatly to work under the by-laws drawn up. While an attempt was being made to effect a settlement, the pilots continued at work, but not under government control. Ships were forced by law to pay pilotage dues to the Custom House before they could enter or clear, so that any remuneration the pilots obtained was over and above that amount.

Mr. Dan Hutchison, general manager of the engineering firm of Hutchison Brothers & Company, Ltd., passed away in the hospital during January after a brief illness. A clever engineer and a good business man, Mr. Hutchison built up, through an aggressive policy, a large machine shop and foundry from a two-man plant, which started in business fifteen years ago on the Victoria waterfront.

The Victoria Board of Trade endorsed a request from the Pacific Steamship Company for an increase in its Canadian government subsidy. The line is now getting \$3000, and \$12,000 is being asked for.

Colonel A. U. R. Wilby was appointed agent of the marine department for the Victoria agency on Christmas Day. Captain George Robertson, his predecessor, is now the superintendent of pilotage for the whole of Canada. Colonel Wilby returned recently from overseas and took up again his old position as engineer for the Victoria agency of the marine department.

Prince Rupert is now a full agency of the marine department, being raised from a sub-agency on New Year's Day. The government lighthouse tender Newington will be stationed there in future and the staff considerably increased at the northern British Columbia port.

The prize schooner Leonor, seized by the Canadian patrol ship Rainbow in the summer of 1916, was ordered to be returned to her owners by the president of the Admiralty Court, London, following the conclusion of the case in January. The Leonor has been lying at Victoria since her capture. The Oregon, captured about the same time, was given back to her owners recently without a trial.

The announcement was made during December that the Canadian government will place a directional wireless station on the west coast of Vancouver Island which will probably work in conjunction with the stations that the United States plans to build along the coast.

The schooner Gunn, built at the Cholberg yard, Victoria, reached Greenock with a lumber cargo during December after a good run from British Columbia. The skipper reported that for a month or more his was the only sailer to enter the port that had not suffered some loss of canvas, or had trouble with the cargo. The Gunn proved to be an excellent sea boat, encountering gale after gale in the Atlantic.

Vancouver

With the first of the year the Canadian government established two important changes in marine regulations of great interest to Vancouver and affecting all ports on the west coast of British Columbia.

First of these was the change in the pilotage law by which the Dominion government, through the collector of customs, enforces a pilotage fee on all vessels not registered in Canada. The pilots of Vancouver, like those at Victoria, have absolutely refused to accept the conditions laid down by this new regulation, which was announced very abruptly and very arbitrarily by the government. The Vancouver pilots have formed the Independent Pilotage Association, including all former government pilots in its membership, and these pilots are being employed by the vessels coming into the harbor. The dispute between this association and the government is still hot and there is no immediate prospect of a settlement.

The other change in marine regulations is that affecting fisheries and is designed to shut out the threatened control by the Japanese. Under the provision of this new regulation no selling licenses will be issued to companies composed of Japanese stockholders. During the last year investments by Japanese in canneries and seine fishing have been very heavy and it is expected that the provisions of this new rule will force these Japanese speculators to sell out their holdings.

An interesting situation arose on the arrival of the Australian motorship Culburra from Sydney via San Francisco. The crew of this vessel signed on at Sydney and on arrival at San Francisco were offered their pay in Australian cash, but found that the American price for the pound sterling was only $3.76. They insisted that the pay be given to them on a basis of $4.80 for the pound, and libelled the ship to enforce this payment. The captain obtained release by giving bonds, hoping that when he arrived in Vancouver he could pay off his men satisfactorily, but in Vancouver a pound is only worth $4.13, and the men still demand $4.80.

Seventeen leading Canadian shipbuilding firms have petitioned the Dominion government to grant a bounty for steel shipbuilding, the amount suggested being a bonus of $10 per displacement ton and $10 per indicated horsepower on all steel ships completed after April 1, 1920. The delegation asserts that the organizations of existing plants could not be successfully held together without this assistance.

Details have recently been announced on the new service to be inaugurated by the Robert Dollar Company between the Orient and New York via Vancouver, Pacific Coast and Panama Canal. Five steamships will be engaged on this line, and it is stated that the terminal ports will be New York and Singapore.

The Canadian government has given a contract to the Coughlan Shipyards for the construction of two additional steel ships of the standard 8100-deadweight-ton design to be fitted with oil-burning engines.

Seattle

The Port Warden's report shows that for the month of November, 1919, a total of 4386 local and deep-sea vessels arrived and sailed from Seattle. These vessels represent a net tonnage of 1,653,231 and carried 207,877 passengers inbound and 206,834 passengers outbound.

During 1919, Seattle shipyards delivered sixty-three steel steamships of 598,000 deadweight tons and thirty-three wooden vessels of 118,750 deadweight tons, or a grand total of ninety-six ocean carriers aggregating 716,750 tons. This is a notable increase over the record of 1918. In addition to this huge shipbuilding program there has been a large amount of work done in re-conditioning and repairing ships; in fact, the Todd Dry Docks, Seattle, is now employing in excess of 1000 men. The 10,000-ton steel dry dock recently constructed for this firm is steadily occupied and signed up for some time in the future. "Big Bill," the huge wooden dry dock, is also busy and there are many smaller vessels waiting for the 4000-ton dock.

The Eastern Moon, one of the second series of Japanese-built United States Shipping Board ships, brought a 6000-ton cargo during the first week of 1920 and also the news that twelve more Japanese-built ships will arrive during the next three months.

The Japanese liner Fushimi Maru arrived in Seattle in the middle of January with one of the most valuable cargoes that Seattle has ever received. The cargo consisted of 5705 bales of raw silk valued at $11,510,000 and 1248 packages of case silk which brought the total value up to more than $15,000,000. This is not the heaviest shipment of silk, but, due to the rise in price, it is the most valuable.

On January 3, the tug Wanderer was purchased by the Merrill & Ring Lumber Company from the Skinner & Eddy Corporation. This boat has seen twenty-eight and one-half years' hard service and is still apparently as staunch and sound as on the day she went into commission. She will be used in log towing operations on Puget Sound and adjacent waters.

A contract just closed by the Alaska Engineering Commission with the Alaska Steamship Company and the Pacific Steamship Company gives to these companies the carriage of 25,000 tons of cargo to be consigned to the ports of Seward and Anchorage during 1920.

The Matson Line steamship West Segovia cleared from Seattle with a cargo of 11,000 measurement tons, consisting of lumber, box shooks, flour, feed and other commodities, 95 per cent of which were produced on Puget Sound. This cargo is all consigned to Hawaiian Islands, and is to be followed by several similar shipments.

Some interesting figures have been made public by W. A. Blackwood, special Deputy Collector of Customs, which are encouraging to those interested in the growth of the American merchant marine trade on the Pacific.

During the six years ending June 30, 1919, 1076 foreign trading merchant vessels cleared from the ports of Puget Sound. Of this total 100, or 9.3 per cent, were of American registry; 12.8 per cent were British; 72.3 per cent were Japanese, and one-half of one per cent of other nationalities. During the two months ending November 30, 1919, thirty-one vessels cleared in foreign trade from the Sound ports and of this number fifteen were American, fourteen Japanese, and two British. This makes the American percentage approximately 50 per cent and Japanese 45.

An interesting change in organization took place recently in the Hood Manufacturing Company, which is now known as the Hood Industrial Motors Company. This firm is manufacturing the Hood industrial tractor which is achieving such satisfactory records for economical haulage in lumber yards and shipyards all over the Pacific Coast.

According to figures made public by the Seattle Chamber of Commerce, more than ten American automobiles consigned to Asia passed through the port of Seattle for every calendar day, Japan being the largest buyer. Three thousand six hundred and sixty cars were exported through Seattle during the year 1919.

The Poulsen Lumber Company has purchased the two large wooden hulls at the Vashon Island plant of the Martinolich Shipbuilding Company, and will push forward the work of completing these vessels. This yard has been closed down since early in 1919.

A new scale of wages has been put in force for employes on port commission properties. Wharfingers are to get $160 to $170 a month, foremen $175, checkers $155, weighers $155 and warehousemen from $140 to $150 a month for an eight-hour day.

The Nippon Yusen Kaisha has been given an exclusive subsidy by the Japanese government for the maintenance of its Pacific Coast line and is contemplating a still further extension of that service.

Tacoma

PORT Engineer G. W. Osgood has submitted to Tacoma Port Commission the preliminary estimates for the cost of constructing the proposed open pier and transit shed units of the port improvement plans. These estimates include also the bridging of channels and equipment of the pier with cargo-handling machinery. The figures show a proposed expenditure of $1,345,187.50. The purchase cost of the site on the tide lands, viz., $775,000, will have to be added to the cost of construction, making a total of $2,120,187.50 to get this section of the port properly started. The growing importance of Tacoma as an export point makes the prompt execution of this work imperative.

Tacoma supplied a large proportion of the 11,000-ton cargo of the steamer West Segovia of the Matson fleet, which cleared January 6 for Hawaiian Island ports.

During the first week in January, 1920, the steamer Robin Hood, the last word in Puget Sound shipbuilding of the master shipbuilders, Skinner & Eddy Corporation of Seattle, loaded a little over 1,000,000 feet of lumber and a large consignment of box shooks at Tacoma. An interesting development has arisen over the officers' quarters in this vessel. The dining saloon for officers was arranged so that the captain, chief engineer and chief officer had a small separate dining room, all the other officers having a well-arranged ordinary dining saloon. The lesser officers of the engine room crew have now refused to sign on the ship unless permitted to dine with the captain and chief engineer. It is said that they are backed up in this stand by the Marine Engineers' Association. Skinner & Eddy, the owners of the vessel, have agreed to make certain changes and adjust the matter with the engineers.

The steamer Nisqually, one of the fastest passenger boats on the Sound, which has been in service in and out of Tacoma for the past eight years, has been purchased by San Francisco interests, and will be placed on one of the bay routes.

Portland

C. O. YOKUM, general manager of the Coast Division of Supply and Sales of the Emergency Fleet Corporation, and J. S. Hamilton, sales agent, have been holding conferences during the first week of the year in San Francisco. Mr. Yokum afterwards went to Philadelphia, where on January 12 a general program was outlined by the Shipping Board for sales of material and hulls during 1920. Marine interests from San Francisco and Seattle have had represenatives looking over the material and hulls stored in the Portland yards, and it is expected that much of this material will be disposed of early this spring. Among these representatives might be mentioned Captain S. E. Howard and Captain A. F. Pillsbury in behalf of San Francisco firms, and Mr. A. W. Carlson, representing a well-known Seattle firm.

Importations of vegetable oils from the Orient and molasses from Hawaii have been increasing to such an extent that the port commission has prepared plans for additional storage tanks at the St. Johns terminals. The terminals now have six tanks with a 15,000-barrel capacity, and it is proposed to add five or six more.

The Guy M. Standifer Corporation has secured contracts for the construction of three 12,000-ton deadweight tankers for the Standard Oil Company. Work on these vessels will be started at the Vancouver plant of the Standifer Corporation as soon as vessels now on the ways are launched.

Fred Ballin, president of the Supple-Ballin Shipbuilding Corporation, announces that the company has closed its books so far as future business is concerned and that the yards at the foot of East Oak street are being dismantled and much of the equipment has already been sold.

It was announced early in the month that five 9500-ton steel steamships had been assigned to the Portland-Oriental service of the Pacific Steamship Company and that a twenty-one-day sailing schedule would be maintained throughout the year 1920.

A large force of men has been put to work at Columbia City, Ore., on the unfinished Dalos, recently purchased from the United States Shipping Board, by M. T. Sommarstrom and sold by him to San Francisco parties who will convert it into a schooner. Captain Sommarstrom has laid the keel of two large trolling boats for use at the mouth of the Columbia river this summer.

Announcement was made at the close of 1919 that the wooden shipbuilding plant of the Columbia Engineering Works at Linnton had been sold to Joseph Supple, the veteran boat builder of Portland, and Dan Martin, formerly of the firm of Hesse & Martin. The plant will in future be devoted to the construction of barges, wooden schooners and sailing ships.

By a curious coincidence, on the last day of 1919, three Portland-built steamers, whose names begin with "M," were maneuvering off the mouth of the Columbia River at the same time on their loaded sea trial trips. These were the steamers Manhan, Montague and Mendora.

Astoria

THE report of the deputy collector of customs of Astoria shows lumber shipments for the year 1919 as follows: 257 cargoes containing 213,875,960 feet, three log rafts containing 18,000,000 feet, eighteen cargoes, 16,510,211 feet; Atlantic seaboard, forty cargoes, 28,880,365 feet; Atlantic seaboard for foreign delivery, 115,060 bundles shooks, 105,450 bundles lath, or a total of 318 cargoes containing 277,266,536 feet. The report also shows 286,996 barrels of flour were shipped for foreign delivery, valued at $2,869,960, and 626,022 bushels of wheat for foreign delivery, valued at $1,865,055. In addition to this, 11,125 sacks of flour were shipped to California points, and 34,535 cases of salmon were shipped to California points for re-shipment foreign. There were also 136,626 sacks of cement shipped in from California.

Reports from the Port of Astoria docks alone show that in 1919 there were 2697 carloads of freight handled and 636 vessels, which aggregated 201,000 tons of freight.

The coaling of steamers at the Port of Astoria docks has been very light since the coal strike has been in effect, but is again under way, the first shipment of 2000 tons having recently been received, and the Liberty Coal Company at Astoria is ready to furnish bunker coal again at reasonable rates, and with the least possible delay.

Records from the Port of Astoria books show that for the last half of the year 1919 there were seventy-seven steamships coaled from the bunkers on Pier No. 2. Notwithstanding the ending of the shipbuilding program in the vicinity, the annual report shows a slight increase in the tonnage handled over the preceding year.

Much of the machinery accumulated on Pier No. 2 of the Port of Astoria terminals for installation in Emergency Fleet hulls is now being removed to the concentration yards at Vancouver to be sold by the Emergency Fleet Corporation. Large quantities of lumber also are being handled from the stocks on hand at the time ship contracts were cancelled by the Emergency Fleet Corporation at the various yards in the community. This is being sold to Eastern buyers.

Construction on the new Pier No. 3 is progressing. The pier is entirely outlined by the bulkhead piling, and will soon be in readiness to receive the sand fill which will be deposited by the Port of Astoria's suction dredge, Natoma. It is still hoped by the engineers in charge that it will be completed by July next.

The new steam power producing plant of the Pacific Power & Light Company, which is being built on the waterfront in Youngs Bay, is now well under way. The port dredge Natoma has recently completed the filling of the site for this plant, and railroad connections are under construction into the yards from the port's belt line railroad.

The dredging program as outlined by the Port of Astoria commissioners for the present year includes the deepening of the Youngs Bay channel from the main ships' channel in the Columbia River to a depth of thirty feet low tide with a minimum width of 300 feet at the bottom of the cut. The dredge will again move to the Skipanon Creek at Warrenton within the next few days to complete the turning basin at Warrenton to enable lumber schooners to load cargo at the mill dock at Warrenton.

The coast guard cutter Algonquin, which is stationed at the mouth of the Columbia River, will leave within the next few weeks for Southeastern Alaska to render medical service and relief to the fishermen in that section.

Grays Harbor

A TOTAL of 81,865 tons of shipping was delivered in 1919 by Grays Harbor to the United States Shipping Board, thus giving this port first place in amount of wooden tonnage among all cities of Washington. This announcement is made known through the annual report of the Shipping Board. Of the Grays Harbor deliveries, the Grant Smith-Porter shipyard furnished 32,985 tons, and the Grays Harbor Motorship yard a total of 48,880 tons.

G. Frazier Matthews, of the Matthews Shipbuilding Company of Hoquiam, is the Washington representative on the Pacific Coast Committee named to confer with the newly organized section of the American Bureau of Shipping on classification and construction rules for wooden ships and for Pacific Coast built vessels.

A dissolution of the firm of Wilson Brothers & Company of Aberdeen and San Francisco has been effected, under which the Wilson family of Aberdeen become sole owners of the mill and other property of the company on Grays Harbor while the San Francisco Wilsons take over the steamship line and retail yards in California. The logging camps and timber interests of the company at Independence, Lewis county, Washington, will remain under joint ownership. Under the other property of the company on Grays Harbor, transfer the San Francisco Wilsons become owners of the steamers, the Idaho, Oregon and Svea.

First steps toward the improvement of the port of Grays Harbor were taken by the port commission at its annual meeting recently at Montesano, the county seat of Grays Harbor, when it was decided to employ a competent engineer and to have a survey of the harbor made. This survey will determine the improvements most needed or which should be undertaken first, and the probable cost.

J. A. Vance of Malone, elected to succeed A. C. McNeil of Montesano at the election in December, was installed in the position of port commissioner, and Frank H. Lamb of Hoquiam was installed to succeed himself. In the election of commission officials for the year, Mr. Lamb was named chairman to succeed W. J. Patterson of Aberdeen, the holdover member of the commission, and Mr. Vance was elected secretary. W. H. Abel of

Montesano was elected attorney for the commission, succeeding J. C. Hogan of Aberdeen, who has held the position for several years.

Grays Harbor lumber shipments in 1919 exceeded 800,000,000 feet, and in addition about 3000 carloads of shingles and several hundred carloads of box shooks, doors, piano sounding boards and other highly finished forest products were dispatched. The rail shipments are estimated as totaling 525,000,000 feet, carried in 21,000 cars; cargo exports totaled 289,838,000 feet, the year's records showing 364 vessels having cleared.

Coastwise shipments for 1919 were carried in 311 vessels and totaled 235,100,000 feet; foreign, 37 vessels, 36,524,000 feet; eastern, 10 vessels, 13,777,000 feet; and Hawaiian, 6 vessels, 4, 437,000 feet.

Willapa Harbor shipments for the year totaled 63,992,000 feet, carried in 81 vessels, 79 of which were coastwise with 62,095,000 feet, and two were foreign bound with 1,897,000 feet of lumber.

Due to war conditions, which practically killed off foreign shipments and made more acute the already existing scarcity of bottoms, cargo shipments of lumber from Grays Harbor during recent years have been much below normal. Shipments in 1919, however, were almost 30,000,000 feet larger than in 1918, and forty-four more vessels cleared this port last year than during the preceding twelve months. To take advantage of the reconstruction period and the unprecedented era of prosperity which is expected to ensue, the port commission has mapped out an elaborate program of harbor development, and a strong and determined fight will be waged to secure Grays Harbor's rightful share of West Coast export business.

H. M. Delanty, head of the Grays Harbor Stevedore Company at Aberdeen, has compiled the following interesting table of figures showing lumber shipments from this harbor during the last decade:

Year	Vessels	Tonnage	Lumber Cargo
1909	618	287,747	457,415,000
1910	593	291,513	443,124,000
1911	618	292,747	456,186,000
1912	638	313,622	486,313,000
1913	542	283,758	425,439,000
1914	504	294,073	437,729,000
1915	412	189,283	305,166,000
1916	399	180,850	300,043,000
1917	378	177,695	293,324,000
1918	320	149,752	262,716,000
1919	364	199,878	289,838,000
	5,386	2,660,918	4,157,293,000

San Francisco

CONGRESSMAN KAHN has recently introduced a bill into the House of Representatives in which San Francisco will be very much interested. This bill authorizes the Secretary of the Treasury to erect suitable buildings on the marine hospital site at San Francisco and to remove all the present structures if necessary. The bill authorizes the expenditure of $600,000, and will, if passed, provide San Francisco with adequate modern housing for the relief of stranded mariners.

The Marine Department of the Chamber of Commerce has compiled some very interesting figures on the tonnage movement at the port during December, 1919, and during the entire year. In December, 379 ships arrived, with a tonnage of 482,536 in the steamer class and 39,143 in sailing vessels. Departures for December totaled 381 vessels with a total tonnage of 544,099, of which total 43,545 were sailing vessels. During the year 1919 a total of 4617 vessels arrived with an aggregate tonnage of 5,259,150 tons of steamers and 788,275 tons sailing vessels. The total number of departures during 1919 was 4696 with 5,441,606 tons steamers, and 772,638 sailing vessels. These figures show a decided improvement over those for 1918, the figures then being over 2,000,000 gross tons.

The outstanding condition in shipping during the past month has been the receipt of greatly increased shipments of redwood and pine lumber, and the export of tremendous quantities of wet goods. During the first fifteen days over eight and one-half million feet of redwood arrived on steam schooners entering the port. From the middle of December to the sixteenth of January there was a stampede among the exporters of wine, brandy and other liquors to book space for export in order to get their stocks out of the country before the enforcement of prohibition. Many Shipping Board freighters have passed through Golden Gate with their entire capacity taken up with California wine. Among these, the West Aleta carried out no less than 15,500 barrels of wine, 11,400 of which were consigned to Cardiff, and 4100 to Rotterdam. The steamer Stanley Dollar took out 6500 barrels consigned to Japan, and the steamer Xenia 12,000 barrels of wine and brandy for Hamburg, Germany.

Figures compiled by the San Francisco Custom House would indicate that the export trade of San Francisco is having a substantial growth. For the fiscal year ending June 30, 1919, an average of 13,525 export declarations a month were filed at the Custom House. For the preceding year this average only reached 11,335 declarations a month. During November, 1919, there were 15,817 shippers' export declarations filed, covering merchandise amounting to $29,265,186.

Notwithstanding the unusually heavy fogs of the past month, the ferry service on San Francisco Bay has maintained its wonderful record of no casualties, and the management of the anchorage grounds in the harbor has been so perfect as to practically insure the vessels against collision or grounding. There have been several near mishaps and one or two vessels have grounded inside the harbor, but in such positions and under such cirstances that they were easily refloated without damage.

All passenger steamers have been running to full capacity, especially to the Orient and to Honolulu, Australia and New Zealand, and the officials of the steamship companies state that practically all accommodations are booked for some months. The record for nearly every ship coming into San Francisco these days shows the cabins full of passengers and holds full of valuable cargo.

"Old timers" on the water front are rejoicing over the decision of the United States Shipping Board to retain the German sailing ships as training vessels for apprentices for American Merchant

Marine service. Certainly these big "wind jammers" will be very useful in this training, and while the ordinary able-bodied seaman on a steam or motor freighter is seldom called upon to go aloft or to perform the duties of the old-time deep sea sailor, still there is no better training to produce real men of the sea than the training on a sailing ship. This has always been recognized in the British Merchant Marine service and will probably always be adhered to by ship operators in general.

The San Francisco Chamber of Commerce achieved quite a triumph for the harbor district when it induced the census bureau of the United States government to enlarge the industrial metropolitan area of San Francisco to include practically the entire shore of San Francisco Bay, thus including in its industrial census 4000 manufacturing plants employing over 65,000 men and with an annual product worth in excess of $350,000,000. This increase was granted on the showing made by the Chamber of Commerce that the great majority of industrial establishments in this territory were financed by, and maintained their head offices in the city of San Francisco.

Announcement is made that a $50,000,000 combination is being arranged between the Green Star Line, Cosmopolitan Line, and Struthers & Dixon. The Green Star Line operates its own and Shipping Board vessels to the east coast of South America, and occasionally sends a vessel to Pacific Coast ports and Australia. The Cosmopolitan Line operates many vessels between New York and Havre, Bordeaux, St. Nazaire, Dunkirk and Rotterdam. Struthers & Dixon have been operating many Shipping Board freighters between Pacific ports and the Orient, and also a number of steamers on tramp service from both Atlantic and Pacific Coast ports.

The shipbuilders' strike is still on, so far as labor unions are concerned, in the district around San Francisco Bay, although all the shipyards are operating on an open shop basis with reduced forces. As an illustration of the effect this strike is having on the industry, and the result that may come if labor persists in its attitude, the Schaw-Batcher Company of South San Francisco, on the 18th of January, sent the West Calera, an 8800-ton hull built by them for the Shipping Board, to the Southwestern Shipbuilding Company at San Pedro to be finished. The West Calera was towed by the new Peterson tug Tatoosh.

Practically every ton of sugar produced in the Hawaiian Islands during the season of 1920 will be brought to the mainland on vessels of the Matson Navigation Company, the American-Hawaiian Steamship Company having cancelled their service to the islands. In the carriage of the immense tonnage of sugar that is expected the Matson Navigation Company will use the big freighters allocated to them by the Shipping Board and the 14-000 - ton freighters now building at the Moore Shipbuilding Company's yard, Oakland.

Small fishing craft by the score, which have long occupied Fisherman's Cove, are interested in a suggestion that has been made, that the basin between Meiggs Wharf and the Shell Oil pier be closed with a breakwater, having a narrow entrance and so forming a snug harbor for the small fishing boats, which are always in more or less danger of breaking from their moorings whenever a stiff "norther" blows. This would certainly be an improvement to that part of the waterfront and should be carried out as promptly as possible.

Shipbuilding yards around San Francisco Bay have delivered to the Shipping Board during 1919 vessels as follows:

	Ships	d.w. Tons
Moore Shipbuilding Company	13	122,800
Bethlehem Shipbuilding Corp.	10	112,000
Schaw-Batcher Ship Works	8	70,400
Pacific Coast Shipbuilding Co.	3	28,200
Union Construction Company	2	18,800
Hanlon Shipbuilding & D. D. Co.	2	10,700
Total	38	362,900

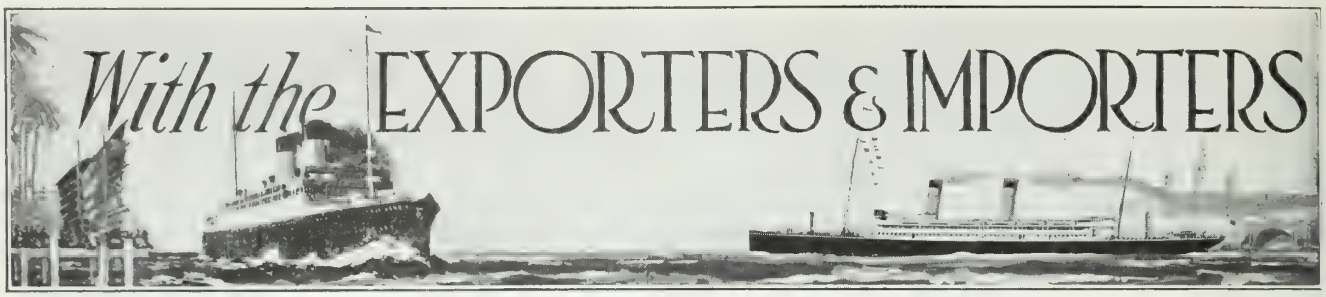
Los Angeles

GREAT gloom was cast over Los Angeles shipbuilding circles the morning of January 17 by the announcement that Mr. David Hollywood, the very popular and efficient manager of the Southwestern Shipbuilding Company, had been accidentally killed the previous evening. Mr. Hollywood was driving alone in his Cadillac car and collided with a San Pedro electric street car. Death was instantaneous. Mr. Hollywood made a very remarkable record as the executive of the Southwestern plant, and by his genial personality had endeared himself to many friends. His wise leadership and friendly spirit will be very much missed among his associates.

There has been much discussion during the last month and much criticism anent the apparent failure of the Board of Harbor Commissioners to get for the port of Los Angeles direct service in foreign trade. It may be said that this condition in Los Angeles is not so much due to any failure on the part of the Harbor Commissioners or their traffic manager as it is due to the very unsettled conditions existing in the overseas charter market and in foreign trading relations generally. It is certainly very idle and non-constructive criticism that would use as a basis for its argument a comparison between conditions as they are now and conditions as they were ten years ago. The great growth of the city of Los Angeles and of its industrial and manufacturing interests will soon induce a very much greater use of its harbor facilities than is maintained at the present time.

We note that the appropriation by Congress for rivers and harbors, although very heavily "pruned," still retains a substantial amount for the work at the harbors of Los Angeles and Long Beach. We also note that Long Beach has achieved an enviable building record for 1919, being in that regard among the first thirty-five cities of the United States.

It has been stated that the newly subsidized line of the Osaka Shosen Kaisha from Japan and other Oriental points to Atlantic ports will coal at Los Angeles on the return trip from the Atlantic to the Orient.



With the EXPORTERS & IMPORTERS

FREIGHT REPORT

January 21, 1920.

OUR last circular was dated December 19th. The steamer Bellata, of which we then spoke as being cancelled for barley, eventually has been chartered to load a full cargo of wine, in barrels, from San Francisco to Hamburg, on the basis of about $47.50 a ton weight.

One of the Green Star Line steamers, the Clausius, has been chartered by New York parties to load a full cargo of California beans from this port to Hamburg, and possibly one port on the Baltic. The charter rate has not been divulged, but we presume it is somewhere about $45 a ton.

We note the first concrete ship built on this coast, the Faith, has lately been chartered from the Gulf of Mexico to Buenos Ayres at $45 for lumber. We merely mention this because of the interest we all still feel in that vessel.

Lumber freights have been active and are quite firm. The last charter to Africa was the new barkentine George U. Hind, belonging to the Rolph Navigation & Coal Company, which was towed up last Sunday from here to the Inman Poulsen mill at Portland. She succeeded in getting the highest rate paid for Africa for several months, namely, $57.50 prepaid to Durban or Delagoa Bay, chartered by Balfour, Guthrie & Company; $55 is now bid for other vessels in the same direction.

For the west coast the steamer Windber was reported chartered at $32.50 for a direct port in Peru by Grace & Company. We quote the market firm now at $35.

The Golden Shore has been chartered by J. W. Vance at $37.50 to Sydney from Grays Harbor. She is expected to be June/July loading.

No charters have been made for lumber to the United Kingdom lately, although large parcels have been handled by liners at $60 a thousand.

Quite a business has been done in charters outside of lumber. The Carrier Dove was reported fixed at $18 for copra to San Francisco. The Golden Shore at $17 for the same business, both by Burns-Philp & Company.

The Wm. G. Irwin, soon due at this port, has been chartered for one round trip to Apia and return here by Atkins, Kroll & Company, on private terms.

The motorboat La Merced was chartered at $18 for coal from Newcastle to a port in Peru, south of Callao, and the Forest Pride and Forest Dream were chartered for coal to Honolulu at $10 a ton, all by the Bank Line Transport & Trading Company.

The Motorboat Catherine D has been chartered by Grace & Company to load sugar from Peru to Vancouver at $15 a ton.

The C. D. Bryant was fixed for petroleum products at 70 cents a case from San Francisco to Suva, by the Standard Oil Company, and was yesterday chartered back with copra from Noumea to San Francisco at $20 a ton by Geo. A. Moore & Company.

The James Rolph, which came out from England in ballast to Cristobal, will be chartered to load logwood from Punta Arenas, Central America, to the United Kingdom.

The steamer Robin Gray was reported chartered to the Pacific Steamship Company for cargo from this coast to the Orient and thence to the United Kingdom or continent on private terms.

Walter Scammell has chartered his steam schooner La Primera at $15 for nitrate to San Pedro and San Francisco, also his motorboat La Merced at $15 nitrate to San Francisco, and $17.50 nitrate to the North, both chartered by Balfour, Guthrie & Company.

The inquiry which has been in this market for quite a while for a steamer to load nitrate to Japan, culminated in the charter of a Japanese steamer of about 5500 deadweight, at the high rate of $40 a ton from a nitrate port to Kobe and/or Yokohama.

Sales have been quite active. The Robert Dollar Company has bought the motorboat Admiral Mayo on private terms from the Pacific Steamship Company. Balfour, Guthrie & Company bought the Monterey, formerly an oil barge, now to be fitted up as a first-class barkentine, at $175,000. The Geneva was bought by the Whitney-Bodden Brokerage Company, Inc., at $25,000, delivered at Talara Bay. The steamer Rajah is still lying in the harbor due to a mixup, as the common talk on the street is, that she was sold to Sudden & Christenson for $300,000 by the Shipping Board, and was later reported sold to a Mr. Frankel of New York for $325,000. The matter is not yet decided as to who will be the actual purchaser.

The Western Fuel Company has sold the tug Tatoosh to the Petersen Launch & Tugboat Company at $100,000. The Hanlon Drydock & Shipbuilding Company has bought the steamer Homer at $25,000, and A. F. Mahoney has bought the steam schooner G. C. Lindauer at $67,500 to replace the Girlie Mahoney lost on this coast last month.

As we close we can say that the demand for tonnage is greater than the supply.

PAGE BROTHERS, Brokers.

DIRECT IMPORTS INTO THE PORT OF MANCHESTER

ACCORDING to statistics recently issued by the British government, the trade of Manchester (including Ellesmere Port, Partington, Runcorn, and Warrington) is reflected in the values of the direct imports which were more than doubled during the period of the war. During the year 1918 the total imports represented $380,527,597, compared with $280,951,162 in 1917, $233,435,469 in 1916, $192,986,371 in 1915, and $164,204,148 in 1914. Probably this large increase is mainly due to advanced prices, for an analysis of the figures shows that in very many cases the quantities of the imports have diminished, while values have generally increased. As an instance, the imports of raw cotton are quoted. The quantity imported in 1914 was 2,922,880 centals, valued at $47,766,682. In the year 1918 the totals were 2,522,592 centals and $121,907,494; so that although the quantity was less by 40,288 centals, the value was greater by $74,140,812.

Imports of bacon show a very large increase. In 1918 the value of the bacon imported was $23,712,298, nearly three times the 1917 total.

Only thirty tons of soap came into Manchester from abroad in 1918, as against 4415 tons in 1914, which was, in part, a normal year.

Timber imports fell off during the war, the hewn from 107,634 loads to 3259 loads, and other descriptions from 331,607 to 32,692 loads. Imports of wool, on the other hand, increased from 879,733 pounds in 1914 to 11,500,654 pounds in 1918, which was, however, less than half the 1917 total.

Tea imports rose to 53,072,378 pounds in 1918. In 1916 the quantity reaching the port was only 511 pounds. In 1917 the quantity was 13,876,069 pounds, which compared with 811,111 pounds in 1914. Tobacco (unmanufactured) also shows an abnormal increase, from 695,562 pounds in 1917 to 11,769,409 pounds in 1918.

FRANK M. COBBLEDICK COMPANY

MR. FRANK M. COBBLEDICK, former sales manager of the Union Gas Engine Company, is rapidly enlarging the sphere of his influence as representative of various Eastern manufacturers. The offices at 693 Mission street have been recently enlarged, and Mr. Edward D. Maltby, formerly of the United States Navy, has been added to the staff.

Among the more important accounts handled by the Frank M. Cobbledick Company are the high-grade thrust bearings manufactured by the Bantam Ball Bearing Company; the Shatz "Universal" annular ball bearings, manufactured by the Federal Ball Bearing Company; tube cleaners, glass cutters and other engineering supplies manufactured by the Worcester Brush & Scraper Company; and Diamond point tools.

The Cobbledick Company has also established connections for the handling of motorboat lighting and ignition systems and for the Wizard magneto.

Mr. W. S. Rogers, president of the Bantam Ball Bearing Company, was a recent visitor to the Pacific Coast and expressed himself as being very well pleased with the representation given to his company and the increasing popularity of their product.

THE ALLAN CUNNINGHAM COMPANY, INCORPORATED

THE Pacific Machine Shop & Manufacturing Company of Seattle, manufacturers and installers of auxiliary machinery in steam vessels, has recently been reorganized under the name of the Allan Cunningham Company, Inc.

Mr. Cunningham has been for a number of years the president and general manager of the Pacific Machine Shop & Manufacturing Company, and the new organization will continue the policy of attention to detail and prompt delivery that has established for its products so enviable a reputation on Pacific Coast ships.

Mr. Allan Cunningham

Mr. Cunningham was born in Glasgow, Scotland, in 1882. He received his education in private schools in Glasgow, in the Technical College of Glasgow, and the University of Washington. He served an apprenticeship in a Glasgow engineering works; came to Canada in 1903 and then to Seattle, Washington, in the fall of the same year.

Mr. Cunningham is the designer and patentee of Cunningham's steam steering gear, screw steerer, electric deck winch, and electric anchor windlass. All of these mechanisms have been favorably received by the Pacific Coast shipowners, particularly the Cunningham electric deck winch, and it is safe to prophesy a very successful future for this manufacturing company under its new organization.

DE LAVAL EQUIPMENT

BRUNSWICK refrigerating equipment has been selected by the Moore Shipbuilding Company for installation in three new oil tankers for the Standard Oil Company; also for the Vacuum Oil Company's new tanker and the two new passenger and freight boats under construction for the Matson Navigation Company.

The installation will be handled by the De Laval Dairy Supply Company, 61 Beale street, San Francisco, who have represented the Brunswick people on this coast for a number of years.

Centrifugal oil purifiers built by the De Laval Separator Company of New York are installed as standard equipment on all the destroyers built by the Bethlehem Shipbuilding Company.

The new battleship California, built at Mare Island, as well as turbine-driven ships now under construction for the Shipping Board by Pacific Coast builders, are equipped with these machines.

Trade Notes and Personal Mention

AN ADVERTISING ENGINEER

MR. RAYMOND E. LOVEKIN, until recently managing director of the American Screw Propeller Company of Philadelphia, and formerly engaged in many manufacturing and engineering enterprises, opened offices in Philadelphia about one year ago as an advertising engineer.

In many of his former industrial connections Mr. Lovekin had paid particular attention to the publicity and advertising campaigns connected therewith and had come to recognize the need of a service which would combine in itself technical and engineering experience and advertising connections and technique.

Mr. Lovekin has now developed a highly successful organization, the efforts of which are devoted solely to the purpose of giving accurate technical advertising service, specializing on the marine mechanical products with which his former experience has made him so familiar.

Mr. Lovekin is a member of the following organizations and clubs: Society of Naval Architects and Marine Engineers, the Engineers Club of Philadelphia, the Poor Richard Club of Philadelphia, the Arkwright Club of New York City, and his organization is probably as well equipped and connected to render engineering advertising service as any in this country.

The Union Shipbuilding Company, Baltimore, Maryland, will shortly commence construction of a railway drydock capable of drydocking vessels up to 4000 tons' displacement. This dock will be constructed of timber, will measure 360 feet over the keel blocks, and will have a draft of 20 feet over the blocks. The Crandall Engineering Company, drydock engineers, East Boston, Massachusetts, are the designers of the dock and will superintend the construction.

Western Marine Railways, Ltd., have contracted for the building of two railway drydocks of timber construction at Burin, Newfoundland. The larger of these drydocks will measure 170 feet over the keel blocks and will be capable of handling vessels up to 1000 tons' displacement; the smaller will be capable of handling two vessels up to a displacement of 300 tons each. The Crandall Engineering Company, drydock engineers, East Boston, Massachusetts, will design and construct these docks. Construction of these drydocks will commence in the spring.

There is under construction at the present time at the Newton Machine Tool Works a new building covering a ground space of 400 feet by 230 feet, or 92,000 square feet, which includes an erection shop, a pattern and storage shop, forge shop and power plant.

The erection shop is to have one square foot of overhead light for every square foot of floor space, and is to be used for erecting machinery on a quantity production basis. It is to be fitted with two 50-foot span overhead traveling cranes.

The American Engineering Company announces the appointment of Mr. Fayette A. Cook as district representative, marine products, in the Great Lakes district.

This company's marine products include steering gears, telemotors, windlasses, capstans, gypsies, winches, towing machines, and marine chandlery. Mr. Cook is qualified to discuss the application of any marine auxiliaries as well as to handle all requirements for repair parts. He will be located in Cleveland, with offices at 1111 Citizens' Building.

The St. Louis sales office of the Standard Underground Cable Company, Mr. E. J. Peetzcker, manager, will, on February 1, be removed from the Security Building, where it has been located since 1897, to the Arcade Building.

Frank O. Wells, president of the Greenfield Tap & Die Corporation, and one of the prominent figures in the screw-thread industry in the United States, has sold his entire holdings to Frederick H. Payne, vice-president. Mr. Wells retires as president and member of the board of directors, and Mr. Payne has been elected president in his place. F. G. Echols, vice-president and general manager, has been elected a director of the corporation to fill the vacancy caused by the resignation of Mr. Wells, but Mr. Wells will remain with the corporation in an advisory capacity.

Rag. Tullio Cavagnaro, Casella Postale N. 438, Rome, Italy, wishes to announce that he is acting as representative in Rome for American firms.

Mr. Cavagnaro could undertake a few new commercial connections, and gives as reference the National City Bank of New York, Genoa; National Association of Manufacturers of the United States, New York City; R. G. Dun & Company, Milan; Rag. Vincent Giuliani, care Banco Di Napoli, Broadway, New York City.

The Kerr Steamship Company of New York has gotten out a very compact and complete atlas of the world, which should prove of great usefulness to exporters and importers, particularly to those who are doing business with the continental European countries engaged in the recent world war, as both the new and old boundaries of all such countries are shown.

A large supply of copies of this atlas has been received at the local office of the Kerr Steamship Company in the Merchants Exchange Building, San Francisco, and any one interested can obtain a copy on application.

Marine Insurance

Recent Developments

By Charles F. Howell

AMERICAN holders of marine insurance policies written in London when sterling exchange was normal or only slightly depreciated, it is pointed out by the Marine Office of America, would stand to lose much money in event of a present loss payable in pounds instead of in dollars. This office recommends that every American shipper with an outstanding marine policy payable in pounds should secure additional insurance payable in dollars, sufficient to protect the difference between the sum insured at the time the policy was issued and the lower amount represented in dollars by pounds sterling in their present depreciated value. Under normal exchange conditions (one pound sterling equaling $4.86) a cargo valued at $100,000 would have been covered in London for £20,500. A total loss today under such a policy would bring the American assured only about $75,000, as the pound today is valued at less than $3.70. In this case the American shipper would have $25,000 additional protection to place in order to be sure that he would be made whole in the event of a total loss. The same argument would apply, only in smaller degree, in the event of a partial loss. The only reason normally for an American shipper to place his marine insurance in London is to secure the benefit of a lower rate than can be secured in New York or elsewhere in the United States. However, any possible saving thus made in the premium would be equalized by the cost of the additional insurance necessary to give the assured in dollars what his value actually is. Where his value in dollars is not thus protected with additional insurance, the American shipper will today pay scores of dollars in loss not protected by insurance under current depreciation exchange for every dollar "saved" in premium through securing a slightly lower rate abroad. Since financial men are of the opinion that sterling exchange will not go back to normal possibly for years to come, it is the belief of prominent American underwriters that American exporters and importers will save themselves time and money by placing their marine policies at home and by demanding that their marine insurance be made payable in dollars.

Insurance Certificate Necessary

Exporters should be very careful to include an insurance policy among their documents when their purchasers are British. A case of more than usual interest has just been passed upon by the British High Court, in which a finding was had for buyers who refused to accept goods that had been purchased "C. I. F.," because there was no insurance policy among the documents. Much of the import business in England is done on "C. I. F." terms—that is, "cost, insurance, freight." When a purchaser accepts the usual draft he is handed the bill of lading and other documents, and so is in position to take delivery when the vessel arrives. In the British High Court case, a cargo had been sold "C. I. F., cash against documents," but when the documents were tendered, upon the arrival of the goods, the purchasers refused to provide the cash because no insurance policy was among the former. While correspondence on the matter was in progress, the market price of the commodities declined and the sellers brought suit to recover for damages sustained by reason of the declination to take the goods. The plaintiffs argued that it was customary for buyers to accept a broker's certificate or note in lieu of the actual insurance policy, but the court held that when goods were bought "C. I. F." the purchaser was not bound to accept a certificate or anything else that represented that the goods had been insured, but could call for the actual policy. It is known that frequently "C. I. F." contracts are completed without the presentation of a specific insurance policy, but with this decision on record it would be unwise for American exporters to take any chances with their British customers.

Southern Marine Conditions

What amounts to a practical paralysis of shipping conditions along the American south Atlantic seaboard has resulted from the strike of the coal miners, with the consequence that marine underwriters have, for the last few weeks, been doing little more than marking time. At Newport News and Hampton Roads between two hundred and three hundred vessels have been laid up from inability to secure the proper amount of bunkers. Shipping interests have been worse than cold to time charters. Some of the larger concerns have taken to handling government controlled boats on a commission basis. Demurrage has been running so high that any profits from time charters are readily absorbed and the charterers stand to lose large sums. The result of all this extraordinary congestion means a heavy accumulation of merchandise on docks, wharves and railroads at all important ports, and marine underwriters are viewing the situation with the greatest interest. Of course, this merchandise, being in transit, would become at the risk of the marine insurance companies, and therefore fire reinsurance is being sought for it. Cotton and lumber constitute the greater part of the congested commodities. The bunkerage problem is made more acute at such points as Norfolk, for example, because of the absence of improved automatic machinery and the consequent slowness in getting the coal aboard. New York, with its

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thoroughly up-to-date equipment, bunkers much more quickly than do the ports further south, and has, to this extent, suffered less than they. At Norfolk work is progressing rapidly on the big filling-in contract, and the harbor and channel are being considerably improved in consequence.

Exception is taken by marine underwriters to the inferences that are being drawn by a part of the public from the recently published annual report of the solicitor of the Navy Department. In the latter document it was stated that marine insurance of this country proved greatly inadequate to meet the demands of the shipbuilders while vessels were under construction during the war. The solicitor says that it was impossible to get full cover against the special hazards incident to the building of the ships. To this the underwriters reply that as the risks on some of the vessels ran at times as high as $20,000,000 the insurance facilities of the whole world would have been inadequate, and the worst possible judgment would have been displayed by them had they undertaken to cover the tremendous hazards that surrounded the construction operations. Among those special hazards were the chances of enemy agents destroying both ships and yards, as also the likelihood of total destruction by fire in premises so hastily built and insufficiently safeguarded. At the present time, with the war hazards eliminated, no difficulty is found by naval constructors in securing all the insurance protection needed, right here in this country. Few merchant vessels require as much as $10,000,000 coverage. Under normal conditions the American marine underwriting market is equal to any and all demands.

War Risk Binder Sustained

That a provisional binder may be sustained in every respect, even though there is no issuance of policy and though the insurer seeks to cancel, was established by the finding of a jury in the United States Court a few days ago. This interesting conclusion developed in a suit brought by Frank B. Hall & Company, on behalf of Balfour, Guthrie & Company, to recover $5000 from the Insurance Company of the State of Pennsylvania, on account of a war risk policy on the bark British Yeoman, which was sunk by the German raider Seeadler in February, 1916. On behalf of the Insurance Company of the State of Pennsylvania, the office of J. S. Frelinghuysen, at New York, went on the Frank B. Hall binder for $5000, as agents, and later endeavored to cancel off on the ground of misrepresentations as to the nationality of the vessel and the time of her proposed sailing. The Hall office refused to accept the cancellation. The jury found for the plaintiff for the full amount, with interest from the date of the loss, less the premium of 1½ per cent.

Minor Causes of Loss

Evidences are accumulating indicative of a determination on the part of marine underwriters to rid themselves of the obnoxious coverages that are being forced upon them by the insistent demands of shippers, and which are not properly within the province of the policy. We have frequently referred in these columns to barnacles of this character, such as theft and pilferage, leakage and breakage, which have developed during the war period and which are proving extremely hard to get rid of. It is freely admitted that insufficient premium is added to cover these minor liabilities, and in instances there is no additional premium at all. Under spur of competition they are included largely as an accommodation to policyholders and brokers. Proper courage on the part of underwriters would soon wipe these unwarranted risks off the books. Two more of these loss-causes—hook and fresh water damage—are likely to be called to the bar shortly. A longshoreman's hook in the hands of a careless or conscienceless man can easily cost the insurers a tidy aggregate. The average burlap bag offers little resistance to the deft sideswipe of a strong, sharp hook; neither does a flimsy packing case. The moral hazard enters here. Scarcity of coffee or shoes in a longshoreman's household are said to lead very naturally to a careless use of the formidable hook and a subsequent claim on the underwriters for damages. An instance has recently been cited where a claim for hook damage surveyed in Australia on two bales of goods amounted to $125 and $175, respectively, although the insured value of the bales was only $1000 each. Fresh water damage frequently arises from the careless use of hose in the hands of deck-swabbers, and the thoughtless hanging of a running hose over an open hatch while its contents deluged the cargo in the hold. Warehouse congestion and the shortage of protecting tarpaulins are also given as contributory causes for damage from fresh water. Risks of this character are sometimes looked upon as trivial, but in the aggregate they give rise to a very sizeable bill for the underwriters to pay.

Sweat Damage

The new French policy of marine insurance excludes the writing of sweat damage, unless by spe-

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
230 BYRNE BUILDING
LOS ANGELES

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

ND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

cial agreement. A similar practice has prevailed in the United States for some time, as regards this particular hazard. Numerous claims of considerable magnitude have arisen from this coverage. It is the consequence of atmospheric changes in the hold caused by the influence of a change in the temperature of the water the vessel passes through in the course of her voyage. In going from warm climates to colder, or from cold climates to warmer, a condensation of moisture that readily damages certain commodities takes place in the hold. This can be relieved by dunnage or by improved ventilation, but with hatches tightly closed adequate ventilation is difficult. Among the merchandise subject to this hazard may be mentioned pepper in bags, low-grade rubber, sugar en route north, cocoa or coffee in bags, hemp, jute, hides, etc. Underwriters in writing this coverage usually insure under the so-called "Skimmings Clause," particularly for cocoa and coffee in bags; and in event of the bags being wet or stained, the affected coffee or cocoa is skimmed off and the damage assessed on the segregated portion.

The Broker's Side of It

The perennial feud between marine underwriters and brokers is taking on an accelerated violence under stress of the mutual recriminations now being exchanged with respect to the responsibility for depressed rates and certain unhealthy features of the American market. The underwriters' side, it is complained, gets more publicity than the brokers'; and the latter rebel against being made the "goats" of the controversy. They insist, and very properly, that it is their business to secure for their patrons the very best rate compatible with safety; and that if the underwriters are so weak-kneed as to accept less than they think they ought to have, they have no one to blame but themselves. The ideal broker should know all sides of the marine insurance business; but few brokers, by this definition, are "ideal." The majority of them have little information on marine matters beyond getting customers and hammering low rates out of underwriters. Insurance costs are Greek to them, and of no concern whatever. In a sense all this is natural enough, but it is not the whole story. With London offering minimum rates on everything in the steamer line, the broker falls for the bait and hands the business over to foreigners unless the Americans are content to write it at what the latter know to be an entirely inadequate figure. It is also charged by high authorities that the broker on this side plays foreign and American underwriters against each other by assuring them he can get better rates from their competitors. This is demoralizing all around, though consistent with the theory that a broker is justified in getting low rates for his clients in any way he can. After all has been said and done, each side in the controversy will have to yield a little so that there may be a common ground for necessary co-operation.

Excessive Marine Losses

Severe weather conditions during the close of the year laid marine insurance under a heavy contribution. Along the North Atlantic, in particular, the record has proved a bad one. Within the brief period of one month no less than eighteen casualties were reported in the vicinity of Halifax; and in one day fourteen "S. O. S." calls were received at that port from vessels in distress. Fog has been the cause of more casualties than any other circumstance. It used to be thought that in fogs the chief danger was from collisions, but the marine underwriter will tell you that thick weather reaps its greatest harvest in groundings and strandings. Some of the directly contributing causes of this excess of recent marine disasters may be laid to the account of inexperienced crews, poorly found vessels, and the abnormal cost of repairs and replacements. As a result of these several adverse conditions, marine insurance has been badly hit for a month or six weeks past, and more than one underwriter has seen his end-of-the-year hopes go up in fog and storms.

Marine Fire Protection

Important developments are being realized in the movement now under way to adequately codify the protection of vessels against loss from fire. The marine insurance committee of the National Fire Protection Association has laid the foundation for comprehensive work by enlisting the active co-operation of the United States Shipping Board, the Steamship Inspection Service, and the American Bureau of Shipping. Representatives of these bodies are on the committee, and further valuable assistance is being given by competent marine architects and engineers. It is the intention to make a definite code as soon as full information has been secured, through which the serious fire hazard aboard ship may be controlled and reduced. It is anticipated that the January meeting of the full committee will yield fine results.

Marine Rates Inadequate

It is almost universally considered that marine insurance rates, as at present charged, are rendering the business unprofitable; and yet no concerted steps toward establishing them at a proper figure are so much as considered. It is the most imperative need of the hour that some improvement in this regard be brought about. Those best qualified to judge of such matters are decidedly of opinion that many American marine underwriters are really ignorant of what constitutes an adequate cost price for the protection they offer. The hull business of this country is notoriously unprofitable—although, for that matter, it is not a very flourishing branch of marine insurance in other lands; and yet foreign offices write it right along, on all kinds of risks and at all kinds of rates, and the American brokers send it along to them as fast as they can handle it. The tendency among students of prevailing conditions is to lay much of the blame at the door of the broker, on the ground of the latter's universal tendency to drive rates down to the lowest figure possible in order to get a fine bargain for his customer. This, of course, is no excuse for underwriters to accept business at unprofitable rates, but the pressure of the broker and the sight of a large premium combine to blind the former to the necessity of a sufficient price for the hazards they are assuming. Frequently the accepted rate is scarcely a third of what it should be. In view of the increased cost of repairs and of the additional causes of losses, pre-war rates should be materially advanced; whereas, as a matter of fact, they have been lowered. Is it not time for marine underwriters to get together and arrange to abide by a commensurate rate schedule? The answer to this query would doubtless be a unanimous "Yes"; to be immediately followed by the inquiry, "What will you do with the rate-cutter?"

H. A. LENNON, NAVAL ARCHITECT

OFFICES for consultation on naval architecture and hull designing have recently been opened in the Dividend building, 354 Pine street, San Francisco, by H. A. Lennon.

Mr. Lennon served his apprenticeship with Workman, Clark & Company, Belfast, Ireland, beginning in 1905, and his experience as ship draftsman and designer covers all classes of merchant ship construction from ordinary standard freighters to large passenger liners.

Mr. Lennon came to the United States in 1910 and in the hull drawing office of William Cramp & Sons, Philadelphia, he was engaged in the design of the first Isherwood-type ships built in America. Since 1912 he has successively held the positions of chief hull draftsman for the Seattle Construction & Drydock Company; designer at the Union Iron Works, San Francisco, and naval architect for the Ames Shipbuilding & Drydock Company, Seattle. In January, 1918, he was engaged as hull superintendent of the Southwestern Shipbuilding Company at East San Pedro and organized the hull department there which has made such a wonderful record in the construction of 8800-ton ships for the United States Shipping Board. In this position Mr. Lennon supervised the work of 4000 men employed in hull construction.

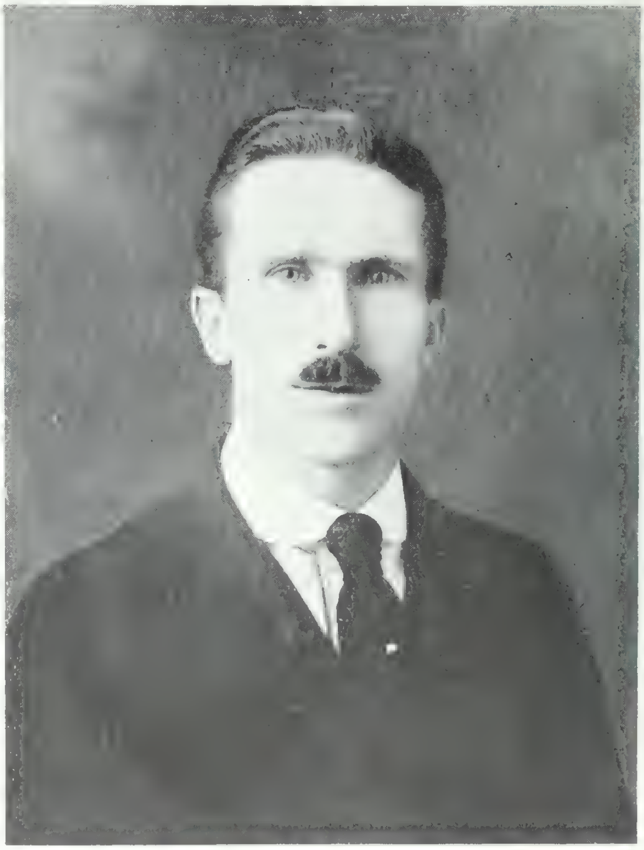
In April, 1919, Mr. Lennon resigned from the Southwestern Shipbuilding Company and took up his present work as consulting naval architect.

NEW RULES FOR BUILDING WOODEN SHIPS

THE American Bureau of Shipping has been busily engaged for some time on the compilation of changes and additions to their rules for wooden ship construction.

This matter has been of particular interest to Pacific Coast shipbuilders for the reason that so large a proportion of the wooden ship program of the United States Shipping Board has been constructed on this coast, and also for the reason that many of the Pacific Coast lumber operators have practically made rules for themselves as regards the construction of wooden steam schooners for carrying lumber.

On a recent trip to New York, Mr. F. H. Evers, San Francisco representative of the American Bureau of Shipping, placed the case of the Pacific Coast steam lumber schooner before the committee of the bureau, and secured from them a promise to hold up the rules for wooden shipbuilding until they could consult with a committee of Pacific Coast experts. This committee is now in New York in conference with the American Bureau of Shipping, and consists of: Captain A. F. Pillsbury, G. F. Matthews, of the Matthews Shipbuilding Company, Hoquiam, Washington; Robert Banks, of Kruse & Banks, North Bend, Oregon, and C. D. Mues, surveyor of wooden ships at San Francisco, for the American Bureau of Shipping. This committee will undoubtedly be able to have incorporated into the rules for wooden shipbuilding, special allowance for the wooden powered schooner, which will enable that type of vessel to receive proper classification and more favorable insurance rates.



Mr. H. A. Lennon

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PACIFIC MACHINERY

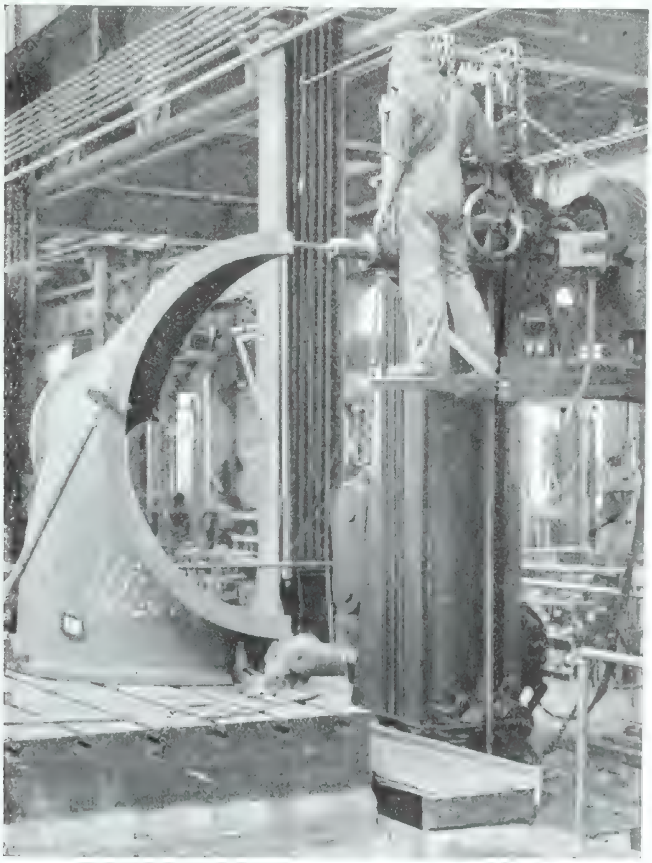
Horizontal Drilling and Boring Machine

TO reduce the cost of handling heavy, bulky pieces for drilling, boring, tapping or facing is an important factor in the selection of drilling and boring machines. The horizontal type of machine seems to offer great economical advantages in this connection and at the same time meet the requirements as to rigidity and accuracy, as well as speed in operation.

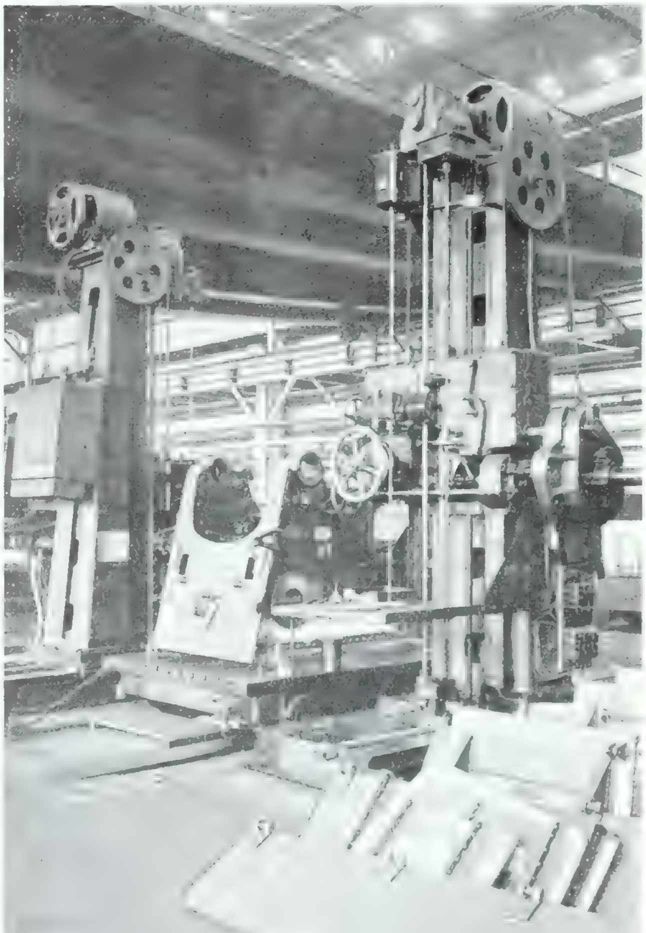
The Pawling & Harnischfeger Company, in their plant at Milwaukee, where they have for many years produced cranes, hoists and monorail systems, were confronted with the need for drilling and boring machines capable of machining the long, bulky parts characteristic of their products.

The invention of the P & H horizontal machine was made with the idea of maintaining the highest degree of accuracy with ease of handling the heavy parts to be machined. One of the illustrations accompanying this article shows the smaller type of horizontal drilling and boring machine installed at the Madson Iron Works at Los Angeles. This machine is shown to be working on cast steel high pressure manifolds for the Southwestern Shipbuilding Company. It will be seen that a manifold of this type presents considerable work in drilling, boring and facing, and before the installation of this machine, it required two days to finish one manifold of this type, but since the installation of the P & H machine, there has been no difficulty in completing two manifolds in one day.

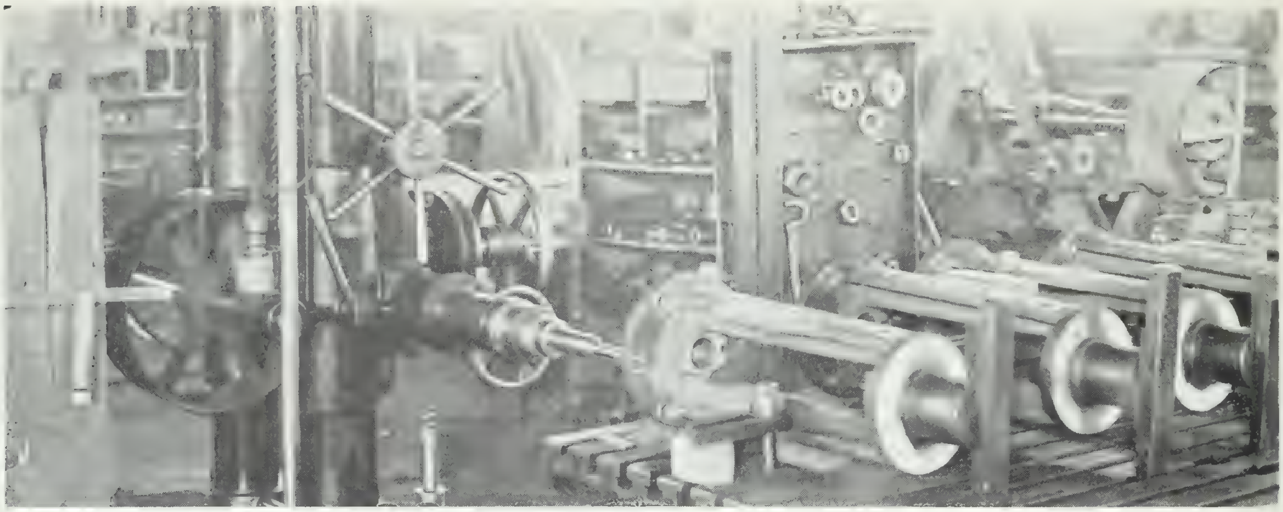
To drill and face the flanges on the high and low pressure cylinders for the 2800 horse power triple expansion engines, the Los Angeles Shipbuilding



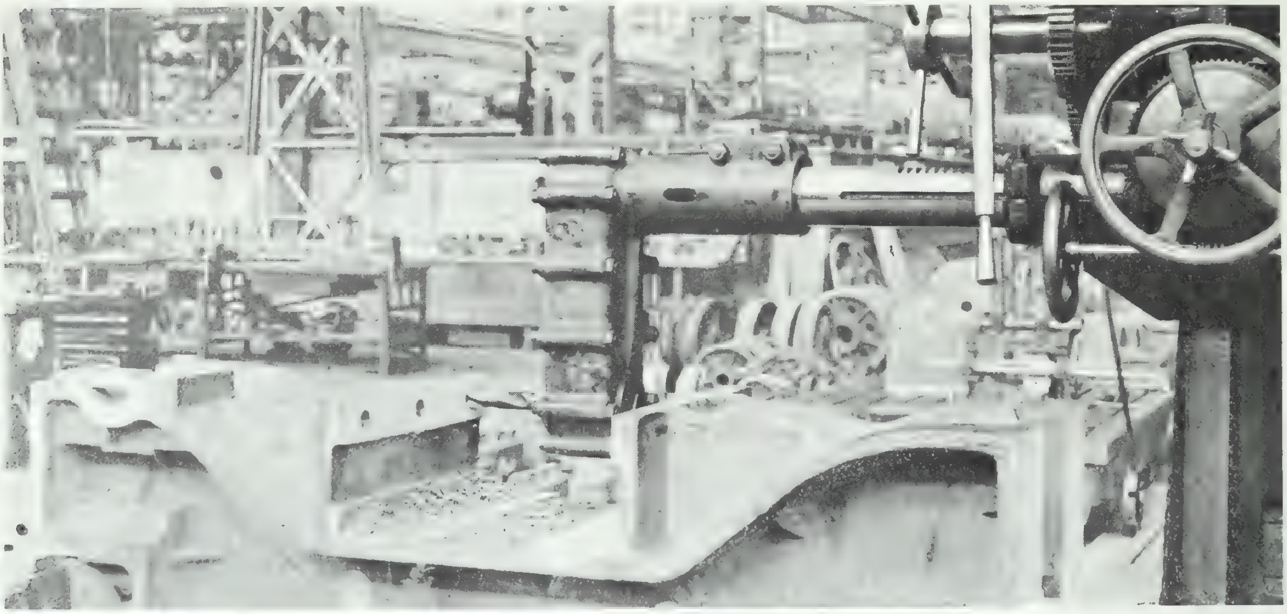
Illustrating the adaptability of a No. 10 P. & H. Horizontal Drilling and Boring Machine to large, bulky castings requiring a number of drilling operations. Note that with the one set up the operator can drill around a large facing without changing his position



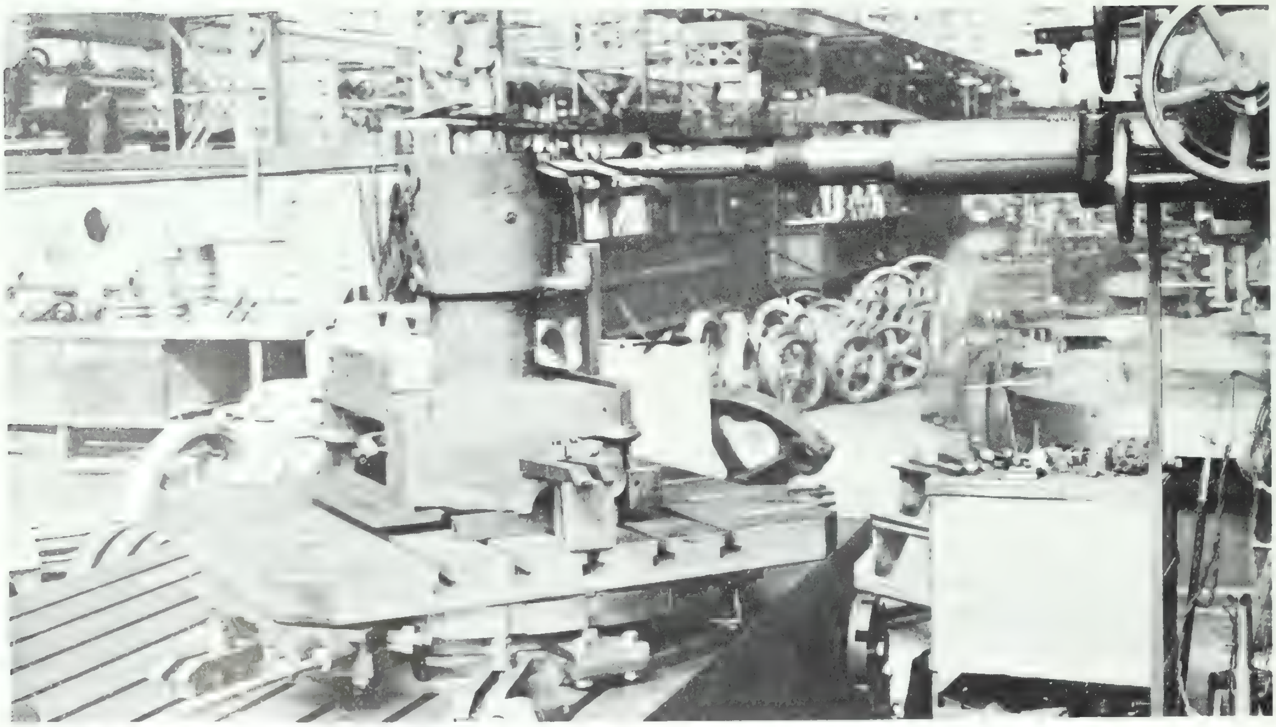
Two No. 12 P. & H. Drilling and Boring Machines set in parallel for heavy gun carriage work at an Eastern arsenal.



Application of a No. 1 P. & H. Horizontal Drilling and Boring Machine to a number of slide frames, insuring perfect alignment and interchangeability



A P. & H. Horizontal Drilling and Boring Machine using an offset arm for a difficult drilling position.



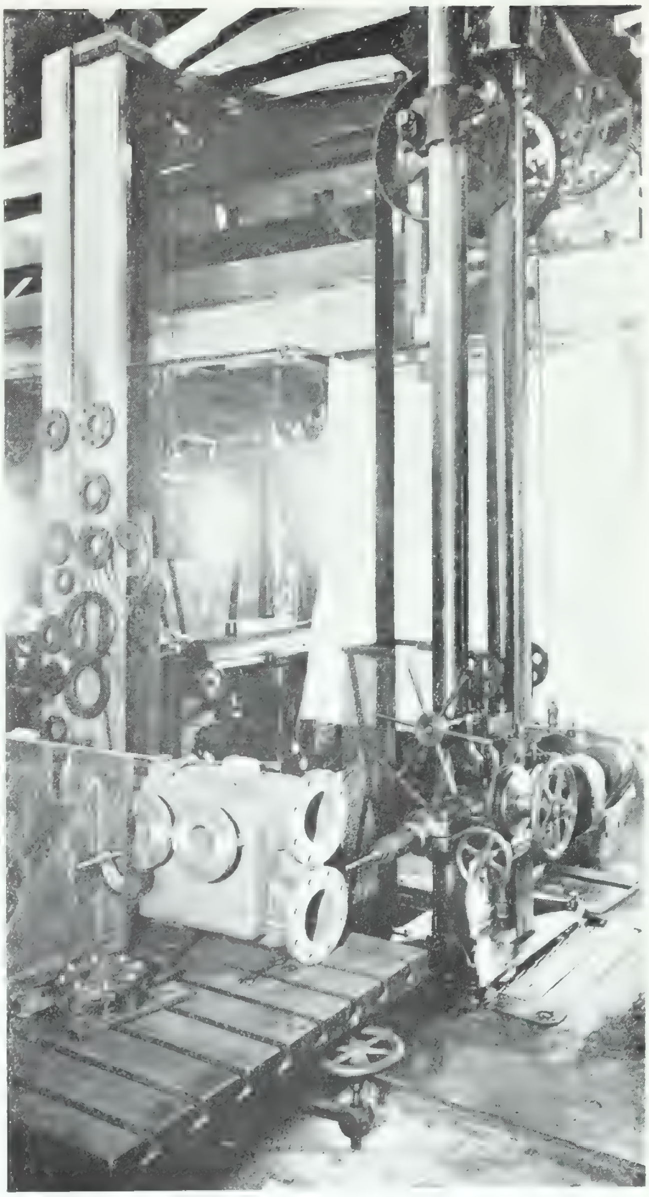
A P. & H. Turntable which permits turning the piece to be machined in a complete circle, thus giving access to all sides

& Dry Dock Company installed a No. 9 P & H drilling and boring machine. As the low pressure cylinder of these engines is 72 inches in diameter, it will be seen that a boring machine of a wide range is required. One of our illustrations shows two No. 12 machines set in parallel and it is interesting to note that all gears and small working parts are enclosed in iron oil tight cases. This machine is powered with a 7½-horse power variable speed motor of from 500 to 1500 r. p. m. The horizontal spindle travel is 3 feet and the vertical carriage travel is 6 feet 5 inches. Ample bearing area is made for the front and rear spindle. The diameter of the driving end is 3¼ inches. The sleeve diameter is 7 inches with a length of 4 feet 10½ inches. The spindle speeds are variable from 10 to 450 r. p. m. with four feed changes for each spindle speed.

The Los Angeles Shipbuilding & Dry Dock Company have found this type of machine so satisfactory that they have since ordered the installation of two additional machines, complete with turn tables and offset drill arm, to handle their requirements.

The mechanism reduced to its simplest elements consists of a vertical column, a saddle enclosing the operating parts which moves vertically upon this column, and a work table upon which the piece to be worked is "spotted." The work table is entirely detached from the machine itself and moves upon a standard gauge track; it may be taken to any part of the plant where track is laid. The convenience of this feature of the work table need hardly be emphasized. The horizontal movement of this table, when adjacent to the machine, combined with the vertical travel of the drill spindle, permits of operation over a wide surface of the piece. By changing fittings in the spindle the job may be drilled, tapped and faced without disturbing its original setting. The use of such accessories as the turn table, offset drill arm, as shown in our illustration, in addition to the mobility of the work table, give the P & H "horizontal" an exceedingly wide range of activity and flexibility. The controlling and operating parts are centralized on the saddle, which moves vertically on the column, permitting complete and easy control by the operator without changing his position or taking his attention from the work before him.

P & H horizontals are built in three types—two of the two column type, designed for a two-point support and the others self-contained, either stationary or portable. They vary in size according to capacity and are designed for motor drive. Motors are all direct-connected and of variable speed. They are readily reversible for tapping purposes. All gears are cut from the solid steel blanks. Bearings are of a high grade bronze. The spindle moves in a cast-iron sleeve of sufficient length to support the spindle firmly and accurately at its farthest point of travel. Change of both speed and feed is done by a simple turn of a hand wheel or lever by the operator without changing his position.



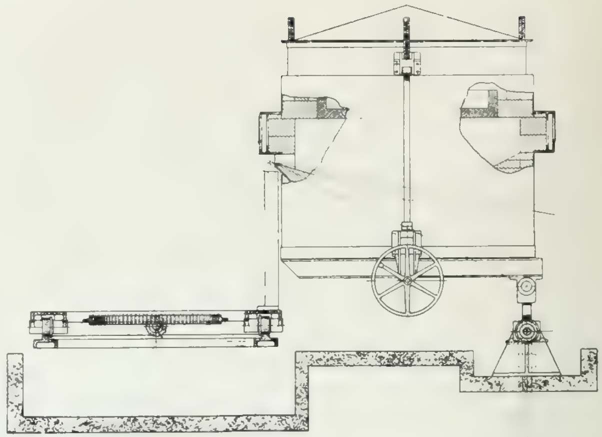
A No. 1 P. & H. Horizontal Drilling and Boring Machine at the Madson Iron Works, Los Angeles. With this machine two cast steel high pressure manifolds are bored, drilled and faced in one day

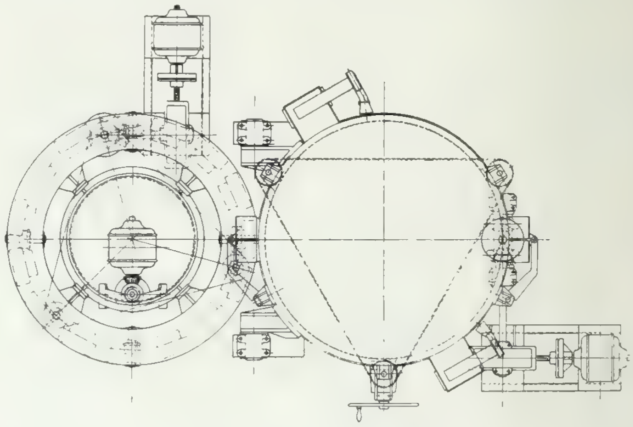
The compactness of design, the ease of operation and the versatility of performance of the P & H horizontal drilling and boring machine make it indispensable equipment in the modern machine shop. The success of P & H engineers and shop men in developing the horizontal drill led to further study of drilling and boring problems. The result was the P & H centering machine and drilling and boring machine accessories. They add to the "horizontal" a wider range of operation, greater ease of handling work and simplified methods for treating difficult pieces.

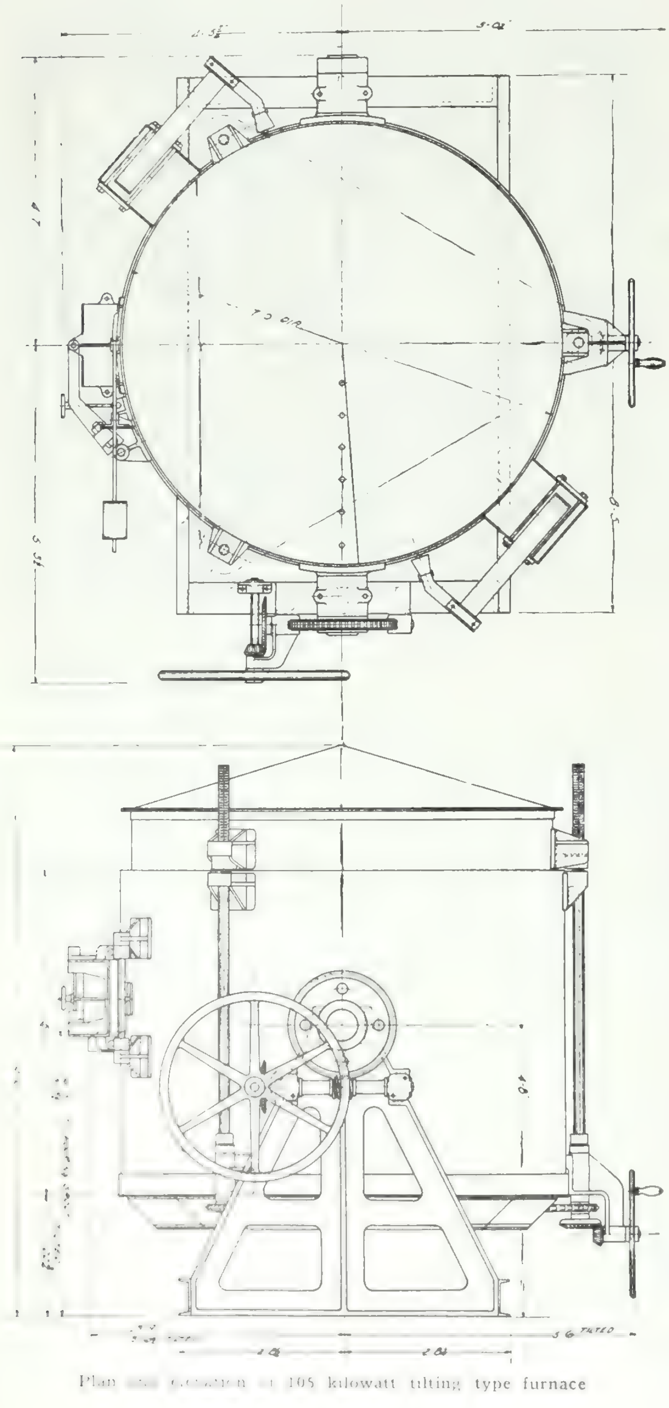
Electric Furnace for Nonferrous Melting

THE electric furnace in the present stage of its development is an instrument of refinement rather than one of production. Its use today is largely confined to foundries where high-grade steel castings are turned out. It is also making inroads in the nonferrous melting and steel heat-treating fields. For the latter purpose comparatively low temperatures are required and these conditions present an opportunity for employing the resistance type furnace under almost ideal conditions. A furnace of this type has been developed by the Electric Furnace Company, Alliance, Ohio.

It is designed for melting nonferrous metals and other work not requiring excessive temperatures, and, when equipped for automatic operation, is claimed to be especially suitable for the steel treating. Its most novel feature is its heating element, which is built in the form of a trough encircling the inside of the furnace above the hearth. This trough is filled with granulated carbon to form a path for the electric current. The construction of this trough with its supports and its charge of carbon is particularly interesting in view of the modern plant which has been built at Salem, Ohio, for the exclusive manufacture of these furnaces, which are named after their inventor, T. F. Baily, president of the Electric Furnace Company. This plant occupies a two-story building on a nine-acre tract along the main line of the Pennsylvania Railroad at the Wilson street crossing, which is within two or three blocks of the center of Salem. The factory has about 70,000 square feet of floor space, part of it under saw-tooth roof and all of it well lighted and roomy.


Sectional elevation of nose-tilting type brass melting furnace and casting table


Plan of nose-tilting type brass melting furnace and casting table

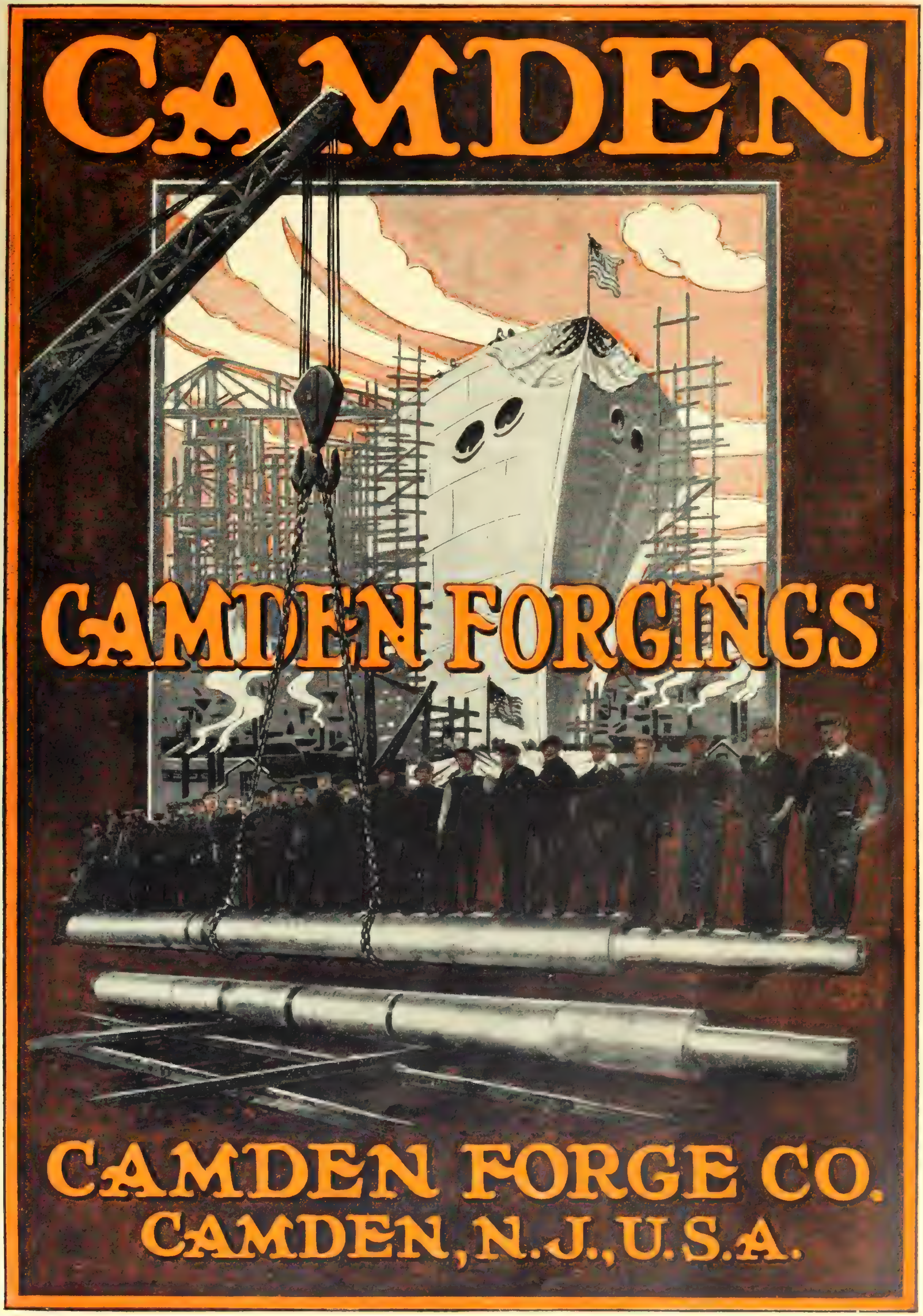

Plan and elevation of 105 kilowatt tilting type furnace

The whole scheme of manufacture in this plant is based on specialization. Each unit required in the completed furnace is built in a part of the factory planned for its particular production. These units are sent to a large central assembling room where the furnaces are put together, tested and prepared for shipment.

Although several sizes of furnaces are constructed, the standard of the Electric Furnace Company is a 105-kilowatt tilting type, rated at 1500 pounds hearth capacity with a melting rate of 600 pounds an hour.

This furnace, when ready to ship, consists of a steel shell seven feet in diameter supported by cast-iron trunnions and lined with firebrick. It is equipped with the necessary geared mechanism for tilting and with a double-hinged, plug-type door. The heating element within the furnace is connected by means of electrodes and cables with the auxiliary electrical equipment which is furnished with each furnace. This electrical equipment consists of an oil-brake, selective switch, a low voltage transformer and indicating meters. When desired, a contact-making pyrometer is furnished by means of which the oil switch may be automatically tripped open when the furnace has reached any predetermined temperature.

The heating element of broken carbon particles, together with its supporting trough, forms the patented feature of the furnaces built by the Electric Furnace Company. It is of such importance that a somewhat detailed description of it may be warranted. The word trough gives the best idea of the housing for the heating element proper. But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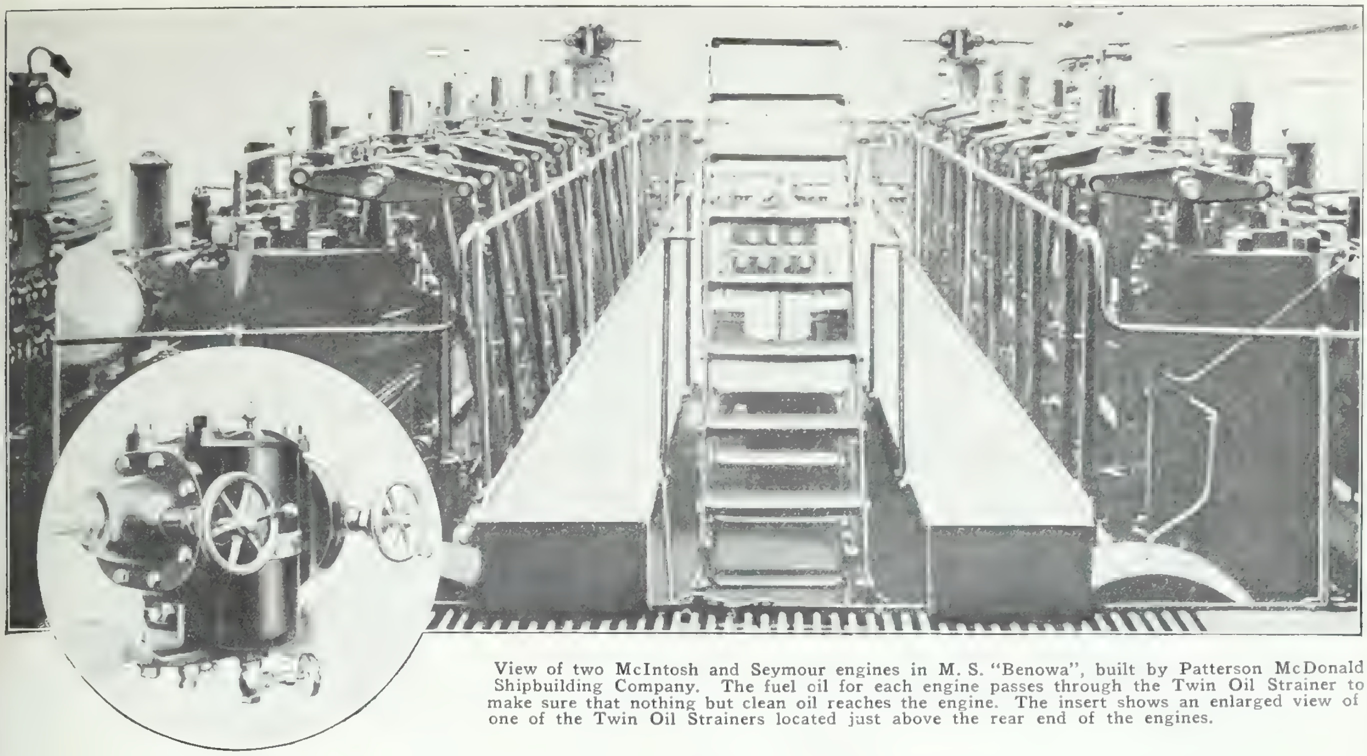


View of two McIntosh and Seymour engines in M. S. "Benowa", built by Patterson McDonald Shipbuilding Company. The fuel oil for each engine passes through the Twin Oil Strainer to make sure that nothing but clean oil reaches the engine. The insert shows an enlarged view of one of the Twin Oil Strainers located just above the rear end of the engines.

The Twin Oil Strainer

USE TWIN OIL STRAINERS AND INSURE A CONTINUOUS SUPPLY OF CLEAN OIL.

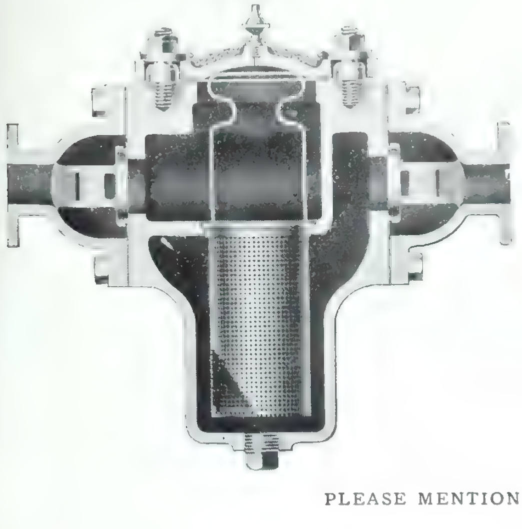
gives the same service as two single strainers, but it is more convenient to operate, requires less space for installation and does away with the extra valves and piping necessary to connect up. These are the features that lead to its being used in submarines and destroyers for the United States Navy, and in cargo boats for the United States Merchant Marine.

Twin Oil Strainers are furnished in sizes from 1 to 5 inch. (2½ inch and larger sizes have flanged connections). Basket mesh 1/64 inch or larger. Complete information in bulletin "AA" which will be sent on request.

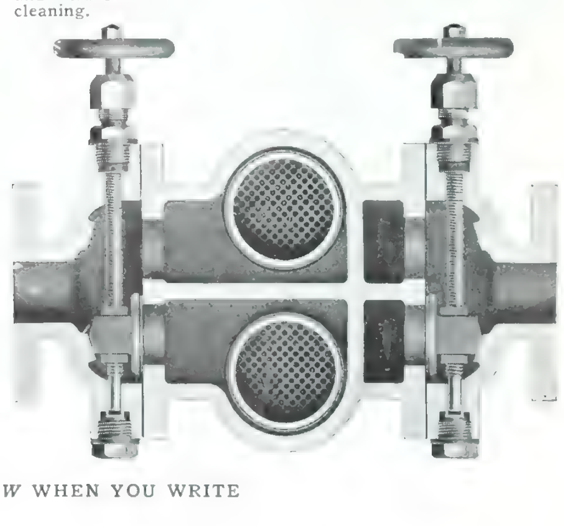
ELLIOTT COMPANY

443 Grant St., Pittsburgh, Pa.

The oil enters the Strainer at the left and empties into and passes through the straining basket, then up and out at the right. All solid impurities are retained in the straining basket.



When a basket is clogged, the valves are shifted to direct the flow of oil into the clean basket, which is in reserve. The compartment containing the dirty basket is then opened up, the basket removed, cleaned and replaced, and held in reserve until the basket then in service needs cleaning.

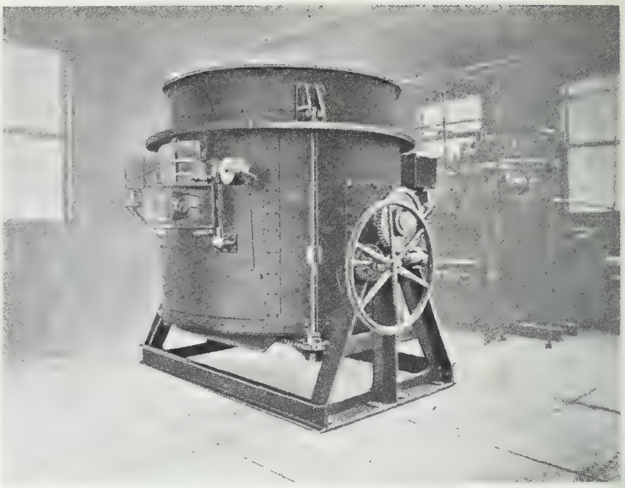


it is a trough in the form of a ring, built to encircle the inside of the furnace above the hearth. It has, for the standard 105-kilowatt furnace, an interior diameter of 30 inches and a wall thickness of 3 inches. Its opening or depression which contains the carbon is 9 inches wide and 7 inches high, which determines the cross section of the heating element. The trough is made in segments to allow for expansion and contraction and is carried on four radial firebrick piers or brackets built out over the hearth. In the construction of the trough, wooden forms are used to bridge the spaces between the piers and to hold the green carborundum sand in place until it is baked, when it becomes firm and strong.

The current flowing in at one electrode splits to follow both sides of the carbon ring around to the opposite electrode from whence it flows back to the transformer.

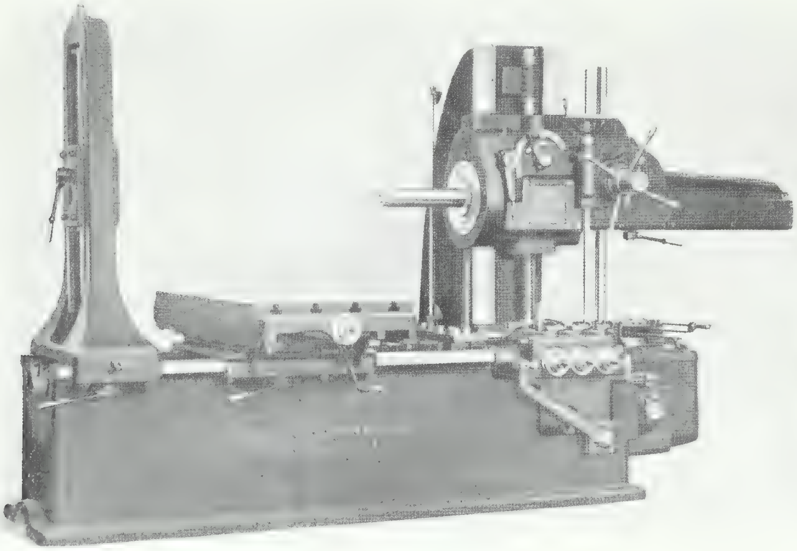
In operation the whole mass of carbon particles in the circular trough glows almost at white heat and it is the radiation and reflection from them which act as the melting agent.

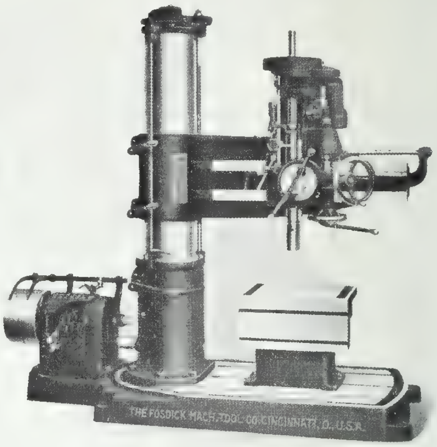
As the furnace door fits practically air tight, there is almost no loss of metal through volatilization during melting. It is not necessary to open the door during pouring; instead, a small plug in the pouring groove may be removed and when the furnace is tilted a stream of molten metal flows out through this opening under the door into the ladle below.



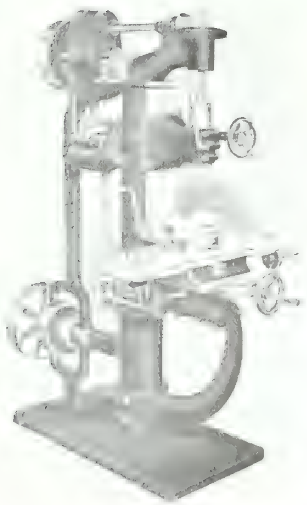
Exterior view of 105-kilowatt tilting type Furnace

Gunn, Carle & Company, with offices at 444 Market street, San Francisco, are the California distributors for the Electric Furnace Company.



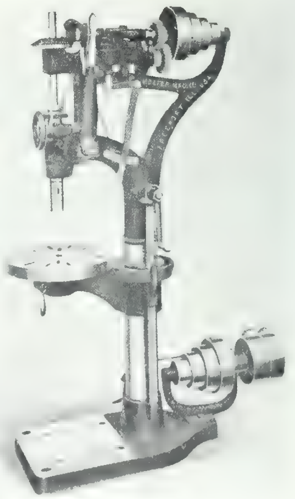


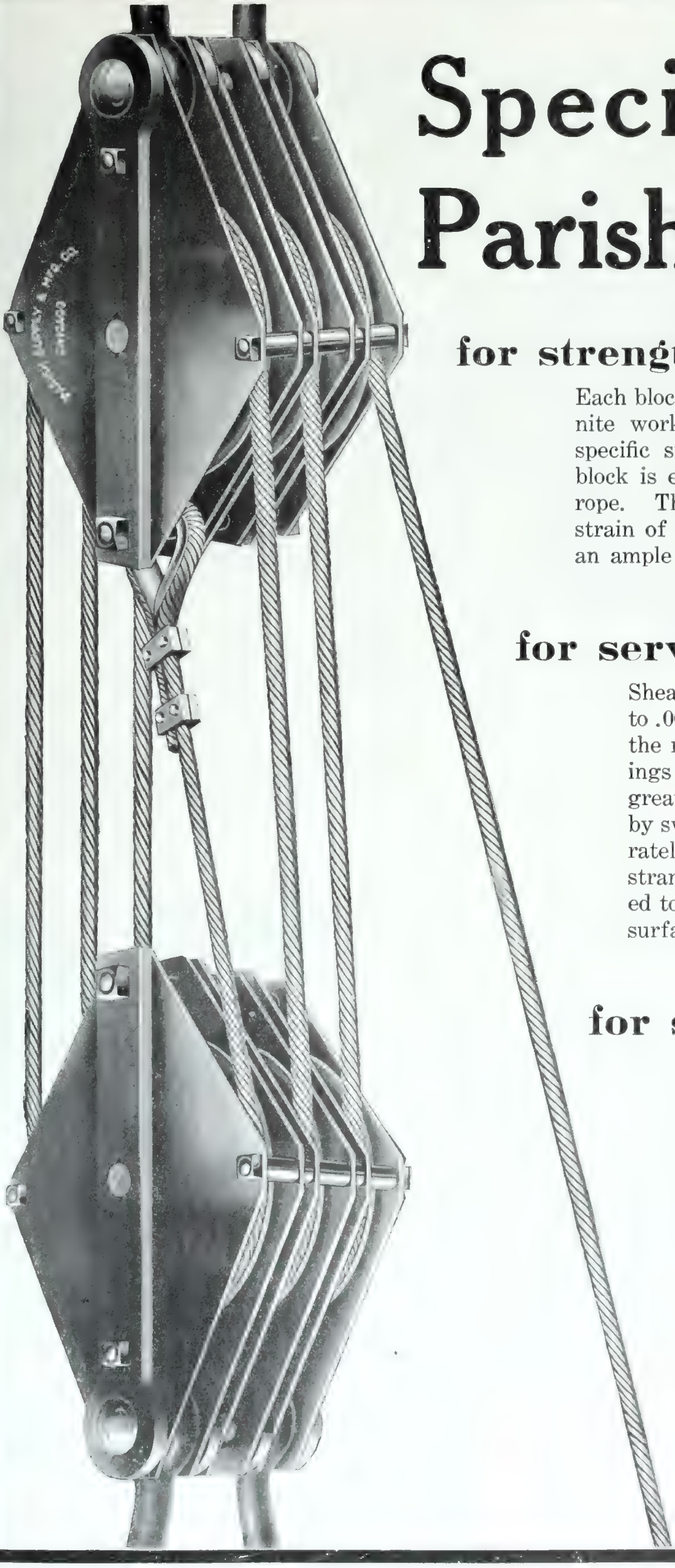
An Interesting Quartette of Tools



THE three illustrations herewith show milling, drilling and boring machines handled by the Eccles & Smith Company of San Francisco.

The horizontal boring, drilling and milling machine illustrated at the upper left is manufactured by Giddings & Lewis, Fond du Lac, Wisconsin, and is noted for rigidity of construction and precision results. At the upper right is shown the Fosdick heavy-duty radial drill. This tool is of very massive construction and is absolutely self-contained, requiring no special foundation or counter shaft. The small insert at the left shows a No. 2 Knight milling and drilling machine. This machine has eight spindle-speed changes and is especially adapted for angular milling work by the ready adjustment of its cross slide table. The insert at right shows a Hoefer drill press.





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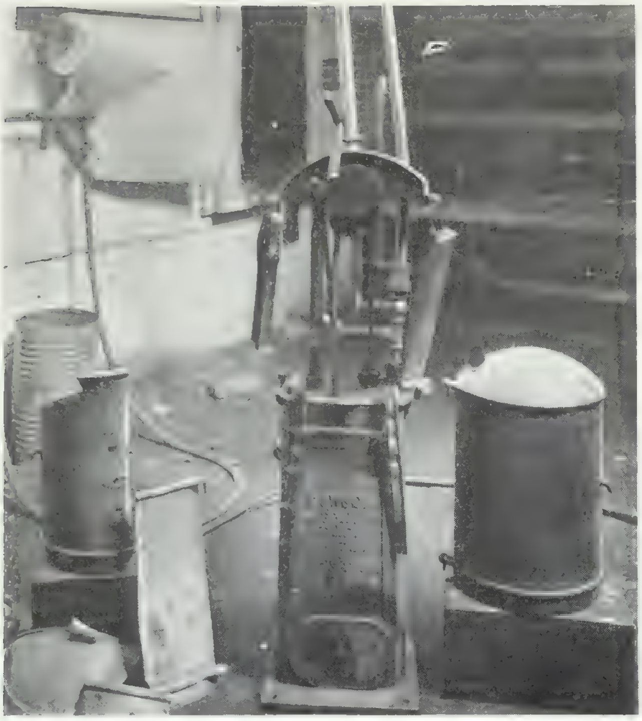
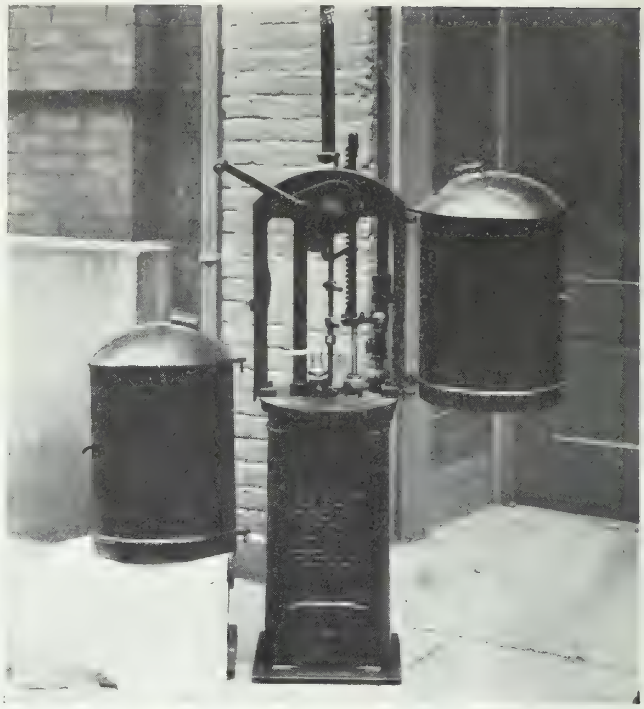
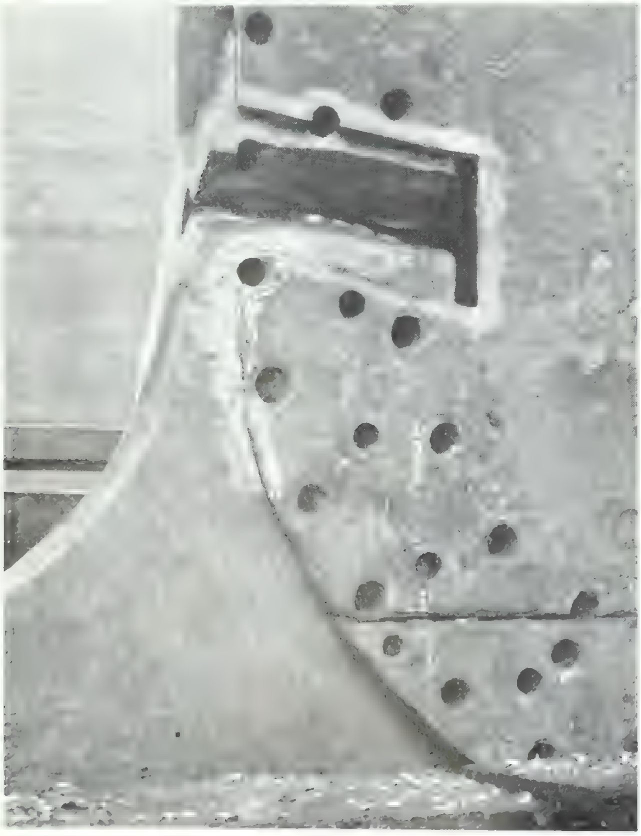
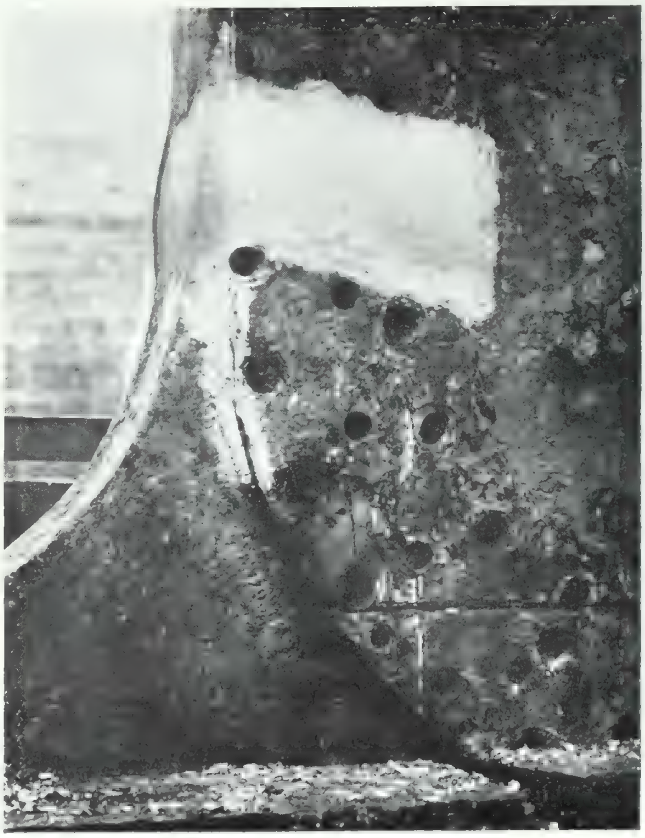
Before and After Welding





On this page are shown two very interesting applications of the welder's art. The Bowser gasoline pump in the upper illustration was run over by an automobile truck in a Portland garage. It was found that there were fourteen separate and distinct breaks in the pump parts, but the welder undertook to make a satisfactory job, and, after a few hours' work with an acetylene torch, the pump was ready for service again, as shown in the second illustration. Below are pictures of the broken stern frame of the steamship Alaska in the drydock of the Skinner & Eddy Corporation at Seattle. In repairing this break, acetylene cutting and electric welding operations were both used. The surface of the break was first cut with an acetylene torch to a double "V" section so that the welding electrodes could be first applied at the center line of the break, and the Portable Electric Welding Company of Seattle soon completed a very excellent piece of welding work, making the stern frame practically as good as new.





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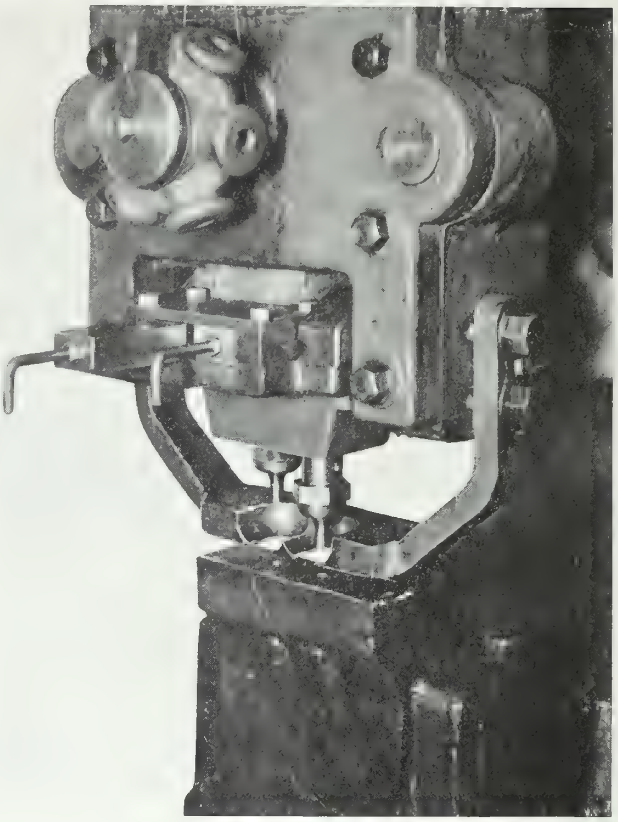
Double-Gagged Punching Attachment

THE illustration herewith shows a new attachment recently put upon the market by the Cleveland Punch & Shear Works of Cleveland, Ohio, which has some very valuable features, particularly when it is used in connection with a spacing table and when the work has two sizes of holes.

Each stem of the Cleveland double-gagged punching attachment is fitted with a spring to lift the punch clear of the material when the gag is withdrawn. Each gag is individually operated and has a long taper end, so that when the gag is inserted the taper end acts as a wedge and forces the punch stem down. This attachment is very desirable when used with a spacing table and when the plate has two sizes of holes, as one punch stem will be entirely clear of the material even when the plunger is at the bottom of its stroke. There is therefore no interference or dragging of the disengaged member.



A new punching attachment manufactured by the Cleveland Punch & Shear Works

New Plant of Kilbourne & Clark Manufacturing Company

Brief Description of Pacific Coast In dustry Which Has Obtained World-Wide Prominence

By H. F. Jefferson

Assistant Chief Engineer, Kilbourne & Clark Manufacturing Company

COMMENCING in 1907 with a small machine shop in the downtown section of Seattle, Washington, and manufacturing motor generators and rotary converters for the then existing United Wireless Company, the Kilbourne & Clark organization has progressed and expanded until it now occupies one of the largest and most modern factories on the Pacific Coast.

Since its early days, when located in the downtown section, the company has successively occupied three different factories, each larger and more modern than the previous one. Its present plant was especially designed, built and equipped to meet the requirements of the manufacture of radio apparatus, which forms the bulk of the output.

From the manufacture of motor generators and rotaries for wireless apparatus, the company was led to take up the manufacture of complete radio equipment, and during the years 1912-1914, a considerable amount of radio development work was carried out, especially for the United States Navy Department. Largely as a result of this work and through the efforts of Mr. F. G. Simpson, general manager and chief engineer to the company, a successful type of commercial radio apparatus was developed, placed on the market, and the first installation made early in 1914. Since then K&C radio apparatus has been steadily improved and developed by a strong engineering organization until its construction is as rugged as, and comparable to that of, standard industrial electric equipment.

The new shops of the Kilbourne & Clark Manufacturing Company at Seattle

Testing laboratories at the new Kilbourne & Clark plant

During the war the company was engaged in the manufacture of radio apparatus for the United States Navy Department on a 100 per cent basis, all facilities being turned over to assist in rapid production and the plant operating night and day. This strictly American industry, to which great impetus was given because its product was a war essential, found at the close of the war that a national and international demand had developed for its apparatus.

The head office is located at the new plant at Seattle, the officers of the company being: C. A. Kilbourne, president; F. G. Simpson, vice-president and general manager; R. O.

Hall, second vice-president and assistant general manager. Mr. C. B. Cooper is superintendent of the Ship Owners' Radio Service, Inc., and is in charge of the New York office of the company. The San Francisco office is in charge of Mr. Ellery W. Stone. The new Seattle plant was completed and put into operation early in 1919 and is shown generally in the accompanying views.

The building is made up of four interconnected structures and is built of reinforced concrete with wooden floors laid on concrete slabs. The roof is of the saw-tooth type, affording the maximum possible daylight and ventilation; it is of mill construction, a part of the frame work being supported by timber columns. The main shop building, an interior view of which is given, is 100 feet wide and 300 feet long, and lies approximately north-south; three wings built at right angles to it extend easterly towards East Marginal Way, on which the plant fronts. The center wing constitutes the office building and is 60 feet by 60 feet; the north wing, 60 feet by 100 feet, is the stock and storage building, and the south wing, 60 feet by 100 feet, the engineering and laboratory building.

In the accompanying view it will be seen that the exterior of the plant is attractively laid out with lawn and shrubbery and presents a most pleasing addition to the industrial section of the city.

Power Supply and Shop Equipment

Power is supplied by the Puget Sound Traction Light & Power Company from an outdoor sub-station consisting of two 100-KVA transformers and located at the rear of the main shop building. Three-phase power is supplied to the shop at 220 volts; approximately fifty motors are installed to operate the shop equipment, a good number of the machines having individual drive. Some of the smaller machine equipment, such as lathes and drills, is operated in groups by motors hung from the ceiling. All automatic screw machines are located at an angle to the direction of the main shop, this enabling long bar stock to be handled without undue loss of space. A number of the heavier class of tools are driven by 10 and 15-horsepower individual motors.

A well-equipped tool-making department is maintained for the manufacture of jigs, punches and dies, precision tools and the numerous fixtures required for quantity production work. To facilitate rapid production, a systematic routing of work through the factory was planned and the whole organization and equipment were arranged with that system in view. Thorough inspection methods are applied at all stages of manufacture.

A finished part-stock room is maintained for the classification of all machined parts in order that work in the assembly department can be organized for rapid production. The accompanying view, showing a batch of radio apparatus under construction for the United States Navy Department, will give a fair idea of the lines along which the work of the assembly department is conducted.

All apparatus before being shipped is subjected to stringent mechanical and electrical tests in the commercial laboratory, a view of which accompanies this article. A well-equipped research laboratory is maintained where special tests are carried out and the latest developments of the radio art followed up.

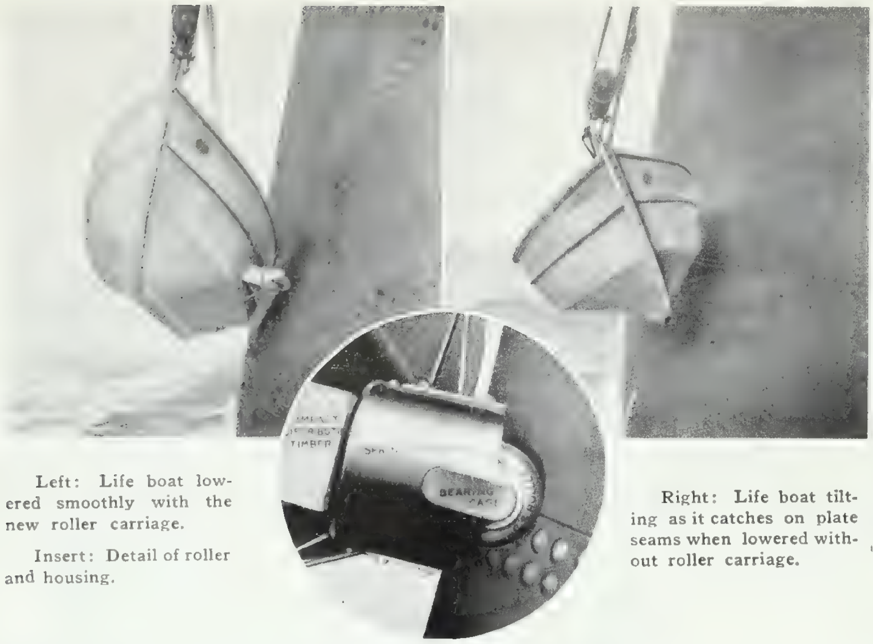
Upper: Radio transmitters in assembly room at the Kilbourne & Clark plant.

Left: Commodore Frederick Grant Simpson, general manager of the Kilbourne & Clark Manufacturing Company.

Lower: The machine shop at the Kilbourne & Clark Manufacturing Company.

The engineering organization is maintained not only to conduct research work and to produce new and improved designs, but to make inspections and tests during manufacture. The drafting department is equipped with an electrically-operated blue print and drying machine in order to facilitate the quick preparation of shop drawings.

In addition to the company's head office, fourteen branch offices are maintained throughout the United States, with an additional office in Honolulu. A subsidiary organization, the Ship Owners' Radio Service, Inc., handles the maintenance of radio apparatus on vessels and contracts with ship owners to handle all service work and message accounting, relieving the shipowner entirely of all detail routine in connection with the radio equipment.



Left: Life boat lowered smoothly with the new roller carriage.

Insert: Detail of roller and housing.

Right: Life boat tilting as it catches on plate seams when lowered without roller carriage.

SOME NEW SAFETY DEVICES

THE Steward Davit & Equipment Corporation, always zealous to increase the efficiency of its well-known line of lifeboat accessories, has during the last year perfected several new devices. We illustrate above one of the most important of these, which consists of a roller carriage for lifeboats so arranged that the lifeboat, while being lowered, rides easily over the projecting rivet heads and seams of the ship's plating. Anyone who has watched the lifeboat drill on a steamer at sea will appreciate the advantages of this mechanism. Rollers are set in bearings in a spring housing so that the boats are protected largely against impact on the side of a rolling ship.

Among the other devices recently improved and patented by the Steward Davit Corporation is an improved release gear by the use of which a simultaneous release at both ends of the boat is guaranteed under full load, partial water borne, or no load conditions. With this release gear the entire load is taken on forged metal which gives an added element of safety.

Another improvement is a new line throwing gun. This gun is arranged on a carriage with the recoil impact taken at so low a point that on actual demonstration, with the carriage not lashed but merely backed against a hatch combing, the carriage on firing takes the recoil without tipping. The conventional design of carriage, if put through the same test, would turn several back somersaults. Many shipping companies and shipbuilders, including the United States Shipping Board Emergency Fleet Corporation, have adopted this gun as standard for their boats.

The Steward Davit lifeboat Falls controller is another improved mechanism by means of which one man controls the lowering of a lifeboat with great ease. The two falls are handled on one divided drum so that the boat can be lowered on an even keel only. The braking is automatic and the device is supplied with removable handle so that in emergency it can be used as a hand winch for raising the lifeboat.

A new type of lifeboat developed during the war, under Steward Davit patents, named the "dead rise type," has a number of advantages over the conventional round bilge type in that the air tanks are at a lower elevation with respect to the keel and that the thwarts are also lower with respect to the gunwale, so that in a loaded boat of this type there is not only a lower center of gravity and greater stability but also greater protection and comfort for the occupants. This boat also has the advantage that there is a smaller number of skin plates used in the construction, the sides being perfectly straight and the bottom only slightly curved, so that twelve plates form the entire boat. The shape of the boat also gives it an advantage in beaching. In the 26-foot size, which has a Class "A" rating for fifty persons, the boat is made for "nesting" on the ship. This boat is built with 70 per cent fewer rivets than are used in the conventional type.

All these new improvements are illustrated and described in a four-page addition to the Steward Davit catalog and detailed information can be obtained by writing to the Steward Davit & Equipment Corporation, 17 Battery Place, New York City.

A NEW WHEELER CONDENSER WHICH ELIMINATES LEAKAGE TROUBLES

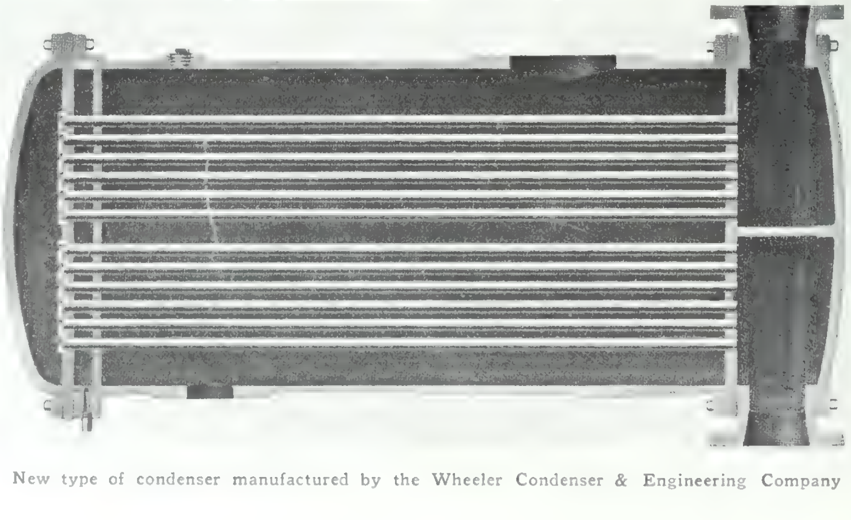
IT was recently brought up at a meeting of marine engineers that most of the ships now in service are experiencing trouble with leaking condensers. These leaks have been almost invariably traced to the stuffing box between the tube and the tube plate. It has been found that, in spite of the kind of packing used, some leakage is practically unavoidable, due to the expansion and contraction of the tube with temperature changes.

The illustration herewith shows a new type of condenser developed by S. Morris Lillie, inventor of the well-known and highly-efficient Lillie Evaporator. This condenser is used chiefly in connection with salt circulating water on board ship or in regions where the water which is used for circulating purposes would be very bad for boiler feed in case of leakage into the condenser and consequent mingling of the bad water with the condensate.

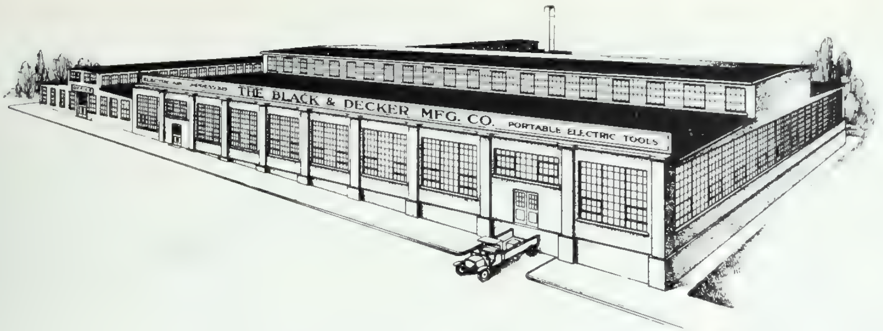
It will be noted on reference to the illustration that the tubes are tightly expanded into the right-hand tube plate, which eliminates the possibility of leakage at this end. At the other end the tubes are provided with the standard ferrules and condenser packings. It is not considered good engineering practice to expand condenser tubes at both ends, because, due to constant expansion and contraction, they inevitably loosen, and leakage becomes greater than where packing is used. The packing permits the tubes to expand freely and yet maintains an almost leakless joint. It is therefore at the left-hand end the leakage occurs, if at all.

In case of leakage of circulating water through the ferrules and packing, such leakage immediately drops down to the bottom of the compartment between the two tube plates, and is then carried off by the drain shown at the bottom, to which is attached either a small direct-acting condensate pump, or a vacuum trap, depending upon conditions.

We are advised by the manufacturers of this condenser, the Wheeler Condenser & Engineering Company, Carteret, New Jersey, that they now offer this condenser in all sizes, the cost of which is but slightly greater than the cost of a standard condenser of the same type.



New type of condenser manufactured by the Wheeler Condenser & Engineering Company



The new shop of the Black & Decker Manufacturing Company, Towson Heights, Baltimore

NEW PLANT OF BLACK & DECKER MANUFACTURING COMPANY

CLOSE upon the heels of the news regarding the removal of the general offices of the Black & Decker Manufacturing Company from Baltimore to the new office building at Towson Heights, comes the announcement that ground has been broken and work started on a new and larger plant for the company. The new building will be 100 feet deep by 200 feet wide, erected on the west side of the present plant and directly connected with it. The old plant has a manufacturing floor space of 12,000 square feet and the new building will add 20,000 square feet, giving a total of 32,000 square feet of manufacturing floor space, not including storehouse, chemical laboratory or the new office building.

The new factory is being erected by the Austin Company, whose headquarters are at Cleveland, Ohio. It will be of steel and brick construction, finished in stucco. Abundant light and ventilation will be provided by the monitor roof and large windows.

The plans include a modern steam-heating system for the entire plant, hot water in unlimited quantities for the lavatories, and an attractive women's rest room.

A most unusual feature of the present plant is the fine maple floor. This is one of the chief factors in maintaining the remarkable cleanliness which distinguishes this plant from the average factory.

The new building will embody this same idea. The floor will be a foundation of concrete upon which sleepers are laid, between which will be cinder concrete. Upon the sleepers will be laid a two-inch tongue and groove pine under-flooring, and the maple floor will be laid over this.

The demand for Black & Decker Towson-built devices has made this expansion necessary, and it is believed the output during 1920 will be more than double that of 1919.

MONEL METAL

WHAT is known commercially as Monel Metal is a "natural alloy" produced from the distinctive nickel-copper sulphide ores of the Sudbury district, Ontario, Canada. It was named after Ambrose Monell, president of the International Nickel Company. The discovery and manufacture of Monel Metal originated with this company and they are still the sole producers.

The metal was originally developed to compete in the German silver field, but as its valuable properties have become better known it has been expanding into a much wider sphere of commercial importance. Combining the strength and toughness of steel with the non-corrosiveness of bronze, along with a comparatively low cost of manufacture, it is gradually assuming an important place in the manufacturing arts and technical processes.

Monel Metal bears a very close resemblance to pure nickel in color and general appearance. Cast Monel Metal has a tensile strength of about 80,000 pounds a square inch, or about the same as Bessemer steel, while the rolled metal may reach over 100,000 pounds a square inch. Monel Metal has a stronger resistance to the weakening effect of high temperatures than any of the common metals; has a high elastic limit, is ductile, malleable, and is susceptible of a high and enduring polish.

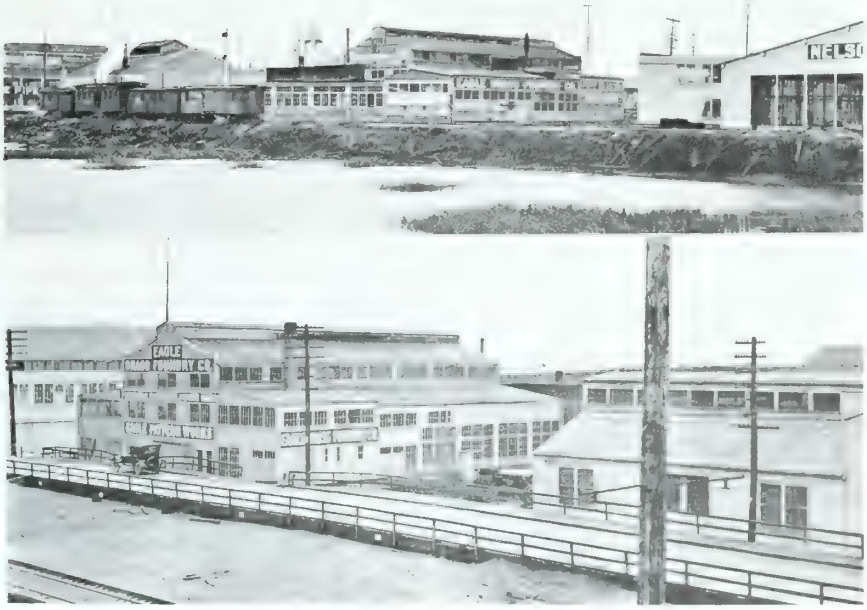
Chemically, Monel Metal contains about 67 per cent nickel, 28 per cent copper and about 5 per cent of other metals, mainly iron and manganese. On account of its strong resistance to corrosion, it finds wide application in meeting the trying conditions encountered either in the presence of salt water or air charged with salt water. Similarly it successfully withstands the action of high steam pressures and superheated steam.

Uses of Monel Metal

Its toughness and resistance to corrosion make it particularly suitable for seats, discs and stems of valves working under severe conditions. It has been found of special service for pump rods and liners. Pump liners and rods made of Monel Metal, instead of pitting, develop a smooth, glassy surface after being in use a short time and thus reduce packing to a minimum. Monel Metal has proved itself so satisfactory for this purpose that the pumping equipment of the United States naval vessels is required to be made of Monel Metal. Its co-efficient of expansion is about the same as steel, thus permitting it to be used in intimate contact with that metal with little danger of the development of undesirable stresses due to unequal expansion.

Propeller blades, bolts in salt water, condensers, sea-water inlets and outlets, yacht fittings, motorboat shafts and nuts, and screws, show a number of marine uses in addition to those already referred to. High pressure hydrant parts, plumbing fixtures, house screens, roofing, automobile trim, etc., illustrate the wide variety of uses in which Monel Metal finds application. The use of Monel Metal in laundry apparatus, acid conductors, ammonia refrigerating plants, chlorine dosing apparatus in water works, ropes for mine hoists, and pickling apparatus in sheet metal and tin plate rolling mills, testifies to its resistance to the action of a large variety of strong chemicals.

The Eagle Brass Foundry Company of Seattle, Washington, who represent Monel Metal in the Pacific Northwest, have made some experiments which promise very satisfactory results in alloying bronze and gun metal with Monel Metal to increase hardness and toughness without materially increasing cost.,



Two views of the shop of the Eagle Brass Foundry Company, distributors for Monel Metal in the Pacific Northwest

Victory Pipe Bending Machine

Above are shown views in the machine shop and foundry of the American Marine Iron Works at Portland, and a portrait of Mr. W. H. Beers. Mr. Beers is the inventor of the Beers Victory Pipe Bending Machine, which has achieved a notable record in speeding up work in the pipe bending shops of the shipyards of the Northwest. The American Marine Iron Works are manufacturing this pipe bending machine in four sizes, which will handle pipe ranging in size from one-quarter inch to six inches in diameter. The machine will bend the pipe cold without injury to the metal fiber, or even to the galvanized covering. It is especially useful in bending electric conduits, and has also been used very successfully with cold rolled steel and with round and square steel and iron rods.

LUNDIN LIFE BOATS PRAISED

THE steamer Dumaru sailed from San Francisco September 12, 1918, cargo gasoline, dynamite, naval stores, etc.; left Guam October 16 with crew of forty-six men and one passenger. Twenty miles from Guam, about 5:20 p. m., lightning struck the ship, which was followed by constant explosions of combustible cargo.

Crew put off in life boats; one boat under the command of the first officer arrived at the Philippine Islands November 9, having been at sea twenty-four days. This boat contained thirty men, eighteen of whom died from exposure.

The other boat was under the command of the third officer and arrived at the Philippine Islands November 10, having been at sea twenty-five days. Nine men in this boat.

Certain of the survivors, upon their return to San Francisco, spoke very highly of the qualifications and performances of the Lundin life boat, basing their recommendations on their experiences of being twenty-five days at sea in the same.

The steamer Dumaru was the property of the United States Shipping Board and was built on the Columbia River in 1918. The steamer was on her first voyage, bound for Manila. The Dumaru was a total loss, having burned to water's edge, then capsized, and as a derelict was finally destroyed by the United States Army transport Logan.

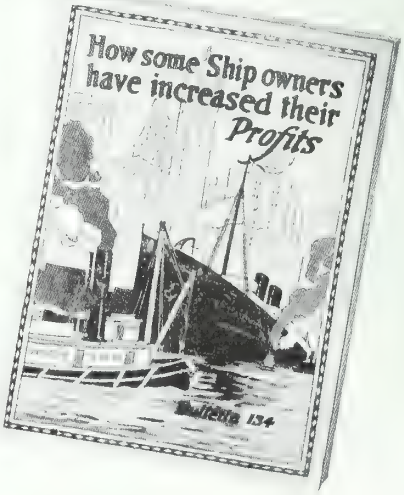
NEW WESTERN MANAGER

MR. WILLIAM FRANCIS, for many years manager of the Pittsburgh branch of the National Transit Pump & Machine Company, was recently appointed Western manager and has been installed as head of the new branch office of that company in Denver, Colorado.

Mr. Francis has had a lifetime of experience in the pump business and has long been known as one of the most expert officials of his firm. As manager of this new branch he will have one of the most important posts and will cover the entire Western territory, including Colorado, Montana, Wyoming, Mexico and everything west to the Pacific Coast. Service to Transit pump owners is a prime factor in the establishment of this branch.

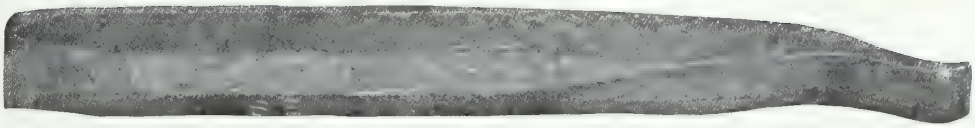
The extent of this territory will naturally require a man of exceptional ability.

Mr. William Francis



How some Ship owners have increased their Profits
Bulletin 134

Cover of an interesting catalog issued by the Diamond Power Specialty Company



Seminole steel chisel bent cold after hardening

"Seminole" a Paradox Steel

SEMINOLE STEEL can be made so hard that it will cut glass, yet it can be bent in this condition without breaking. This desirable property has long been sought for, and after years of experimentation, the Ludlum Steel Company, of Watervliet, New York, has developed such a steel in its brand, Seminole.

When hardened, this steel may be bent over the edge of an anvil, if hammered carefully. Owing to the popularly accepted theory that tools made of it will withstand any usage to which they may be subjected in actual service, it is estimated that its use will result in a large saving in the cost of reforging. It is said that a chisel made of this steel will duplicate its original work after reforging, and its salvage value would approximate its first cost. The steel flows readily when heated from a bright red to an orange color, and may be forged with ease. It has been found that the efficiency of the steel is not diminished by overheating, in the usual understanding of the term; in fact, the hotter it is made, the harder it gets, when quenched in either oil or water.

The steel was developed by P. A. E. Armstrong, vice-president of the Ludlum Company. It is made of orthodox alloys but arranged within certain critical zones in order to make martensite the predominating structure. While martensite is one of the hardest structures, it also is one of the most brittle. In the new steel it retains its hardness but loses its brittleness.

An unusual property of the steel is displayed in rolling. Practically all steels when being rolled have a fantail edge, due to the fact that the steel is driven more on the outside than the inside, thus giving the end of the bar the appearance of a "serpent's mouth." The pressure in rolling the new steel affects the inside more than the outside, and the steel in the center is squeezed out, giving the end of the bar a "rat-tail" appearance.

A most desirable feature of Seminole is its simplicity of heat treasment. No soaking or drawing is necessary to temper. For all general purposes it is simply heated quickly (preferably in a coal fire, although equal results may be obtained in a fast heating gas furnace) to about 1700 degrees Fahrenheit and immediately quenched in oil. To perform stunts such as bending after tempering, a slight draw to about a straw color, 400 to 500 degrees Fahrenheit, is required. Greater efficiency is obtained from this steel by the slight draw, but for all general purposes the proper heating and the quenching are all that is necessary.

Seminole steel is proving to be of particular interest to shipbuilders, bridgebuilders, railroad shops, pipe manufacturers, and, in fact, to every man who uses a cold chisel or punch. Cape chisels made of this steel can be bent without breaking. It is asserted that it will cut armor plate, nickel rivets and alloy steel billets satisfactorily, and will chisel cut steel that is almost file hard. The qualities claimed for it of toughness, hardness, non-battering, fatigue-resisting and simplicity of heat treating make it most desirable in any shop where shock tools are required.

The steel is particularly recommended by its makers for hand tools, beading chisels, pneumatic chisels (especially those doing heavy work), rivet sets, bull dies, plate punches and dies, mining drills and hollow drills. It is free from any tendency to warp, twist or move in hardening. Pneumatic tools made of Seminole will not crack or break at the fillet. Rivet sets are free from any tendency to break or crack under the hammer.

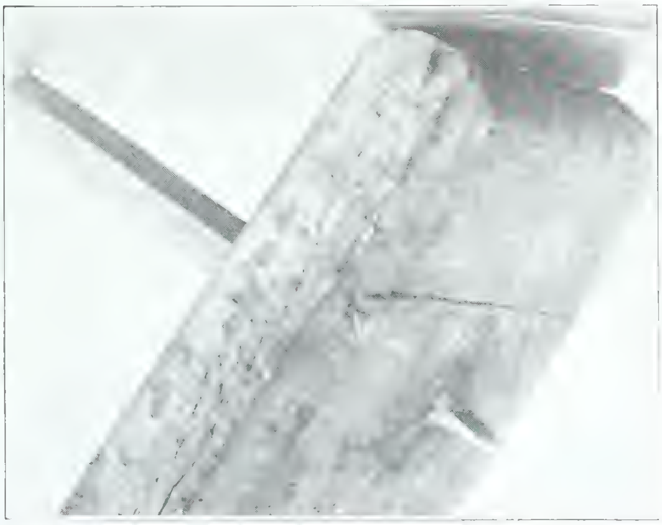
The discovery of Seminole steel is the result of research and the use of modern steel mill equipment. The Ludlum Steel Company is one of the oldest of the high-grade tool steel mills in the country. Established in the year 1854, it has grown from a small crucible plant to one of the largest high-grade tool steel producing mills in the country. Making nothing but high-grade tool steel, their melters, rolling mill men and hammer men are highly skilled in the expert handling of special steels.

Of particular interest in these mills are the electric crucible furnaces which are the outcome of many years of experience. Having experimented with practically every known type of electric furnace, the Ludlum Company developed a special form of electric crucible furnace wherein are combined all the benefits common to the crucible and the full refining possibilities of the electric furnace.

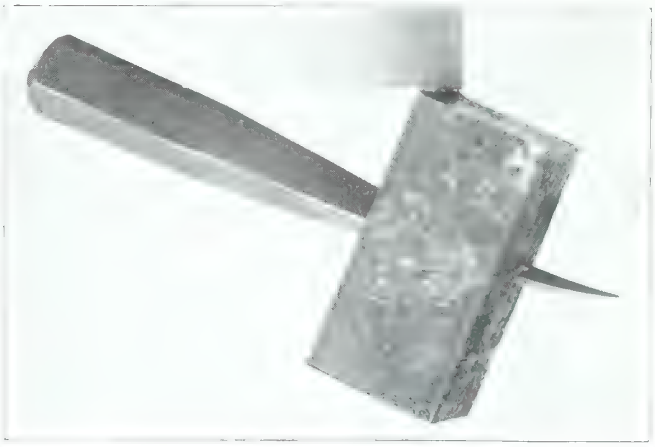
Pyrometer control of their reheating furnace is another interesting point peculiar to the Ludlum mills. These pyrometers give a ready means of checking up the expert furnace man's knowledge of temperatures, and are a tremendous advantage in turning out consistently uniform steel.

The several brands of steel manufactured by the Ludlum Steel Company have been recently introduced in California through the medium of Thomas S. Hutton, with offices in the Call Building, San Francisco, California. While in the service as lieutenant of engineers, he became acquainted with the Ludlum mill and methods, and upon his discharge, secured the soliciting agency for California.

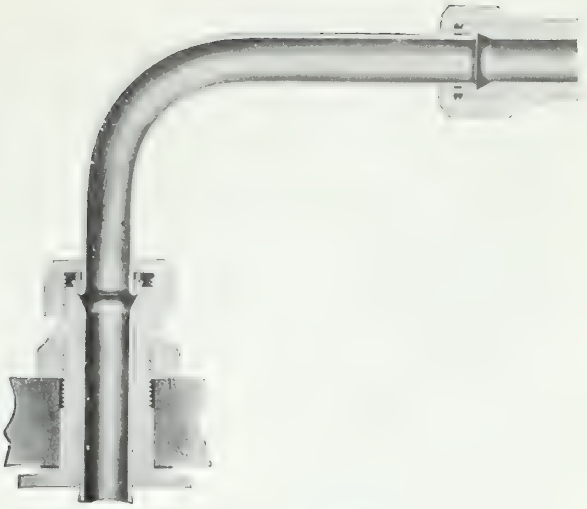
Mr. Hutton states that he is daily growing more enthusiastic on the merits of Ludlum steels because of the unfailing favorable report that follows every trial of their products. "Uniform quality" is the slogan of the company, and according to Mr. Hutton, it is significant.



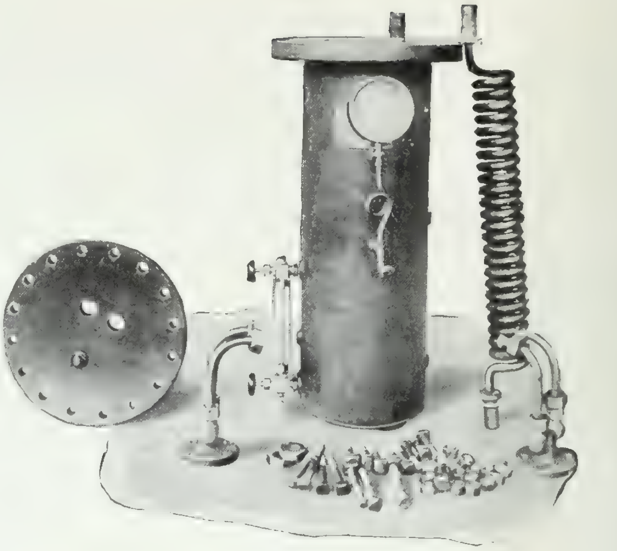
A ¾-inch file-hard octagon chisel of Seminole steel driven through a steel block 2½ inches thick. The block is of .35 carbon steel



A curved prick punch of Seminole steel which retained its curve while driven cold through block of .35 carbon steel



Patented expansion joint Reilly fuel oil heater



Reilly fuel oil heater disassembled

REILLY FUEL OIL HEATER

NOW that coal is such a scarce commodity and so expensive, attention is naturally turned to oil as a fuel, particularly as oil has many advantages over coal besides the present one of price. A few of these advantages are the total absence of ash, uniform operating conditions,, low handling cost, small storage space and minimum danger of spontaneous combustion.

One of the important items in the proper burning of fuel oil in power plant boilers is the heating of the oil before it goes to the burners, as this is necessary to insure proper vaporization, and, therefore, good combustion of the fuel oil.

In this connection the Reilly Fuel Oil Heater is of timely interest. It consists of a cast iron shell, suitable for a working steam pressure of 250 pounds per square inch with a heating surface of helical coils of seamless drawn steel tubing. The oil is pumped through the coils before the oil passes to the burners. Live steam in the shell of the heater is regularly employed as the heating agent because sufficiently high oil temperatures cannot be secured if exhaust steam is used.

Inasmuch as the condensed high pressure steam is returned to the boiler in order to conserve the heat in this condensation, it is essential that provision be made to prevent the possibility of a leakage of the fuel oil into this condensed steam. The Reilly Fuel Oil Heater is so constructed that there are no oil joints inside the steam space. This eliminates any possibility of a leakage of oil into this condensation.

By referring to the illustrations showing the fuel oil heater disassembled and to the artist's drawing showing the section of the Reilly Patented Fuel Oil Heater Joint, the distinctive features can be readily appreciated.

This heater is manufactured by the Griscom-Russell Company, 90 West street, New York City, and is largely used in the United States Navy and merchant marine and is rapidly coming into general use in stationary power plants.

LUMBER PRODUCTION IN THE UNITED STATES

FOLLOWING is a list of the computed totals of production of each kind of lumber in the United States for the year 1916, which may be taken as a normal year. It is interesting to note that oak is the largest item in hardwoods, with maple a low second and ash, hickory and walnut far down in the list. It is also of interest to note that out of a total of nearly forty billion feet of lumber produced, hardwood totals eight and one-half billions and the balance is softwood.

Yellow pine	15,055,000,000
Douglas fir	5,416,000,000
Oak	3,300,000,000
White pine	2,700,000,000
Hemlock	2,350,000,000
Western yellow pine	1,690,000,000
Spruce	1,250,000,000
Cypress	1,000,000,000
Maple	975,000,000
Gum, red and sap	800,000,000
Yellow poplar	560,000,000
Chestnut	535,000,000
Redwood	490,850,000
Larch	455,000,000
Birch	410,000,000
Cedar	410,000,000
Beech	360,000,000
Tupelo	275,000,000
Basswood	275,000,000
Cottonwood	200,000,000
Elm	240,000,000
Ash	210,000,000
White fir	190,000,000
Sugar pine	169,250,000
Hickory	125,000,000
Balsam fir	125,000,000
Walnut	90,000,000
Sycamore	40,000,000
Lodgepole pine	30,800,000
All other kinds	40,351,000
Total production for 1916, feet B. M.	**39,807,251,000**

White Brothers' Trade Bulletin, No. 15.

THE WESTERN ELECTRIC PORTABLE UTILITY LIGHT

A NEW type of night light for highly localized lighting has recently been placed on the market by the Western Electric Company. This light, which is to be known as the Western Electric Portable Utility Light, is for use at close ranges, where the light is to be located at a distance not greater than 125 feet from the object or surface to be illuminated.

With the light operating on a 100 foot throw, a 100-foot spread is obtained at an angle of sixty degrees.

The unit gives a smooth white light without gleam or glare. This is made possible by a new development—the hammered glass reflector. A 200-watt Mazda, Type C, lamp is used.

The unit is of especially rugged construction throughout and will withstand rough usage in service.

The hammered glass reflector is spring suspended in a one-piece cast iron housing. The housing is closed by a wire glass front, which is fitted into a recessed cast iron ring. This forms a door, which is hinged at the bottom and secured by a hand latch, thus affording easy access to the interior of the housing. The recessing in the ring makes the interior of the housing fully weather-proof.

The lighting unit can be furnished in either black or gray weather-proof enamel finish. It is 19¼ inches high and weighs approximately 30 pounds. This light weight makes the unit very easy to carry from place to place. The base is 9 inches in diameter, giving the light stability when mounted on a flat horizontal surface. The unit can also be mounted on either vertical or flat surface, such as walls, poles or roofs, by virtue of a heavy universal joint which fastens the housing to the base.

All adjustments can be made by hand—no tools are necessary.

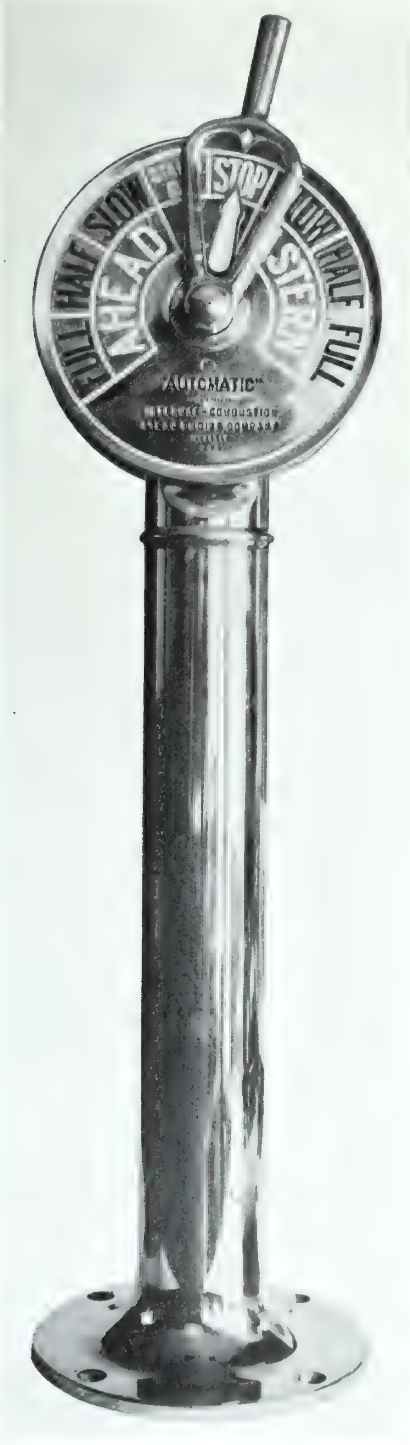
The Western Electric portable utility light has a wide range of applications. In railroad work it can be used for lighting transfer tables, coaling stations, inspection pits, loading platforms, cranes, roundhouses and drawbridges. On marine work it can be used for lighting docks, dredges, ships, loading operations, canal locks, dry docks and pile-drivers. Its industrial applications cover even a wider variety of uses, such as lighting shop yards, material yards, coal yards, well drilling, coal tipples, erecting shops, machine shops, tramways and inclines, conveyors and all kinds of emergency work.

Other uses will be found in illuminating play grounds, skating rinks, signs, street corners, alleyways, swimming pools, monuments, flags, building fronts and construction work in general.

REMARKABLE GROWTH OF OHIO BLOWER COMPANY

THE recently announced formation of the Ohio Body & Blower Company brings to public attention another chapter in the growth of an institution which is busily engaged in writing a typically American business romance. The Ohio Blower Company, from which the new corporation is an outgrowth, has long possessed an enviable reputation in the steam engineering field. Its many friends who knew and remember it in the days of its small beginnings, eighteen years ago, will find inspiration and interest in this brief review of its history.

Starting modestly, almost without capital, in small space in an already old building in down-town Cleveland, backed largely by hope and vision, its initial stock-in-trade with which to enter the national market was the Swartwout Helico-Centrifugal Exhaust Head. This cast-iron exhaust head was a pioneer of its kind. The sole other activity of the new company was the manufacture and erection of dust-collecting systems. The latter department was the wheel-horse of the company over the decade to follow and remains today a considerable factor.



The "Automatic," an efficient engine-room telegraph, manufactured by the Internal Combustion Steam Engine Company, Seattle

The exhaust head proved to be the "daddy" of a long line of kindred steam specialties—steam and oil separators, the hydromatic steam traps and water-level control valves, and feed-water heaters being added at varying intervals.

In the meantime the sheet-metal department had not been lacking in progressiveness. Out of this department came first the Swartwout Rotary Ball-Bearing Ventilator (patented), the first successful device to apply the rotary principle to induce ventilation by means of a partial vacuum. Now a standard and accepted factor in the architectural and engineering fields, the unique silhouette is a familiar sight on the skyline of modern structures from coast to coast.

The next development of the sheet-metal department was the addition of steel core-ovens to the rapidly-growing Ohio Blower line. Two styles of ovens are supplied to the foundry trade—truck-type and shelf-type, together with core racks and similar accessories.

When the entrance of the United States into the war compelled the inauguration of the huge shipbuilding program, the engineers of the Ohio Blower Company determined to apply their long familiarity with air-handling and sheet-metal fabrication problems to an opportunity which they felt existed toward speeding the work. The result was the Swartwout Standardized Ship Cowl, complete with turning gear. This cowl, used in large quantities under the government program, and the first cowl ever designed for quantity production and purchased from stock, is now developing a peace-time market.

While the addition of each of these varied lines served to increase noticeably the company's sales-total and extend its "family" of sales-agents throughout the United States and the world, the weeks immediately following the armistice saw the step taken which has proved the most radical and far-reaching in the company's history. In that month the directors, convinced of the great market existing in the immediate territory around Cleveland, voted to enlarge their plant to provide space for a department to build high-grade motor-bodies on a production basis. Here the long years of expert sheet-metal fabrication served the company in good stead. Dating from the sale of the first Lind motor body, the problem of the company ever since has been to keep the manufacturing facilities apace with orders. The funds derived from the new issue of stock will be used largely for this purpose.

The Ohio Body & Blower Company will take over three plants from the older company. Plant No. 1 is the three-story plant on Perkins avenue, Cleveland, which served for five years as the exclusive home of the company. Plant No. 2 is the new plant, housing the home offices, on Detroit avenue, on the west side of the same city. Plant No. 3 is the modern foundry at Orrville, Ohio, which operates exclusively on Ohio Blower Company work. These three plants provide employment for more than 600 workers in 15,000 square feet of floor space. Spring will see these figures increased to 1000 workers and 350,000 square feet of floor space by the completion of another unit of Plant No. 2, to be devoted to the building of closed bodies.

The paid-in capital of the Ohio Body & Blower Company is approximately three times that of the Ohio Blower Company and affords ample resources for further expansion in plant and business. The change will not affect the personnel of the management in any way. The officers of the older company, Mr. D. K. Swartwout, president, and Mr. H. H. Lind, vice-president, assume the same offices in the new corporation and will be backed up in their efforts by the same corps of able assistants in all departments.

A PIONEER IN AMERICAN ENGINE BUILDING

THE H. G. Trout Company of Buffalo, New York, is one of the pioneer engine building firms of America. The plant is situated at the eastern end of Lake Erie and is, therefore, at the transfer point connecting the Great Lakes with the seaboard at New York City through the Great Erie Canal. The distance by rail to New York is about 500 miles and is covered by railroad freight in practically one day. The H. G. Trout Company occupies an entire city block near the Lake front. The business was started in 1844 as the Shepard Iron Works and was reorganized in 1870 as the King Iron Works.

Mr. H. G. Trout entered the service of the Shepard Iron Works in 1849 as an apprentice and developed with the business. In the year 1872 he took over the plant and ran it under his own name until 1908, when he incorporated under the name of the H. G. Trout Company and continued in the management until his death in 1911.

When this company was started in 1844, standard marine engines were simple high pressure for the smaller sizes and low pressure condensing for the larger sizes, in almost all cases one-cylinder engines. The larger engines were used mostly upon paddle-wheel boats, the screw propeller being in its infancy. Mr. Trout, therefore, began with the marine problem in its early days and developed with it. He was especially fortunate in being associated with Mr. H. O. Perry, who was one of the first superintendents of the Shepard Iron Works and a pioneer in steam engineering. Mr. Perry is credited with many early patents incident to the development of the compound engine and Mr. Trout was intimately connected with their development as foreman and superintendent. Most of the early compound engines on the Lakes were built on the Perry and Lay principle

The compound engine was introduced into America about the year 1867 and the first installation consisted in replacing the condensing engines then in use by adding a high-pressure cylinder on top of the then existing low pressure, creating the so-called steeple compound engine. Once the principle was proved to be economical, the building of new installations followed rapidly, and very shortly the steeple compound engine was superseded by the cross compound, where the high pressure and the low pressure cylinders were placed side by side, operating their own cranks. The triple expansion and quadruple expansion engines followed in their order, and the H. G. Trout Company continued to be abreast of the times in the development of all the above types.

During the world war, the H. G. Trout Company devoted its entire engine building capacity to the construction of 3500-horsepower triple expansion engines for ocean-going ships. The cylinder sizes for these engines are 26½-inch, 44-inch and 74-inch diameter by 51-inch stroke. These engines are giving perfect satisfaction.

The development of the screw propeller appealed to Mr. Trout and he devoted much of his time and attention to that problem. He had a peculiar genius for adapting each wheel to the boat and the special conditions under which it was to be used, and his continued success increased the demand for his wheels, thereby developing new trade until the "Trout Propeller" is now known in all parts of the world where propeller wheels are used.

Anything from the simple non-condensing engine to the triple expansion can be designed or built from customers' drawings, while propellers ranging from one foot to twenty feet in diameter can be made on short notice, in iron, semi-steel or bronze. The foundry is equipped with the latest facilities for producing iron castings up to twenty-five tons in weight, and brass castings up to fifteen tons in weight, while the machine shop is fully equipped with modern machinery to take care of everything produced in the foundry.

Mr. W. B. Trout, who is now president of the company, started in 1865 and has therefore served fifty-four years. Two other members of the organization have each exceeded thirty years' service.

Each department is supervised by a specially trained man who has had several years' experience and who is fully qualified to solve the problems presented to him.

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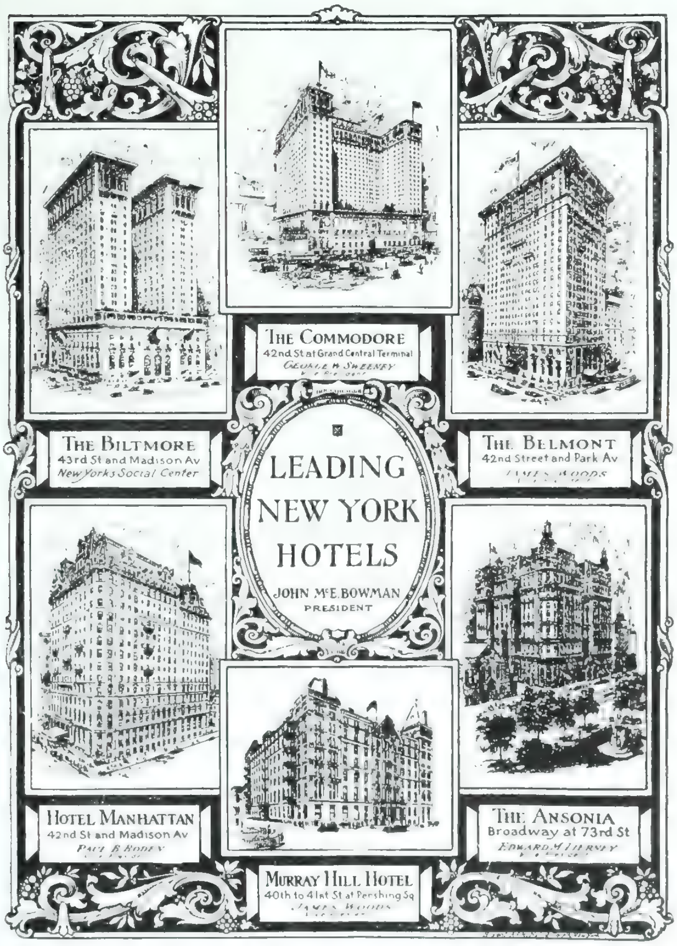
FIFE BUILDING SAN FRANCISCO



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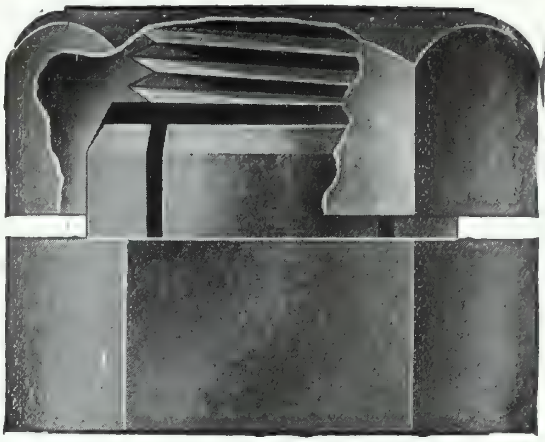

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Trade Literature

TOYO KISEN KAISHA FOLDER

NOW that the travel restrictions have been withdrawn to a great extent, the tide of tourist traffic is turning with eager eyes to the trans-Pacific voyage and the fascinating lands that lie beyond the setting sun. In response to this increased demand for information regarding this wonder journey, steamship companies operating from San Francisco are issuing some remarkably attractive printed matter. The most beautiful and comprehensive of any travel literature yet published has just been received from James King Steele, manager of the publication and exploitation department of the Toyo Kisen Kaisha (Oriental Steamship Company). In this folder, which is printed in four colors and lavishly illustrated, the traveler is carried by text and engravings from San Francisco to Honolulu and thence to Yokohama, Kobe, Shanghai, Manila and Hongkong "Along the pathway of the Sun," which is the popular name for the semi-tropic route traversed by the ships of this line. All the principal points of interest in Japan, China and the Philippines, including the wonderful overland rail tour from Shanghai to Peking, Mukden (Manchuria), Seoul (Korea) and back to Japan are described in detail as to cost of rickshas, motors, hotels, railway and sleeper fares and time schedules, etc., in a manner more comprehensive than in anything heretofore attempted. As an aid to understanding the text, a superb map of Japan and the Far East is given a prominent place, showing the overland tour above mentioned and the Pacific, with rail routes and steamship lines.

Tourists coming from the Orient to America are also assisted by the splendid illustrated map showing the interesting places of the United States with detailed information regarding the railroads, hotels and places of interest.

Mr. Steele, besides being in charge of the steamship company's advertising department, is also editor of "Japan," a beautiful monthly travel publication issued by the Toyo Kisen Kaisha and is recognized as a leading authority on trans-Pacific and Oriental travel. He has recently returned to San Francisco after his annual visit abroad.

HOW SOME SHIPOWNERS HAVE INCREASED THEIR PROFITS

Diamond Power Specialty Company's literature has always been marked by its appeal to the sound good sense and the engineering knowledge of the executive to whom it is addressed. This is particularly true of the company's new bulletin, "How Some Shipowners Have Increased Their Profits." The bulletin is written particularly for owners, managers and superintending engineers as well [illegible] as the vessel chiefs.

The book deals first with the relation of boiler efficiency to coal consumption and to steaming radius. It then discusses the relation of soot to boiler efficiency, and after an interesting review of the soot problem, discusses Diamond Soot Blowers for all types of boilers, in considerable detail. The bulletin is a forty-eight page, handsomely bound book, printed throughout in two colors, making it extremely attractive as well as interesting, because of its contents. Copies may be had on application to the company in Detroit or by addressing F. W. Leahy, Marine Manager, 32 Broadway, Room 1611, New York City.

What We Do. By the Wellman-Seaver-Morgan Company, Cleveland, Ohio.. A very interesting booklet of 63 pages, illustrating the engineering activities and undertakings of these well-known designers and builders of apparatus for handling and transporting materials and all power machinery. Herein will be found described the largest developments of hydro-electric power and the largest application of that power to material handling problems.

Revised and Enlarged Bulletin No. 112-B, entitled "Condensers, Pumps, Cooling Towers, Etc." The Wheeler Condenser & Engineering Company, Carteret, New Jersey. This bulletin illustrates the latest developments in condenser practice. It shows a surface condenser containing fifty thousand square feet of surface. Sixteen condensers of approximately this size are now under construction. These will contain approximately 1000 miles of Crescent Brand tubing drawn in the large Wheeler tube mill. The bulletin shows photographs of a number of actual installations of surface condensers. It illustrates and describes surface condensers, jet condensers, barometric condensers, the Wheeler-Edwards air pump, the Wheeler rotative dry vacuum pump, the Wheeler turbo-air pump, the patented Wheeler steam jet air pump, Wheeler centrifugal pumps for all services, jet condensers, barometric condensers, natural and forced draft cooling towers, feed water heaters, and Wheeler evaporators and dryers.

A free copy of any of the bulletins described above will be sent to responsible persons upon mentioning this publication.

CARGO SHIPS

Of great gray ships with angry mouths
That spit with fangs of death,
Of great, grim guns and hurtling tons
Of hell-bred steel and fiery breath
  Some scribes are wont to write.

But I would rather tell of ships
With dazzled coat and cubist art,
Within whose hold a cargo—gold,
For fighting men from Freedom mart
  Food to eat, and fight.

Of great gray ships and gaunt grim
    guns
Some poets love to sing,
But I, uncouth, would chant the truth,
And a merry welkin ring.
  To a barnacled old tramp.

"Ships are but steel," the cynic says,
"Cold Steel—with energy."
But I see a soul in the ocean toll
Of each martyr of the sea,
  My eyes are dim and damp.

And if I were rich, on a wind-swept
    shore
I'd build a monument
Upon whose sides kissed by the tides
Proudly would I indent
  Each boat and skipper's name.

Aye, names of ships and noble crews
Who rest in Neptune's caves,
They pawned a life to aid the strife,
Though victims of the pirate knaves,
  Are crowned with martyrs' fame.

—A. M. Sullivan.

THE COLLINS-FERGUSON COMPANY

GLENVILLE A. COLLINS, mechanical engineer, who for several years has been manager for the Wellman-Seaver-Morgan Company in Seattle, has withdrawn from that firm and resumed practice as consulting engineer with offices at Suite 1316-1318, L. C. Smith Building, Seattle, and with branch offices in the Gasco Building, Portland, Oregon; also at Tokyo, Japan, and Shanghai, China.

Glenville A. Collins

Mr. Collins has been a resident of the Northwest for fifteen years and has been actively engaged in various constructive enterprises throughout the Northwest.

Recently Mr. Collins organized with Mr. H. P. Ferguson of Portland the Collins-Ferguson Company. This new company is doing a large machinery business in Oregon and Washington and maintains several offices in the Orient.

Mr. Ferguson recently returned from Japan with several splendid orders for large plants, and after touring the States on a buying expedition has again left for Japan.

The Collins-Ferguson Company is the exclusive representative for some of the best American manufacturers of power plants, railway, terminal and mining equipment, and is also prepared to contract to design and build complete plants ready for operation.

Pacific Marine Review

[illegible]
San Francisco's
Water Front
Aero View

MARCH
920

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Pacific Marine Review

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SAILINGS FROM SAN FRANCISCO FOR JAPAN AND ORIENT
Persia Maru ..... March 11
Seiyo Maru . March 12
Choyo Maru .... March 25
Korea Maru March 30

SOUTH AMERICAN PORTS
Anyo Maru April 22
Seiyo Maru .... June 22

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Pacific Marine Review

The National Magazine of Shipping

March, 1920

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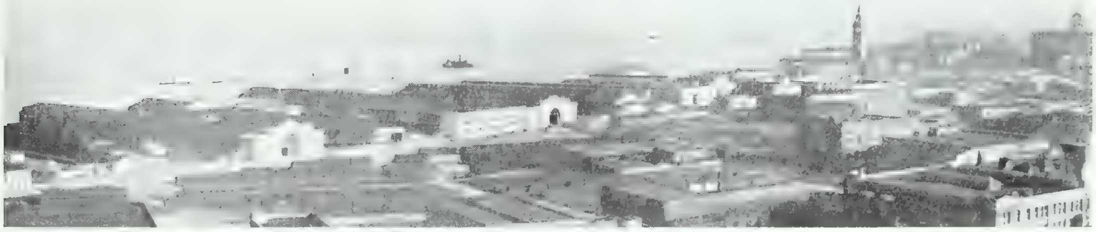
Industrial Attractions of San Francisco

By C. A. Day

Director, Industrial Department, San Francisco Chamber of Commerce



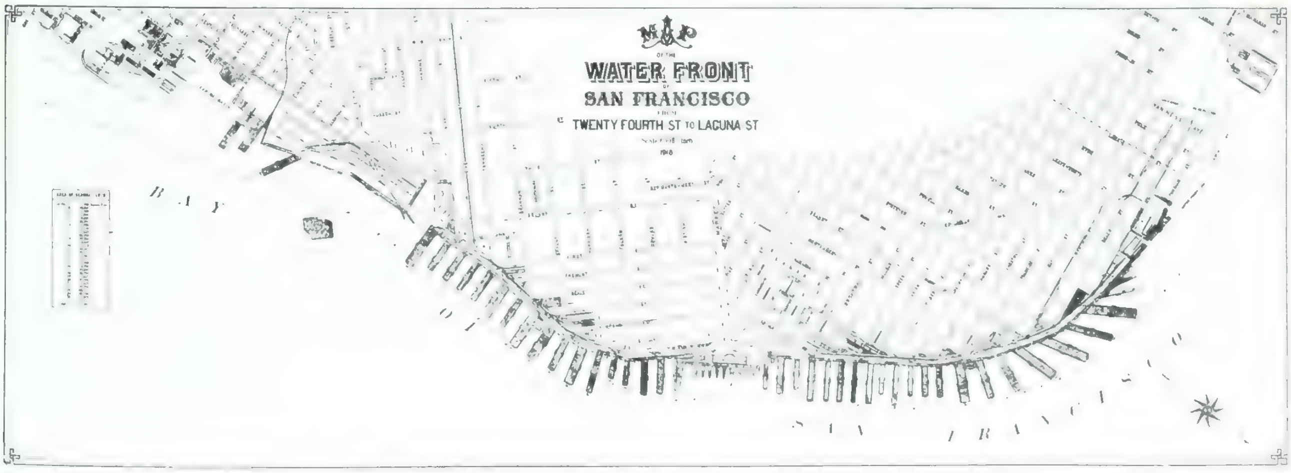
View of a portion of the San Francisco waterfront

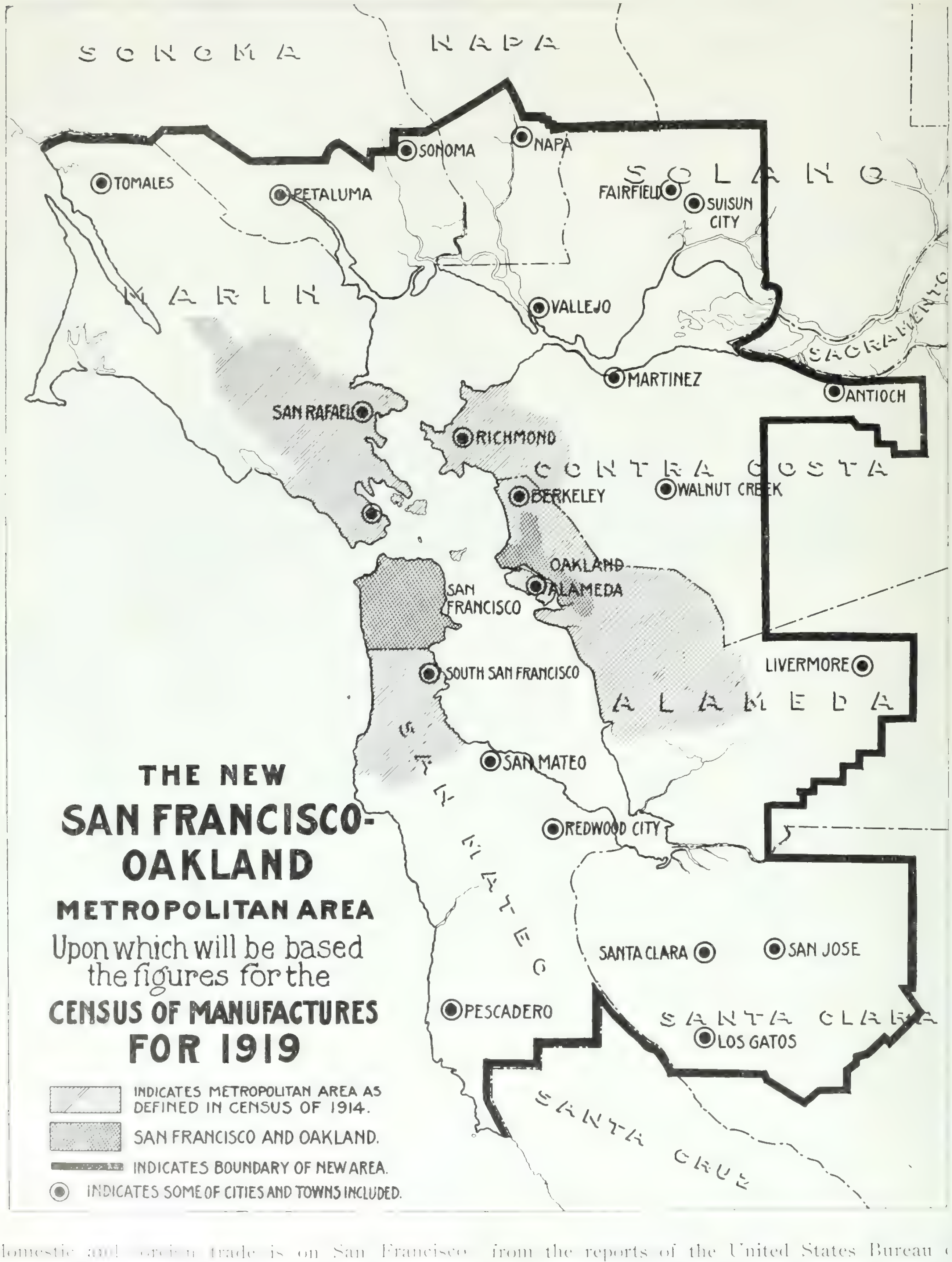
A WORLD WAR was necessary to disclose the tremendous resources of the Pacific Coast as a manufacturing district. The unprecedented demands of our own and foreign governments resulted in achievements in the way of food production, shipbuilding, lumbering, chemical manufacture and other activities which would not have been dreamed of under normal conditions. Prior to 1914 the average Easterner thought that industrial America extended west only as far as Chicago, and that this belief was shared by American government officials is shown by the almost total failure of the Army and Navy purchasing departments to utilize and develop the manufacturing resources of the far Western States until the war was practically over. Had hostilities continued a year or two longer the congestion of Eastern railroads and factories would have forced a belated recognition of this important manufacturing district which was practically overlooked. Exceptions must be made in some cases, notably that of the Emergency Fleet Corporation, which awarded large contracts to Pacific Coast shipbuilders, resulting in the creation on San Francisco Bay of one of the greatest steel shipbuilding sections in the world. Workers in the shipyards, foundries and machine shops increased in a few months from a mere handful to upwards of 75,000, and most of these are yet here and will remain if given reasonable assurance of continued employment.

California's reputation as a great food-producing state was maintained during the war, and the big ocean freighters, built in record time in the local shipyards, were loaded with the products of its mills, canneries and farms and dispatched with food for our armies and our allies. Before this country entered the war, foreign governments secured practically the entire output of California's big powder factories, and thousands of tons of high explosives were shipped to Europe in American and foreign bottoms.

These were California's chief contributions in a material way toward winning the war. Much more could have been done had the opportunity been given.

The most central location on the west coast for the manufacture and distribution of goods for both





domestic and foreign trade is on San Francisco Bay, which, in conjunction with the Sacramento and San Joaquin rivers, forms a safe harbor and a vast inland waterway which facilitate the collection of raw material and the distribution of finished products and has proved exceedingly attractive to industry.

Even during the pre-war period the growth of manufacturing in this district was impressive, as is shown by the following figures which are taken from the reports of the United States Bureau of Census: In 1899, 2016 factories produced goods to the value of $119,240,348; in 1904, 2621 factories produced goods valued at $159,033,080; in 1909 the number of factories was 2539 and the value of products had increased to $199,593,117; and in 1914 there was further increase to 3249 factories, which produced goods to the value of $258,077,474. There are no official figures available since 1914, but it is assumed, on the basis of unofficial data obtained from many sources, that the United States Census of Manufactures for 1919 will show upwards of 4000 factory establishments now operating in the San Francisco - Oakland industrial area and a production in excess of $400,000,000.

The San Francisco - Oakland industrial district, as designated on the maps of the United States Census Bureau for 1919, will contain a much larger area than that shown in former reports of the bureau. Its boundaries have been extended to include all of the important manufacturing centers on the bay shore and up the Sacramento River as far as Antioch. This increase was granted on the showing made by the industrial department of the San Francisco Chamber of Commerce that practically all of the important industrial units in the bay section, while properly belonging in San Francisco, and in fact maintaining their main offices and sales organizations in the metropolis, were forced to erect their factories at adjacent points where land is obtainable in large tracts at much lower prices than prevail in the limited industrial area of the peninsula. San Francisco in this respect is not dissimilar to New York, and the history of its industrial growth will closely parallel that of our sister city on the Atlantic.

Many arguments can be advanced which point to San Francisco as the center of one of the world's great manufacturing districts of the future. The Pacific Coast States are the great producers of raw materials, and the local manufacturer is saved the heavy freight charges which must be added to the costs of his Eastern competitor. The great forests of the West are now supplying the entire country with lumber. Large deposits of iron ore are known to exist in California and their extensive development is a problem of the near future. Coal will be obtained from Alaska, where production will follow the completion of the government railroads. The whole district is rich in minerals which are used in the manufacture of chemicals, which, in turn, form the basis of manufacture in many other lines. California is the great food-producing state of the Union and the products of its farms, orchards and fisheries furnish the material which keeps the wheels turning in hundreds of factories. As the chief port on the Pacific Coast, San Francisco is the logical Western market for copra, crude rubber, vegetable oils, jute, hemp and other Oriental products which are extensively used in American factories.

Unlimited power is developed in the mountains of California by the great hydro-electric plants and transmitted to the coast over high-tension lines. In comparison with nine Eastern cities, the local rates for the heavier loads required by large plants are from 12 per cent to 140 per cent lower. Crude oil is almost universally used for factory fuel purposes, is obtainable in unlimited quantity, and is a cheap and efficient fuel.

As a shipping and distribution point, San Francisco has no equal on the Pacific Coast. The harbor, with its 450 square miles of placid surface, could provide safe anchorage for the merchant fleets of the world. Existing docking facilities provide for the simultaneous accommodation of 61,800 deadweight tons for repairs. Bond issues amounting to $21,600,000 have been devoted to the development of the harbor in addition to vast sums expended from port revenues. Two hundred and twenty-three acres of docks and wharves, served by 144 spur tracks, have been built for the accommodation of bay and river, coastwise and deep-sea shipping. San Francisco alone has a developed waterfrontage of over four miles, with a minimum water depth at the sea wall of thirty-four feet.

Three transcontinental railroads have their western terminals at San Francisco, in addition to three coast lines which reach from the northern to the southern boundaries of the Pacific States. Local transportation is provided by steam and electric railways, and by bay and river steamers, which maintain a regular passenger and freight service between San Francisco, Sacramento and Stockton.

San Francisco, being the largest commercial city on the west coast, is visited frequently by business men, buyers and manufacturers from all parts of the world, affording frequent opportunities for personal contact between producer and consumer. Statistics of the United States Immigration Bureau for 1919 show that 19,432 cabin passengers arrived and 19,274 departed from the port of San Francisco, against 2963 arrivals and 2770 departures from Seattle and other American Puget Sound ports.

The population of the San Francisco metropolitan area is about one and one-fourth million, and Pacific Coast States, with a population of about ten million, can be justly claimed as lying within its distributive area.

In finance San Francisco far outstrips any other city in the West, its bank clearings for 1919 amounting to $7,286,339,237, or $706,000,000 more than the combined clearings of the next five largest Pacific Coast cities. Its total bank resources are in excess of one billion dollars, and total deposits exceed $500,000,000.

The heavily populated bay district affords the best market on the Pacific Coast for skilled, unskilled and female labor. Italians, Portuguese, Spanish and Greeks predominate, and these hardy races produce ideal workmen, particularly for the heavy industries. Climatic conditions are such that out-of-door employment is possible for 365 days of the year, and cool, bracing weather tends to a maximum efficiency in the worker. Artificial heating of plants in the winter and cooling in summer are entirely unnecessary.

Factory sites are available on the San Francisco peninsula or at points on the bay shore within easy commuting distance from the city. Prices run from a few hundred dollars an acre in the outside districts, to four or five dollars a square foot in the city proper, and the range in area is unlimited for practical purposes. Many locations are adjacent to deep water and spur tracks connecting direct with the main transcontinental lines are always obtainable. The whole industrial area is served with electric power by the lines of the hydro-electric companies. In many cases an ample water supply can be developed from wells which tap abundant underground sources, although in some cases it is found necessary to depend on the private companies, of which there are several in the district.

In summing up, it will be found that the San Francisco metropolitan area possesses practically everything necessary to manufacturing in addition to peculiar advantages of its own which are not found elsewhere on the globe. The future holds rich promise that, in addition to its superlative attractions as a place in which are found in abundance the things which make life worth living, San Francisco is destined to become the center of one of the world's great marts of trade and commerce.

Synopsis of Merchant Marine Policy Hearings Before the Senate Commerce Committee

By The Traffic Manager

HEARINGS are now being held in Washington before the Senate Committee on Commerce to determine the future merchant marine policy of the United States of America, and this article is an attempt to briefly summarize the hearings to date for the benefit of the general public who are not supplied with the reports of these hearings.

The personnel of the Senate Committee on Commerce is as follows:

Wesley L. Jones, chairman, of Washington, D. C., Republican.
Knute Nelson, Minnesota, Republican.
Laurence Y. Sherman, Illinois, Republican.
Warren G. Harding, Ohio, Republican.
Bert M. Fernald, Maine, Republican.
William M. Calder, New York, Republican.
Irvine L. Lenroot, Wisconsin, Republican.
LeBaron B. Colt, Rhode Island, Republican.
Charles L. McNary, Oregon, Republican.
L. Heisler Ball, Delaware, Republican.
Walter E. Edge, New Jersey, Republican.
Duncan U. Fletcher, Florida, Democrat.
George E. Chamberlain, Oregon, Democrat.
Joseph E. Ransdell, Louisiana, Democrat.
Morris Shepard, Texas, Democrat.
Thomas S. Martin, Virginia, Democrat.
John H. Bankhead, Alabama, Democrat.
F. M. Simmons, North Carolina, Democrat.
James A. Reed, Missouri, Democrat.
William F. Kirby, Arkansas, Democrat.

There are three merchant marine bills pending, viz.: the House Greene Bill, the Senate Ransdell Bill, and the Senate Jones Bill. The first two of these bills advocate the forced sale of all vessels at world market prices within a short period of time; the ships of over 6000 tons to remain under American registry until released by the Shipping Board, and those under 6000 tons to be free to go under foreign flags. An opposite policy is provided by the bill of Senator Jones, which creates the machinery that would enable Shipping Board vessels to remain under American registry, and to be used as a means, where needed, of building up pioneer trade routes, thus displacing foreign tonnage in the carriage of merchandise and passengers, and keeping in commission, ready for emergency, a larger volume of American tonnage.

The hearings began on Wednesday morning, January 20, 1920, and the two principal witnesses on that date were B. S. Grosscup, general counsel, and A. F. Haines, general manager of the Pacific Steamship Company.

Mr. Grosscup advocated the sale of all ships to Americans at greatly reduced prices as a form of subsidy for the establishment of the American merchant marine, which he stated could not exist without government assistance. Ships of less than 6000 tons should be disposed of at nominal prices to serve as feeders to regular lines of larger ships. He advocated a fleet of ocean-bound ships sufficient in number, variety, style, size, speed, type, and other conditions, to enable the President to face military or economic emergency "with soft words but with a big stick," and in the meantime to keep the ships operating in profitable trade for the benefit of all American business interests, making their operators a medium of trade development. He further advocated the fostering of an ultimate creation of maritime companies whose shares shall be widely distributed, thereby giving to every citizen a chance to participate in the profits, if any profits result. He believes that the plan of Senator Jones, to turn over to a non-political Federal corporation, completely separated from the Shipping Board, will best accomplish the primary purpose of a maximum passenger and cargo fleet under the American flag, and that the government should not abandon the policy of developing an efficient, stalwart merchant marine, but that legislation should be provided to enable executives to add to it.

Mr. A. F. Haines recommends the formation of a Federal merchant marine corporation as outlined in the Jones bill, the life to be at least twenty-five years; this corporation to be authorized to buy, sell, charter, and build vessels, shipyards, terminals, etc., and to issue $3,000,000,000 small denomination bonds; no individual to hold in excess of $5000. He believes this system will popularize marine securities and put the bonds in the hands of at least 600,000 investors, thus educating and interesting the public in our merchant marine; said corporation to sell ships to private owners on easy terms—say 5 per cent down and 5 per cent a year until paid. He stated this might seem a low price, but some form of government assistance would be required to keep our vessels under the American flag. Indications pointed to the fact that the government may require another Liberty Loan, and instead of introducing a new Liberty Loan, why not make it a Merchant Marine Loan, and as a single Federal owned operating body would be necessary, why not make it the Merchant Marine Corporation? The Shipping Board should become, as originally intended, a regulating body, combining the duties of the Steamboat Inspection Service, Bureau of Navigation, Treasury Department, Bureau of Foreign and Domestic Commerce, Immigration Department, and others. Mr. Haines thinks that if the Ransdell bill or the Greene bill is passed the American merchant marine will disappear. He believes that our wooden ships should be sold, but that our small steel ships should not be sold because they can be profitably operated between foreign ports, and are needed in time of national emergency; a naval reserve should be created, which would pay a graduated retainer to ships' officers. Mr. Haines also recommends certain changes in our navigation laws, particularly pertaining to the Steamboat Inspection Service, and forcibly brings out the fact that a merchant marine is necessary in case of international difficulties.

The American Steamship Owners' Association, at its meeting on January 27, 1920, adopted the following resolutions to be placed before the Senate Commerce Committee:

RESOLVED, by the American Steamship Owners' Association, That we reaffirm the declaration of a National merchant marine policy adopted at a general meeting on November 10, 1919, recommending that the American merchant marine be owned and operated by private individuals, firms and corporations, and indicating how the present war-built government-owned fleet could be transferred to private control and successfully operated to the best advantage of the nation.

RESOLVED, That we particularly reaffirm the recommendation that government-owned ships of over 6000 deadweight tons be sold only to American individuals, firms and corporations to be retained beneath the American flag.

RESOLVED, That government-owned ships of less than 6000 deadweight tons be sold preferably to American citizens so far as there may be need of such ships in carrying American commerce and that such of these ships be sold to foreign citizens or subjects with the privilege of a change of registry as the Shipping Board, after inquiry of all steamship owners and operators, shall decide are not required for the development of American trade routes or for the promotion of an efficient merchant marine. American purchasers should also have the right of resale to foreign subjects with the privilege of transfer of registry.

RESOLVED, That it is the sense of the association that, having regard to a proper equalization of capital charges with those of our principal foreign competitors, in point of depreciation, interest and insurance, all single-screw steel-built steamers of the government-owned fleet, of 12,900 deadweight tons and under, should be sold, as above recommended, at a price not exceeding $100 a deadweight ton, depending upon the type, class and condition, with a proper allowance for depreciation for age, and with exemption for from ten to fifteen years from Federal excess profits taxation if employed in the foreign trade.

RESOLVED, That in the allocation of government-owned ships that may be unsold after the remainder of the fleet has been disposed of to private ownership and control, preference be given as far as practicable to those American individuals, firms or corporations that already own ships or purchase government-owned tonnage, and thereby contribute to a complete, privately owned and controlled merchant marine.

President H. H. Raymond presided, and a list of the shipowners present, adopting said resolutions, is given below:

American-Hawaiian Steamship Company.
American Transportation Company.
Atlantic & Pacific Steamship Company.
Barber Steamship Lines, Inc.
A. H. Bull Steamship Company.
Clinchfield Navigation Company, Inc.
Clyde Steamship Company.
Crowell & Thurlow Steamship Company.
Dollar Steamship Company.
France & Canada Steamship Corporation.
Garland Steamship Corporation.
Gaston, Williams & Wigmore S. S. Corp.
Gulf Refining Company.
Gulf & Southern Steamship Company.
Harriss, Magill & Company, Inc.
International Mercantile Marine Company.
Livermore, Dearborn & Company, Inc.
Luckenbach Steamship Company, Inc.
Mallory Steamship Company.
Maru Navigation Company.
Moore & McCormack Company, Inc.
Munson Steamship Line.
New England Fuel & Trans. Company.
New York & Cuba Mail Steamship Company.
New York & Porto Rico Steamship Company.
Old Dominion Steamship Company.
Oriental Navigation Company.
Pacific Mail Steamship Company.
Pacific Steamship Company.
Pan American Pet. & Trans. Company.
Pocahontas Fuel Company, Inc.
Red "D" Line.
Southern Pacific Company.
Southern Steamship Company.
Standard Oil Company of New Jersey.
Standard Oil Company of New York.
Sun Company.
Texas Steamship Company.
United Fruit Company.
United States Steel Products Company.
Vacuum Oil Company.
Warren Transportation Company.

The **Pacific American Steamship Association,** with its main office in San Francisco, sent the following wire to the American Steamship Association, under date of February 5, 1920:

> "Pacific American Steamship Association, through its committee on legislation and policy, this date unanimously endorsed the resolutions adopted by American Steamship Owners' Association at its general meeting held at the Produce Exchange, New York, Tuesday, January 27, with the following exceptions: We disapprove recommendation that 'All single-screw steel-built steamers of the government-owned fleet of 12,900 deadweight tons and under should be sold as above recommended at a price not exceeding one hundred dollars per deadweight ton.' We recommend that vessels of government-owned fleet be sold at world market price of tonnage of similar type and age. Please present our recommendations to the Senate Commerce Committee at the hearings of the shipping policy now in progress."

The membership of this association is as follows:

Associated Oil Company.
China Mail Steamship Company, Ltd.
Columbia Pacific Steamship Company.
Gulf Main Steamship Company.
Hind, Rolph & Company.
Luckenbach Steamship Company, Inc.
Matson Navigation Company.
Oceanic Steamship Company.
Pacific Steamship Company.
Pacific Mail Steamship Company.

Standard Oil Company.
Struthers & Dixon, Inc.
Swayne & Hoyt, Inc.
The Dollar Company.
W. H. Grace & Company.
W. S. Scammell & Company.
Williams, Dimond & Company.

The United States Chamber of Commerce submitted the question of our merchant marine to its membership, and 522 branch chambers, situated in forty-four states, Hawaii, Porto Rico, Alaska, Mexico, Italy, France and Cuba, voted as follows on the nine questions involved:

> I. Sale of wooden vessels, and of steel vessels under 6000 tons deadweight, on the best terms obtainable from American or foreign bidders, is recommended by the committee.
> 1236 votes in favor.
> 234 votes opposed.
>
> II. Sale of other government-owned vessels to regional associations for transfer at cost to private individuals and corporations of the several regions is recommended by the committee.
> 1201½ votes in favor.
> 244½ votes opposed.
>
> III. Absorption by the government of the difference between the war cost and present value, as a war loss, is recommended by the committee.
> 1395 votes in favor.
> 61 votes opposed.
>
> IV. Freedom from regulation as to routes and rates is recommended by the committee.
> 1370 votes in favor.
> 84 votes opposed.
>
> V. Restriction for a period of years upon transfer to a foreign flag of steel vessels over 6000 tons deadweight purchased from the government, is recommended by the committee.
> 1338 votes in favor.
> 121 votes opposed.
>
> VI. Preference for American underwriters and use of the underwriting market of the world for issuance not covered by American underwriters, without intervention by government insurance, are recommended by the committee.
> 1375 votes in favor.
> 73 votes opposed
>
> VII. Encouragement of an American classification society is recommended by the committee.
> 1409 votes in favor.
> 44 votes opposed.
>
> VIII. A general declaration by Congress of a policy to give aid toward the maintenance of a privately owned and operated American merchant marine is recommended by the committee.
> 1374 votes in favor.
> 93 votes opposed.
>
> IX. Continuance of operation of the competent American shipbuilding yards, on private account, both as to yards and the vessels they construct, is recommended by the committee.
> 1414 votes in favor.
> 42 votes opposed.

Mr. Sumner Myrick, of Boston, Massachusetts, representing the United States Chamber of Commerce, appeared before the Senate Committee, in person, on February 2, and recommended the sale of government ships, 25 per cent down, balance in twenty annual installments, interest at 4½ per cent secured by mortgage on ship. Vessels of 4500 gross tons or less to be sold to foreigners as soon as Americans have purchased all they care to. He advocated I. C. C. handling the import and export rates; also that the Department of Commerce should assign commercial agents to co-operate with foreign consuls; and an increase in the present mail subsidy. Mr. Myrick advocated that a board of naval architects and engineers should price the vessels according to present cost of construction in American yards, foreign competing yards, cost of existing competing tonnage before the war, and condition and adaptability of tonnage sold. He favors the Rowe bill to amend the Seamen's Act. As an inducement for Americans to purchase government-owned ships, Mr. Myrick thinks they should be relieved from excess profits tax, and our American classification society encouraged.

Mr. John W. Thomas, of Chicago, speaking for the Mid-West-Gulf-South Atlantic Foreign Trade and Transportation Committee, representing twenty-three states, embracing the so-called Mississippi Valley Association and South Atlantic Ports Association, testified briefly as follows:

> 1. Shipping Board shall continue under present policy until trade routes are established.
> 2. Shipping Board program to be continued until a well-balanced fleet is completed.
> 3. Ten years to be allowed to carry out this policy and sale of vessels to be completed within that time.
> 4. United States merchant marine ultimately to be operated by private citizens of the United States.
>
> NOTE.—This association represents no shipowners and wishes freedom of control from big steamship interests and a few big ports.

Mr. George Edward Smith, for the American Manufacturers' Association, presented resolutions which may be summed up as follows:

> 1. Sale of government ships to private ownership as soon as practicable at world market prices for like tonnage.
> 2. Urged government aid if necessary to meet foreign competition which might ensue.

Mr. Benjamin C. Marsh, representing the Farmers' National Council, made his usual inconsistent and extravagant assertions. Several Senators, members of the committee, denied that he represented the farmers in their states. He did not seem to be able to make it clear whether he means the government should own and operate ships or merely retain title. In one breath he stated that he was willing that the government should retain title and lease or charter its vessels, and in the next, charged that Wall Street would get possession and completely ruin the merchant fleet unless the government kept a tight grip on the vessels.

Mr. Frank C. Munson, president of the Munson Steamship Line, believes vessels of the Shipping Board should be sold on the basis of $100 a ton plus $10 to $25 for new and larger types. The original cost must be written down in order to equalize our ship capital charges with those of competing nations. He claims that our vessels cost about twice as much as the British, and this brings the difference in the capital charge at present Shipping Board prices to about $200,000 a year. Mr. Munson believes the Shipping Board vessels will be absorbed by private interests if valued at $100 a ton. Later it will be almost impossible to sell Lake type ships, which are poorly designed and small, requiring considerable repairs. Such vessels should be leased so as to net the government five or six per cent on the investment, with a depreciation of 10 per cent the first year, 9 per cent the second, 8 per cent the third, 7 per cent the fourth, 6 per cent the fifth, and 5 per cent every year thereafter until they are completely paid for, or disposed of by sale.

Mr. Philip Manson, of New York, testified before the committee and said he was representing the public. It was brought out by questioning that he is a member of a firm which neither owns nor operates ships. Mr. Manson criticised everyone connected with the Shipping Board, past and present. He said that generally Shipping Board officials were feathering their own nests. Senator Chamberlain ventured the opinion that Manson was not attacking the integrity of the men on the Shipping Board, but Mr. Manson stated that in fact he was. Grafting and crookedness were charged to Shipping Board operators. He claims that many were in close touch with foreign interests and working against rather than for the American ship. Mr. Manson had previously submitted a list of shipping men charging them with all sorts of improper motives in connecting themselves with the Shipping Board during the war. He named Mr. P. A. S. Franklin, Mr. Frank C. Munson, Mr. Charles M. Schwab and others in this connection, and was only prevented from mentioning more people by being granted permission to furnish a new list. He remarked that nothing had been accomplished by submitting his former list. Manson stated that shipbuilders also were grafters, and cited the Morse yard. He is absolutely against the sale of a single ship, and said that the government should operate its vessels, dispense with all managers and operators, put in its own men, and pay them good salaries. He also said that Commissioner Scott was not thought a proper man to be on the board, because of his close relation with steamship owners through a wrecking company.

Mr. Charles W. Morse, head of two shipyards, one at Alexander, Virginia, and the other in Connecticut, appeared before the committee and stated that he had recently purchased twenty-four ships and was negotiating the purchase from the government on the same terms of 100 more ships, excepting that the first payment on the latter lot was considerably less than 25 per cent cash. Subsequent statements indicated that it may have been 5 per cent cash and the application of all net earnings on the first year toward payment of the principal. He was outspoken in favor of no reduction in price, and believed Judge Payne's attitude to be correct. Personally he wanted assurance that, having paid $200 or $225 a ton for ships, others would not buy for less. He thought it wrong to allow ambitious persons to take over vessels at a reduced price, receive profits for a year, and then turn them back, because shipowners, having their own as well as Shipping Board vessels, would give first consideration to their own. Mr. Morse did not encourage government-built passenger ships, because private interests would take care of these if assisted by the government, through the plan similar to that of Farm Loans. He believes in marine insurance and financial aid from the government along the line of war risk insurance, and said that English marine insurance companies grew fat on American premiums. Mr. Morse recommended making the Shipping Board independent of executive control, and suggested a cabinet officer for chairman of the board. He further stated that labor unions were severe on American shipping.

In connection with the above synopsis of American views on the subject of government versus private ownership and operation of our merchant marine, it may prove interesting to quote the opinions of one of England's greatest shipping men, Lord Inchcape, head of the Peninsula & Oriental Steam Navigation Company, which owns and controls 427 steamers with a gross (not deadweight) tonnage exceeding 2,250,000 and operating all over the world:

Excerpts from speech of Lord Inchcape, December 10, 1919, at the seventy-ninth general meeting of the Peninsula & Oriental Steamship Company:

"Shipping is one of the most uncertain industries in the world. One or two good years are, as a rule, followed by five or six bad, and if the shipping companies or the shipowners had been short-sighted enough to distribute profits of the good years up to the hilt and to make no provision for the bad, the mercantile marine of the United Kingdom would have been nowhere when the war broke out five years ago."

"It is a curious coincidence that as soon as all free ships came under charter to the British government, and the rates of freight and passage money were controlled by the government, they were advanced by anything from 19 to 85 per cent; and it is another coincidence that as soon as the steamers were freed from government control in the spring of 1919, the rates were considerably reduced. If there was any profiteering in freight and rates of passage, the shipowners were certainly not the culprits."

"We make no complaint. We have borne philosophically our share of the burdens of the war, and we are proud to think that the Prime Minister has said that without the British mercantile marine we should have collapsed, as a nation, by February, 1915."

"In the early part of 1919, I did a daring thing and with considerable trepidation. I entered into a contract with the government entirely on my own account to take over some 196 steamers then under construction, and these have all been distributed to British private shipowners on the same terms as I took them over. The tonnage amounted to 1,400,609 deadweight, involving about thirty-three millions sterling ($160,000,000)."

> (NOTE.—This would indicate that the British public secured these new steamers at approximately $114 a deadweight ton, while our Shipping Board is asking between $190 and $225 a deadweight ton.)

"Any government measure which seeks to rivet on British industry the abomination of government control with its paraphernalia of licenses, certificates, affidavits, appeals, etc., will be fought unitedly by the entire commercial community. We have had enough of this sort of thing. We endured it while the war lasted, because patriotism demanded that we should, but the sole condition upon which British trade can recover the ground it has been forced to yield is, that it should be absolutely free of bureaucratic control. We want to get on with our business, not to spend our time arguing with government clerks, dancing attendance on the Board of Trade, appearing before committees, filling up forms, wheedling consuls for permission to import what we need, throwing open our books and bills and invoices to inspectors from Whitehall, and going through all the worry, expense and delay of explaining and justifying every transaction in which we are engaged, to some official inquisitor."

> (NOTE.—The public may judge how aptly this statement applies to our own government-operated vessels.)

Notes from the East

"Americus"

WITH ship plate quoted at $3.65 per hundred, finished iron castings at 11 cents per pound, wages higher than ever dreamed of before, and yet orders received in American shipyards from British shipowners, and well defined rumors of an order for a small fleet of passenger steamers about to be placed here by the Japanese, who says Americans cannot build ships in competition with the world? Where will it all end, and what are we coming to, are the questions of the hour. At least two hundred thousand more tons of tankers are on the verge of being contracted for in addition to the enormous orders given out for these essentials to the oil industry since the armistice. We can see no slacking up in our shipyards for another year anyhow. So much for the building end of our merchant marine.

The operating end—after all the most important, is another question; for if we can operate, the building will follow as surely as the night follows the day. All eyes are on Washington and ship operators are gathering there from all over the land to testify before the Senate Commerce Committee as to the best disposition of the government-owned fleet. All kinds of opinions are being brought out in the testimony of people who know the shipping game, but the great underlying sentiment is in favor of private ownership and operation at the earliest practicable time. Government operation is frowned on, and rightly so, by those who know business methods. I have already made a prediction that the outcome will be a compromise, and from the testimony adduced I can see no reason for changing the prediction. The representatives of the American Steamship Owners' Association have come out flatfooted for the sale of the Shipping Board ships at $100 per ton; that price would undoubtedly permit American operators to compete with foreign rivals, owing to savings in capital cost, insurance and depreciation. The only drawback seems to be whether or not all of the ships could be disposed of even at that greatly reduced price. If purchasers bought only the more desirable ships, what would become of the unpurchased ships or the culls from the bargain counter sale? To offset this proposition, Mr. C. W. Morse indicated his willingness to purchase nearly a million tons at a price of $200 per ton. Added to that is the fact that the Shipping Board is actually selling ships today at costs of from $200 to $225 per ton, and in fact has sold $83,000,000 worth of ships at varying prices, according to their age and condition. Verily it is a problem to know what is the best thing to do, and our wise solons in the Senate have a conundrum confronting them. The great worry among people interested is to have something definite decided upon. This period of doubt we are passing through is very trying, and we are all afraid will prove to be very damaging to our merchant marine prospects. What is there about shipping that provokes such long-drawn out delays?

I had hoped this month to be able to make some pertinent remarks anent the sale of the seized German ships, but even that proposition is still up in the air, notwithstanding that the President overruled the protest of the Secretary of War and decided definitely that these ships should be sold. A howl of disappointment has gone up from some quarters because $4,000,000 was the highest bid offered for that queen of the seas, the Leviathan. I am not so sure, however, that under proper restrictions regarding keeping her under the flag, and of her return to the government in time of war, at a cost based on her selling price plus the cost of reconditioning her, with due allowance for depreciation, it will not turn out to be a good bargain for both sides. It is generally known in shipping circles that ships like the Leviathan, Lusitania and Mauretania are not profitable investments, owing to the enormous consumption of fuel and other costs of maintenance. They are generally marked off as good investments largely for advertising purposes. They are, of course, almost priceless for use as transports in times of war; hence, if the government can unload her on a private company for operation in times of peace, and still keep a string on her for transport purposes, it ought to be a good proposition. It will cost, it is said, six million dollars to recondition the ship, which will make a capital outlay of about ten million dollars for whoever purchases her. To build a duplicate of this ship at current prices would, it is calculated, require an investment of money variously estimated by competent builders of between twenty-five and thirty million dollars. Hence, even with a drawback of being a "dry" ship when operated under the American flag, whoever purchases this giantess at this comparatively low figure ought to be able to make it a paying investment.

Some criticism has been heard in the public press of the proposed great cost of re-conditioning the Leviathan, comparing her to the Imperator, which was at once put in operation by the Cunard Line. Such critics do not know that the Leviathan was completely gutted out when she was transformed into an army transport, and that, as she is now, is totally unfitted for passenger service, whereas the Imperator was laid up near Hamburg during the entire war, and had but few minor changes made in her internal arrangements when she was requisitioned for the purpose of bringing our troops home from France.

While the disposition of the ships, both new and old, is of course vital at the present moment, it is, after all, of secondary importance when compared with the other complex problems awaiting solution to keep our ships in the competition for world trade. Bills of great importance are pending in Congress concerning various phases of the problem, and are being held up awaiting final action on the general policy with regard to the disposition of the ships. Delays on these bills are dangerous. There are rumors that several of these bills, already passed by the House, are to be embodied in a general shipping bill to be reported out by the Senate Committee on Commerce. The Alexander Load-line Bill, so promptly and unanimously passed by the House, is still in the Senate Committee. It would have been reported out and passed several months ago but for the opposition of certain New England schooner interests. These vessels should unquestionably be given special consideration when regulations are decided upon to put the Load-line law into effect, but there is no reason why the bill should be held up on that account. With almost the unanimous demand of shipowners, ship-operators and shipbuilders for the passage of legislation on this vital question, Congress should not delay action any longer. The United States is practically the only maritime nation which does not have a recognized load-line, and it is easily conceivable that but for the present tolerance of our maritime rivals, this fact might be worked to the great disadvantage of American ships in the foreign trade. It will take several months' hard work on the part of our best naval architects to prepare equitable rules for load-lines to meet the varying conditions of coastwise, lake and foreign trade, such as American vessels may enter, and no time should be lost by legislative delays.

The Rowe bill for encouraging the Americanizing of crews on merchant vessels was put through the House with flying colors, only to meet with inaction in the Senate.

There is yet to be devised a comprehensive bill to meet the requirements of keeping marine insurance at home, instead of spending nearly one hundred millions of dollars annually for this vital safeguard to our maritime efforts abroad among our rivals on the seas.

The bill to foster our American classification society, so vital to our insurance interests, has been unanimously approved by the House Committee on Merchant Marine, and is awaiting its turn on one of the interminable House calendars.

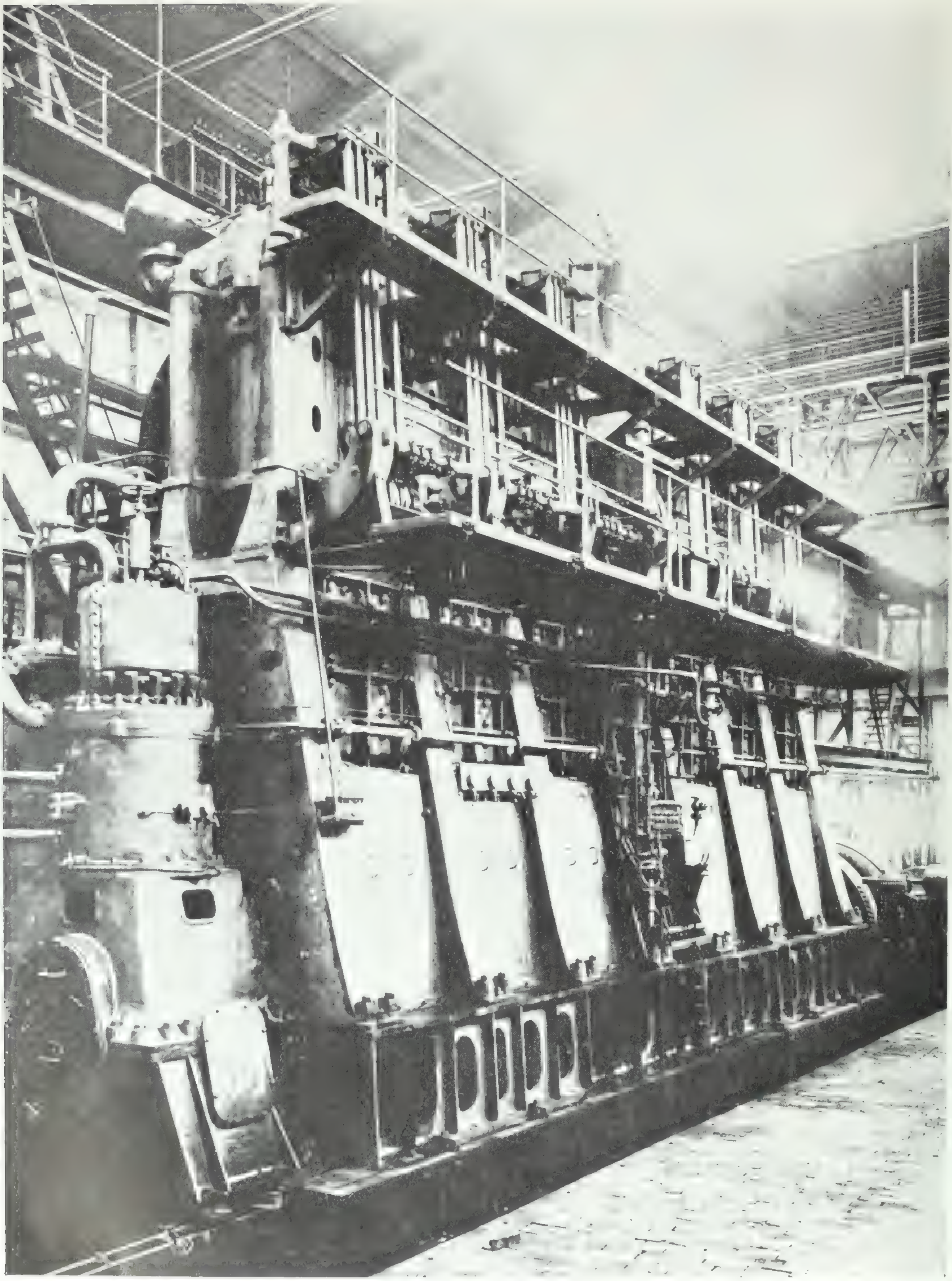
The ship mortgage bill, devised by one of California's leading admiralty lawyers, is still in a formative stage. Americans must be induced to invest their money in ships before we can hope to become a truly maritime nation, and nothing would aid such investments more than the passage of the proposed bill, which would guarantee the safety of money placed in shipping. Mr. Edmunds has introduced a bill permitting freight vessels to carry not more than twenty passengers, without coming under the requirements of passenger vessels. This is a very desirable piece of legislation, and will permit of American business agents traveling direct to ports now only available by patronizing foreign steamers ofttimes in circuitous routes.

Three members of the Shipping Board, Commissioners Donald, Stevens and Scott, have just held a conference in New York with representatives of ship-operators, with the idea of arranging new terms of operating and managing Shipping Board ships. The old basis of operation did not make it an incentive for operators to increase earnings and has resulted in inefficiency. It is now proposed to make the returns from operating government ships proportionate to the net earnings, and this system will undoubtedly result in increased efficiency and earnings.

It is pleasing to note that the Pacific Coast will again have representation on the Shipping Board, the President having nominated Mr. Titus of San Francisco to fill the existing vacancy. From the frequency with which changes have been made in Shipping Board officials, it will soon be in order for ex-members to organize a Society of Veterans. And just at the moment of writing this communication, it is announced that Judge Payne has been promoted to the cabinet to succeed Secretary Lane. The latest whirl of the kaleidoscope has it that Major Cushing, the present efficient chief of operations, will resign about April 1, and be replaced by Captain Paul Foley of the Navy, now in charge of oil activities. Rumor also has it that Commissioner Scott of Connecticut will step out about April 1, and will be replaced by some good Republican from the South. With Mr. Robert L. Hague in charge of all construction and repairs, as now arranged, the Pacific Coast will still retain a very influential hand in Shipping Board policies.

Former Commissioner H. M. Robinson of California has again been drafted into service, by being made chairman of a committee of bankers and financial men, to devise means for making ship investments attractive to the American public. This, as before stated, is a most important step in the development of our merchant marine, and no better selection than this patriotic and efficient Californian could have been made.

The National Merchant Marine Association, now that it has determined upon a policy to pursue, will soon make an active campaign for an increase of membership. Senator Ransdell of Louisiana is the president of this association and takes a vital interest in its welfare. It council consists of well-known proponents of the merchant marine, drawn from every section of the country. Its objects are entirely patriotic and it aims to promote the interests of the merchant marine in every legitimate manner. Annual membership costs only $5, so come, all ye good Pacific Coasters, and send in your application to the secretary, at Room 1111, Munsey Building, Washington, D. C. Add your mite to boosting our American merchant marine.



Werkspoor 1000-horsepower direct-reversing full-Diesel marine engine, one of a pair built by the Skandia Pacific Oil Engine Company for the 5000-ton motor tanker now under construction by the Moore Shipbuilding Company for the Standard Oil Company of California.

Another All-American Full-Diesel-Engined Tanker

THE Standard Oil Company of California, following its progressive marine policy, has under construction at the yards of the Moore Shipbuilding Company, Oakland, another modern steel fuel oil tanker, which is to be driven by full Diesel engines and to have all auxiliaries electrically operated. This tanker is to be thoroughly American in material, workmanship and equipment; in fact, practically the entire ship and her machinery will be manufactured within the limits of the San Francisco Bay industrial area.

The equipment and machinery lay-out of this vessel are substantially the same as those of the 2800-ton tanker building for the same company by the Union Construction Company described on page 99 of Pacific Marine Review for January, 1920. The tanker building at Moore's, however, is a decided step in advance for Pacific Coast motorship construction in that she is larger and more heavily powered than any Diesel engined vessel yet built here.

The hull of the new tanker is to be practically a duplicate of the tank steamer El Segundo of the Standard Oil Company fleet. The dimensions are 330 feet length, 46 feet beam, and 27 feet molded depth, with a draft loaded of 21 feet 6 inches. Her gross deadweight capacity, including water and fuel, is 5010 tons, and the net cargo capacity is 4350 tons deadweight. The framing, stanchions, shell plating and all the details of the construction on the hull will be fabricated according to Standard Oil specifications and will be such as to give this vessel a 100-A-1 classification in the American Bureau of Shipping and in Lloyds.

The quarters for deck officers will be arranged in the bridge houses. The after deck house will be fitted with quarters for the engineers and also with the galley and mess rooms for the officers and crew. The crew are housed in quarters fitted under the poop, so arranged that one room is allowed for each two men.

The main propelling machinery will consist of two Werkspoor full Diesel engines and is to be built by the Skandia Pacific Oil Engine Company, Oakland. Each of these engines is of 1000 horsepower at 135 revolutions a minute, and it is estimated that the combined power of these engines will drive the hull at a speed of eleven knots, loaded. An excellent idea of the construction and finish of these engines may be gained from the illustration published herewith. The overall dimensions of each engine are: length, 38.5 feet, including air compressor and Kingsbury thrust bearing; height overall above center line of shaft, 20.5 feet; crankshaft diameter, 12⅝ inches.

Each engine weighs 120 tons, including fly wheel. It is estimated that a fuel consumption under full load of these engines will be 60 barrels a day. The cylinder bore on these engines is 20.5 inches with a stroke of 36 inches. They are of the cross head type, especially designed for marine work and fitted with full pressure circulating oil system to all bearings. A very interesting feature is the continuous oil filtering system supplied by the Richardson-Phenix Company, with the use of which the total consumption of lubricating oil will be not more than five gallons in twenty-four hours. The lubricating oil is water-cooled and this is depended upon to keep the bearings cool, no special provision being made for cooling water at any bearing.

The compressor is of the three-stage type driven from the main shaft, injection pressure in these engines being 900 pounds a square inch. Power for auxiliaries and for lighting the ship will be supplied by three 100-kilowatt 250-volt General Electric generators direct-connected to three 150-horsepower Diesel engines built by the Dow Pump & Diesel Engine Company, Oakland.

In arranging the electric auxiliaries, and particularly the cargo fuel oil pumps, every precaution that ingenuity and experience could suggest has been used to insure safety and reliability of operation. All motors in the pump room are absolutely gas proof and of the ventilated type, air for this purpose being supplied by an electric motor-driven blower located in a steel gas-tight control room directly above the pump room. This enclosure of the control apparatus and of the ventilating motor of the main cargo pumps absolutely eliminates all danger from explosive gas.

The living rooms on the vessel will be equipped with electric air heaters and the galley will have a complete electrical cooking equipment to take care of all the needs of the commissary department.

The Standard Oil Company of California has certainly shown a very progressive spirit in initiating on the Pacific Coast the construction of real motorships, and the Moore Shipbuilding Company and the Skandia Pacific Oil Engine Company are to be congratulated upon the signal honor which will be theirs of completing and delivering the best example of modern motor tanker construction yet built in America.

SAFE STEPS IN ENGINE ROOMS

The Irving Iron Works Company, Long Island City, New York, has been awarded the contract for supplying all flooring-grating, walkways and ladder steps for the two new super-dreadnaughts, California and Tennessee. The product furnished will be standard Irving "Subway" grating and Irving "Safsteps," such as is already in use on over 500 vessels, including ships for the United States Army and Navy, the Emergency Fleet Corporation, as well as those of private ownership. The terms of this contract demand that the grating shall be galvanized throughout a refinement in line with the exceptional requirements on these two new fighting vessels.

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A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor
G. N. SOMERVILLE. . . . . Associate Editor
J. G. BRAY . . . . Pacific Coast Adv. Mgr.

NEW YORK OFFICE
339 at 30 Church Street
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THE FUTURE OF THE INDUSTRIAL WORLD

"THE workers today are producing from 20 to 30 per cent less per man than they did before the war," said General Guy E. Tripp, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, in a statement recently made in New York.

This let-down of productiveness is the greatest menace that confronts us today, the general stated, and is far more serious than high prices, strikes, lockous, Bolshevism and all other present economic and industrial difficulties. In fact, a careful analysis may show that this spirit of indolence is the chief cause of all the other troubles. Certainly, if the productiveness per capita that existed before the war should now be regained, the distress caused by the high cost of living would disappear. But, if we continue at the present rate of producing less than we actually need, then the results will be too alarming and gloomy to even permit the belief that we will not respond when once we realize we are in danger.

If industrial depression is caused by superimposing inefficiency upon strikes, financial disturbances, the falling off of immigration and all the other influences, our situation will be deplorable because a great number of people will not have enough to live on during the reconstruction period.

A second domestic problem of almost equal magnitude centers around the railroads. The government took over the roads during the war and immediately costs were increased and net profits turned into deficits. It is now proposed to return the roads to private management, but unless constructive legislation is framed that will insure proper return on the capital invested, there will result either another period of the slow decay of railroad securities or a decisive financial disaster so great and widespread that industrial property will surely suffer.

Added to these two purely domestic problems, there is a third which concerns our relationship with Europe. We have loaned Europe $9,600,000,000, which cannot be paid on demand, and in addition Europe needs vast amounts of our goods, for which she cannot pay on delivery.

The existing debt can be handled if converted into long-time bonds, especially with a sinking fund provision, but the financing of Europe's reconstruction cannot be so easily disposed of. It is not advisable to accomplish this by a government loan to Europe, because we are already sufficiently burdened with government bonds and because such a loan would insure a continuation of the government control of industry, at least as far as price-fixing is concerned.

These three problems appear to be the most important of those standing between industry and prosperity, but it seems entirely probable that they will be satisfactorily solved and the prophecies of disaster be unfulfilled. Already there are influences at work correcting the tendency to slacken production, among others being the realization that loss of production means loss of employment, a greater appreciation of his job on the part of the workman, the entrance of women into industry and their ability to displace non-efficient male workers, national prohibition, the reaction against government socialism as a result of experience, and other factors.

There are many other problems besides the three mentioned, but they are of less importance. Bolshevism is not so dangerous as our present outburst of extravagant living, which embraces all classes and which will accentuate the ill effects of our extraordinarily inefficient work. Strikes and lockouts are not fundamental troubles and at times may act as corrective agents of more serious tendencies.

"So, while I see great dangers which must be looked squarely in the face," said the general in conclusion, "I am nevertheless an optimist who believes that they are rapidly becoming more generally understood. I also believe the heart of the people is sound and that our democratic institutions are still on a firm foundation. I look to a much higher future; and as an American I believe that our country will achieve greater things under the rule of the whole people, who flounder—as they always will—among the elementary truths of political economy, than it would achieve under the rule of any kind of autocracy, however wise it may be, which flounders—as it always will—among the elementary instincts of men."

AMERICAN MERCHANT SHIPBUILDING

MERCHANT shipbuilding on a commercial basis is now being resumed in the United States on a considerable scale. For over two years after August, 1917, Congress voted from the Treasury the funds to pay for nearly all the vast tonnage built in American shipyards to win the war, and this construction is not yet concluded. During the closing months of 1919 commercial steel shipbuilding was slowly resumed, and on January 1, 1920, American shipyards were building or under contract to build for private shipowners 165 steel vessels of 679,170 gross tons, according to returns received by the Bureau of Navigation, Department of Commerce. These returns do not, of course, include steel ships yet to be built for the United States Shipping Board with appropriations by Congress. On July 1, 1917, when shipbuilding for commercial purposes virtually ceased, American shipyards were building or under contract to build 499 steel ships of 1,896,522 gross tons for American and foreign shipowners. Practically all these ships were taken by the government and completed with public funds.

Steel Vessels Under Construction in American Shipyards

Following is the summary of steel ships building or under contract in American shipyards January 1, 1920, for private owners, so far as reported to the Bureau of Navigation, Department of Commerce.

COMPANIES	No.	Gross Tons
American Bridge Co., Ambridge, Pa	11	900
Bath Iron Works, Bath, Me	1	6,250
Bayles Shipyard (Inc.), Port Jefferson, N. Y	1	700
Bethlehem Shipbuilding Corporation (Ltd.)		
Fore River Plant, Quincy, Mass	8	62,18
Harlan Plant, Wilmington, Del	4	23,000
Moore Plant, Elizabeth, N. J	3	1,350
Sparrows Point Plant, Maryland	7	52,150
Union Plant, San Francisco, Calif	7	49,080
Brunswick Marine Cons. Corp., Brunswick, Ga	1	1,000
Chester Shipbuilding Corp., Chester, Pa	2	......
Clinton Shipbuilding & Repair Co., Philadelphia, Pa	6	4,000
Consolidated Ship'g Corp., Morris Heights, N. Y	2	......
Downey Shipbuilding Co., Newark, N. J	4	17,313
Federal Shipbuilding Co., Newark, N. J	20	140,104
Geo. Lawley & Son Corp., Neponset, Mass	2	......
Greenport Shipbuilding Co., Greenport, N. Y	2	584
Herreshoff Manufacturing Co., Bristol, R. I	1	178
Johnson Iron Works, Morgan, New Orleans, La	1	200
Kyle & Purdy (Inc.), City Island, N. Y	3	910
Long Beach Shipbuilding Co., Long Beach, Calif	2	2,350
Manitowoc Shipbuilding Co., Manitowoc, Wis	2	3,300
Moore Shipbuilding Co., Oakland, Calif	7	68,700
National Shipbuilding Corporation, Violet, La	6	3,806
Newburgh Shipyards (Inc.), Newburgh, N. Y	4	18,000
New Jersey Dry Dock Co., Elizabeth, N. J	2	730
Newport News Ship'g & D. D. Co., Newport News, Va.	2	21,800
New York Shipbuilding Corp., Camden, N. J	1	7,800
The Pusey & Jones Co., Wilmington, Del	3	4,300
Schaw-Batcher Co. Shipworks, South San Francisco	2	16,000
Skinner & Eddy Corp., Seattle, Wash	3	21,000
Spedden Shipbuilding Co., Baltimore, Md	2	2,819
Standard Shipbuilding Corp., New York City	2	2,800
Staten Island Ship'g Co., Port Richmond, N. Y	10	7,070
Sun Shipbuilding Co., Chester Pa	13	93,790
Tank Shipbuilding Corp., Newburgh, N. Y	4	3,220
Texas Steamship Co., Bath, Me	7	30,700
Union Construction Co., Oakland, Calif	1	1,300
Union Shipbuilding Co., Baltimore, Md	3	7,310
Whitney Bros., Superior, Wis	1	100
William Cramp & Sons, Philadelphia, Pa	2	2,406
Total	165	679,170

ANNUAL MEETING OF THE AMERICAN BUREAU OF SHIPPING

THE annual meeting of the American Bureau of Shipping was held at the head office in this city yesterday afternoon. Mr. Stevenson Taylor, president of the society, read his annual report, which was enthusiastically received by the members present.

For the year ending December 31, 1915, the records show that the bureau had classed 764 ships of 1,464,460 gross tons and on December 31, 1919, the records show the classification of 2234 ships of 5,790,729 gross tons—almost four times the tonnage of 1915. There is at present building under bureau supervision in this country a total of 3,656,336 gross tons, which includes all wood and steel ships being built by the government and for private ownership; this is approximately 85 per cent of all ships building in this country. It was pointed out that upon the completion of the present program the American Bureau of Shipping will have classed 20 per cent of the world's total merchant fleet, which places it second in importance of all the classification societies in the world.

The by-laws of the society were amended so as to dispense with the present executive committee, their duties to be assumed by a board of managers, reduced in number from the present board. The new board of managers will include:

John S. Ashley, George T. Baldwin, Louis F. Burke, H. L. Coulby, Wm. T. Davidson, Wm. A. Dobson, Wallace Downey, C. Russell Ebert, Homer L. Ferguson, Wm. R. Hedge, Frank Gair Macomber, Jas. P. Magill, Charles E. Mather, Wm. H. McGee, Samuel D. McComb, Frank C. Munson, Benjamin Rush, Walter Wood Parsons, Antonio C. Pessano, Joseph W. Powell, Wm. A. Prime, H. H. Raymond, John C. Rolphs, Alfred Gilbert Smith.

These men, it will be readily recognized, are representatives of the leading shipbuilders, ship operators and underwriters in the United States.

Three new members of the association were elected: Mr. Wallace Downey, president of the Downey Shipbuilding Corporation; Mr. C. Russell Ebert, vice-president of the Automobile Insurance Company, and Mr. James P. Magill, of Haris, Magill & Company. There were added to the technical committee: William E. Reynolds, Commodore Commandant, United States Coast Guard; Mr. James M. Roberts, naval architect; Captain Quincy B. Newman, engineer-in-chief, United States Coast Guard, and Mr. Joseph E. Sheedy, of the Downey Shipbuilding Corporation.

Among those who attended the meeting of the directors were Mr. Walter Wood Parsons, vice-president of the Atlantic Mutual Insurance Company; Mr. Joseph W. Powell, vice-president of the Bethlehem Steel Corporation; Mr. H. A. Magoun, vice-president of the New York Shipbuilding Corporation; Mr. Frank Gair Macomber, of Boston; Mr. Antonio C. Pessano, president of the Great Lakes Engineering Works, and Mr. Cornelius Eldert, president of the Atlantic Mutual Insurance Company.

The present officers of the bureau were re-elected for a further term of one year.

President Taylor reported the bureau to be in excellent financial condition and as having ample facilities for undertaking the classification of 100 per cent of all American vessels built in American shipyards.

Mr. Gilbert P. Taylor was added to the list of officers as treasurer of the bureau.

COMMERCIAL DEVELOPMENT OF AIRCRAFT

HAS America forgotten the lesson learned during the war of the value of aircraft? The importance of an efficient navy to protect our shores is easily realized, and even in times of peace we cheerfully spend huge sums for its development. Yet, although most international authorities believe that in the future aircraft will form the chief means of national defense, we in this country have done very little to capitalize the knowledge gained from the expenditure of huge war appropriations to develop our aircraft industry.

It must be remembered that to have an efficient supply of airplanes in time of war, it is necessary to have an adequate supply of machines in peace, or else sources from which the machines and personnel can be drawn. Such a reserve can most easily be brought about by the extension of our present air mail service to include the carrying of parcels post, and the development by the railroad and express companies of new aerial lines for the transportation of heavy parcels.

Future wars in the air will not be carried on by small machines fighting together, but by the rain of bombs from large airplanes on enemy territory. It would therefore be sound policy to seek to develop the large weight-carrying type of commercial machine, which would embody in its construction certain characteristics suitable for military aircraft. Then, should the emergency arise, there would also be a reserve of men with a knowledge of aerial navigation.

Great Britain has taken the lead in the development of commercial aeronautical transportation and is giving extensive financial and legislative encouragement to the aircraft industry.

France grants a subsidy to approved air transport lines based on the cost of depreciation. As the life of a machine is estimated at 400 hours, one-quarter of the depreciation necessary on this basis is paid by the State. This is much less than would have to be paid if the government had to keep on hand a smaller amount of equipment.

Germany, although not allowed by the peace treaty to keep airships, is developing numerous aero-transport lines within her border and to the countries lying to the north of her.

Japan and Italy are making extensive development in their air mail service, while several of the South American republics have made large purchases of aircraft equipment from Europe.

It is pointed out by the National Foreign Trade Council that the development of air transport and its successful use by the public will lead to improvement of communications throughout this country and abroad, and will enable business to be carried through to a successful conclusion more expeditiously.

The establishment of the necessary aids to aerial navigation, the construction of adequate flying fields near all our chief commercial centers, and the promotion of airship service to overseas countries are matters which demand the immediate attention of our government, and which require the formation of a separate department of aeronautics free from the stifling influence of existing government departments.

THE ONLY SAFE FOUNDATION

EVERY intelligent business man who wants to see long years of prosperity bless our land and create permanency of employment for labor and for capital should take heed to the dangers which attend the high profits of the hour.

Business men must realize that the thought which finds expression, "Get all you can, while the getting is good," is dishonest in spirit and destructive in its effect. We know it is very difficult to resist piling on the prices when people are ready to buy anything and everything, from a silk shirt to a ton of iron, at any price named; we know that the law of supply and demand cannot be set aside by man's whims for any great length of time, and that only through measured production, which spells prosperity, or decreased consumption, which opens the gate to the land of poverty, can the upward trend of prices be permanently halted. Nevertheless, many manufacturers and dealers are doing their utmost to demand unholy profits, and are thus boosting prices beyond all reason and endangering their own and the country's continued prosperity. Sensible men of sound judgment should do their utmost to counteract this condition, even at the expense of smaller profits now.

The world's demand for many things—the world inflammation which was inevitable as an outcome of the war, more than cutting the dollar's purchasing power in half—our unwise income excess profits tax—our permanently high cost of food, all combine to lift prices to a new and higher level which must continue for years.

Despite these facts we must try to curb these influences rather than stimulate them. We must seek to save the producer of the golden egg instead of ripping wide open the goose, hoping to get a basketful at one sweep. Let the conservative influences of the country, the sober leaders of America's trade and industry, discredit every profiteer who by exorbitant profits robs his customers and his country, robs himself of his own self-respect, whether he be the small or the big business leader, the billionaire corporation executive or the proprietor of the small country sawmill, the millionaire store or the little corner grocery.

It behooves everyone to realize that unless he can honestly say that he has treated every customer, every employe and every competitor exactly as he would wish they would treat him, he is not honest at heart nor is he following the only rule ever given to mankind which would insure permanent peace and prosperity.

The golden rule is the only safe foundation on which to build character or business or nations. In proportion to its observance is there peace and prosperity or chaos in life and in business.—**Manufacturers' Record.**

The Harbor of San Francisco

By John H. McCallum[*]

NOTWITHSTANDING the fact that the harbor of San Francisco is the chief asset of the city of San Francisco, it is surprising how few of the citizens (including the business men who directly or indirectly do business over the docks) know very much about the harbor itself, its size and importance, the port management, or the business done through the port.

It will, of course, be of interest to many to know that the San Francisco harbor extends from the Golden Gate on the west to the San Mateo county line on the south — a distance of eight and a half miles — and is owned by the State of California. It is, of course, universally acknowledged that the harbor of San Francisco in its natural aspects is one of the finest in the world, but it may not be known that it is accessible through the Golden Gate at all stages of the tide and in all conditions of the weather, the entrance channels being of such width and depth that the largest vessels can enter or leave at any time. Also, it may not be known that the tidal range is only five to eight feet, and that the harbor is so admirably sheltered from storms that the annual damage to shipping is practically nil.

Administration of Port and Development

The harbor of San Francisco being publicly owned, its affairs are administered by a commission composed of three members, appointed by the governor, and known as the Board of State Harbor Commissioners. The offices of this board are located in the Ferry Building.

The assets of the harbor are valued at some $26,500,000. The harbor is maintained by revenue derived by dockage on ships, tolls on cargo, belt line switching, rentals of docks, seawall lots, Ferry Building, etc. The harbor has been self-sustaining from the beginning, and must, under the law, continue to be. The harbor thus pays its own way—not a dollar coming out of the state treasury nor the treasury of San Francisco in the way of taxes. The revenue thus received must provide not only for administration expenses, replacements, repairs, etc., but must also provide for interest on bond issues and redemptions.

SUMMARY

Summarizing the activities of the Harbor Commission in part for the past year, the following develops:

THAT there has been completed and put into commission three up-to-date modern concrete piers, Piers Nos. 3, 31 and 33, as well as bulkhead wharves and belt line improvements;

THAT there has been handled over state-owned wharves during the last fiscal year nearly 9,000,000 tons of freight, and that there has been handled during the same time 164,000 cars on the belt line tracks;

THAT changes are being made in the belt line to facilitate the handling of cars, notably changes in the Southern Pacific interchange yard;

THAT the board has adopted a change in its system of revenue which is meeting with almost universal approval, and in accordance therewith has issued a new tariff;

THAT in order to stimulate harmonious relations in foreign trade, the Board has appointed an advisory committee, and has compiled data relative to the imports and exports of the business;

THAT through the efforts of the Harbor Commission the Railroad Administration, under its new tariff, is absorbing switching charges to and from the piers, and has equalized the difference between the absorption rates of San Francisco and those of Seattle;

THAT there has been built and ready for operation at the present time a vegetable oil terminal. In connection therewith an oil barge has been purchased;

THAT the Embarcadero has been paved for twelve thousand feet with smooth pavement;

THAT a viaduct across the Embarcadero has been erected;

THAT with the co-operation of the commercial interests of the city the board looks forward to a busy year for the port of San Francisco—a year in which it will do all in its power to aid and assist the commerce of the port.

It is essential to the greater development of the port that the people of San Francisco and California should realize the importance of the harbor to the industrial and commercial development. To that end the board invites the public to a more general visitation and intimate knowledge of the harbor.

The harbor has been practically rebuilt during the last seven years, and during this period of reconstruction many new piers of the most modern type have been built. There are at present forty piers of various sizes in active use providing cargo area equivalent to 131 acres, or about fifty average city blocks, and sufficient to take care of about 1,500,000 tons of cargo a month. There are more than fifteen miles of berthing space, or sufficient to accommodate 245 vessels of average size at one time.

Notwithstanding the increased growth of the import and export trade, it has been found that sufficient wharf area is available to adequately take care of this commerce. However, the Board of Harbor Commissioners is committed to the policy of providing sufficient cargo area to take care of all commerce coming into this port, and this it can do by the expenditure of the $8,000,000 of the San Francisco Harbor Improvement Act of 1913, as yet unexpended.

During the present year there have been completed and put into commission three of the most up-to-date modern concrete piers, Nos. 3, 31 and 33, having a total berthing area of about 4600 feet and providing additional cargo area of about 35,000 square feet.

As a concrete example of what the port is actually doing in the matter of tonnage handled over the wharves during the past fiscal year, there were about 9,000,000 tons of freight handled over the state-owned wharves, and during the same period of time there were 164,000 cars handled over the belt line tracks.

Belt Line Development

During the period when reconstruction of the waterfront began, only six piers were served by the belt railroad. Now all but two piers have belt line connection. On all the new piers there is a depressed track on the one side and a surface track on the other, thus bringing ship and rail together, which promotes dispatch and makes for cheapness in handling cargo. Seven years ago there were but a few miles of belt line track. Now there are over forty miles, serving activities located adjacent to the waterfront and the United States transport docks (through a tunnel built under Fort Mason in 1914 at a cost to the harbor board of $270,000) to army posts at the Presidio, as well as to docks and piers.

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[*] President of the Board of State Harbor Commissioners.

The belt line tracks are connected with the main line of the Southern Pacific at the foot of Townsend street, and the Western Pacific, Santa Fe and Northwestern Pacific by ferry slips at the foot of Taylor street.

In order to facilitate the handling of increased traffic on the belt line, extensive changes are being made in connection with the interchange yard maintained by the Southern Pacific Company at the foot of Townsend street, which changes, in addition to enabling the belt line to handle an increased number of cars more expeditiously and at a reduced cost, also adds additional trackage to the main belt line.

It is the policy of the harbor commission that the belt line shall serve all territory adjacent to the waterfront, and on any public street where authorities of San Francisco will permit the laying of tracks.

It has been demonstrated that the bay and river commerce has greatly increased since new Pier No. 3 has been served by the belt railroad. Business that heretofore reached San Francisco by railroad now finds its way to the port over the docks.

We believe that the great territory of land, now unoccupied, south of Mission street and east of First street could be put to valuable use by erecting warehouses and buildings to be occupied by wholesale establishments, etc., if the territory could be served with railroad connections. Therefore, it is the board's policy to serve with the belt line any of the above territory provided with spur tracks. The same policy applies to territory adjacent to the waterfront and on the north side of the harbor—wherever it is feasible to construct and operate spur tracks—so that in the North Beach section of the waterfront idle property may be put to use advantageous to the commerce of the port and to the advantage of property owners in that district as well.

The board is considering the advisability of constructing, in the near future, an up-to-date concrete pier to be known as Pier No. 1, which will be located immediately north of the Ferry Building, and which is estimated will cost when completed approximately $500,000. This pier, together with Pier No. 3 (just completed) and Pier No. 5, which are adjacent to each other, are to be used exclusively for bay and river commerce.

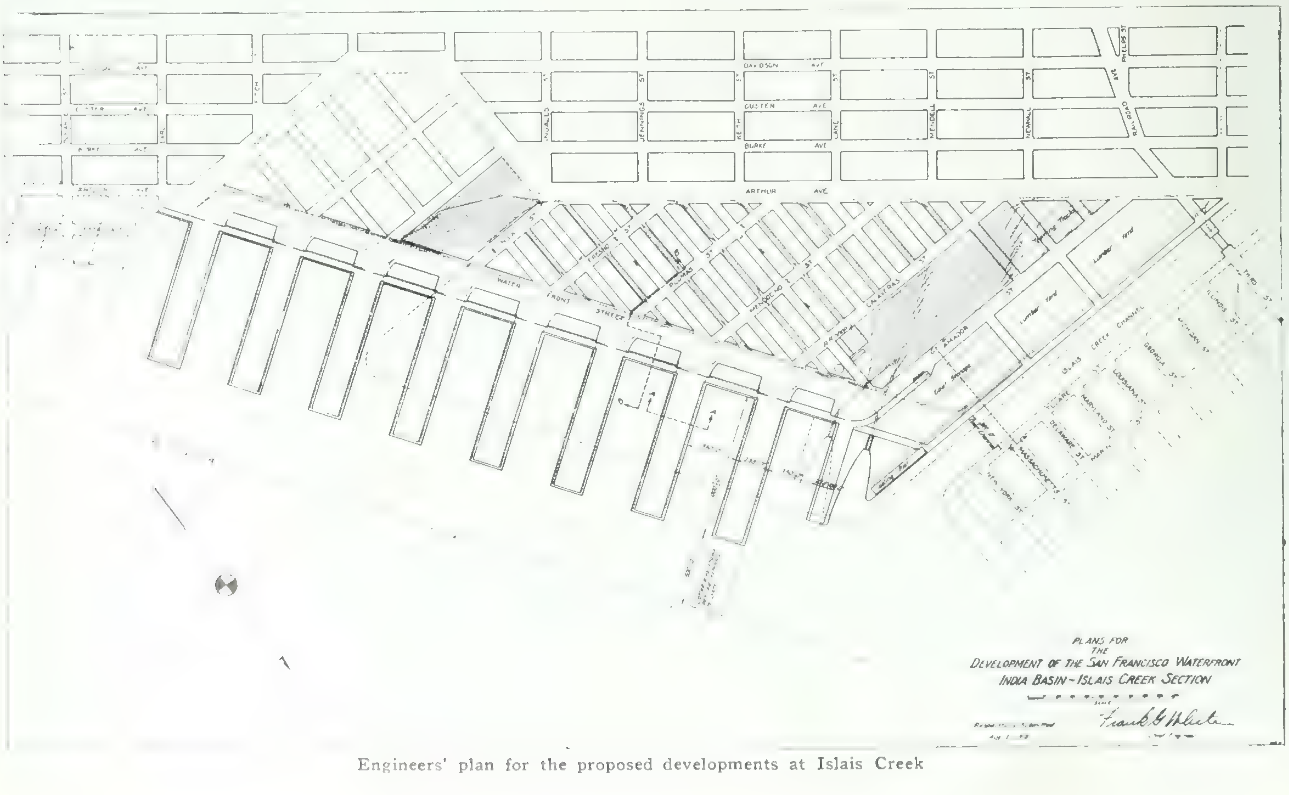
It is the present intention of the board to build connecting bulkhead sheds between many of the existing piers as well as to extend some of the present piers about 200 feet out into the bay to the pierhead line, when occasion demands, thus adding many square feet to the existing wharf area.

The piers range in size from 125 feet wide by 600 feet long to 200 feet wide by 1120 feet long. The larger piers, which are mostly used for foreign trade, are wired so that electric power can be used in connection with labor-saving machinery devices, thus enabling cargo to be handled with rapidity and at a minimum cost. Many of these piers are sufficiently large to accommodate any vessel that comes through the Panama Canal.

There are also available for immediate use, for the handling of heavy freight, floating derricks with a lifting capacity of from twenty to fifty tons, and with booms from 100 feet to 105 feet; also several stationary derricks with a carrying capacity of from twenty to thirty tons, booms from sixty to ninety feet; one shear leg derrick with 100-ton capacity; also locomotive cranes of various weight-lifting capacity.

Vegetable Oil Terminal

Recently the board has acquired, at a very reasonable price, through condemnation proceedings, complete title to sixty-three blocks of land in the Islais Creek district, comprising approximately 165 acres and bounded by Islais Creek, Waterfront street, India street, Arthur avenue and Third street, thus adding a very valuable holding to the state's property for the use and development of the port's commerce.



Engineers' plan for the proposed developments at Islais Creek

It is proposed to use a portion of this property in which to establish a free port in the event that Congress should approve a bill, now before it, establishing free ports at different points in the United States.

The board is at the present time constructing a terminal for the handling of Oriental oils on a portion of this property adjacent to Third street. This terminal will include complete facilities for the handling of oil, which arrives in bulk as well as in cases. The case and barrel oil will be handled on a covered concrete platform in order to conserve leakage. The bulk oil will be pumped directly to storage tanks, and from this to tank cars for shipment. The complete facilities will include, in addition to the storage shed, a heating and pumping plant, pipe lines, railroad tracks and all necessary appurtenances for the economical and efficient handling of various kinds of oil.

The last legislature passed a bill authorizing the board to lease parcels of land in the vicinity for any purpose directly beneficial to the port and advantageous to shipping. Several parcels of land have been leased to oil importers upon which are being erected oil tanks. These tanks are nearly completed. Competent critics have stated that this is one of the wisest pieces of legislation which has been passed for many years and that it will ultimately lead to large development, which will be of great benefit to the port of San Francisco.

It is believed that by the erection of this terminal thousands of tons of Oriental vegetable oils that heretofore went elsewhere will find their way to this port. It is the intention of the board to make this terminal one of the most up-to-date, economical terminals to be found anywhere on the continent. In erecting this terminal the board has worked in co-operation with the importers and exporters who are handling this commodity.

The Embarcadero

The public may not be aware of the fact that the Embarcadero is owned by the state, and under the jurisdiction of the Board of State Harbor Commission is paved, cleaned and lighted; that there has been constructed within the past year from Fishermen's Lagoon to Channel street, a distance of 12,000 feet, smooth pavement ranging in width from thirty to forty feet, to facilitate more rapid travel. It is also hoped that this smooth pavement on the Embarcadero may be used by the city of San Francisco in connection with the municipal line, for the operation of a passenger bus service along the waterfront, which is a facility very much needed in San Francisco.

The Embarcadero in front of the Ferry Building, with its street railway loop, etc., is often a very congested place, and in order to provide a safe and convenient passage way for the convenience of pedestrians crossing the Embarcadero, there has been constructed during the past year a viaduct from the second story of the Ferry Building across the Embarcadero to a point just north of the north line of Market street. This viaduct is meeting with very great success—thousands of people using it daily.

Change in System of Port Revenue

Last year the board adopted a new system of port revenue as it applies to foreign trade. For some years past there has been more or less contention among the shipping interests as to whether or not the system of port revenue, effective in this harbor for many years, should not be changed in whole or in part. Therefore, in order to determine the matter, this board appointed a large, representative committee, composed of importers, exporters, ship-owners and ship-operators doing business in San Francisco.

After a very painstaking and exhaustive study of the matter, the committee made a unanimous recommendation to this board that, hereafter, vessels engaged in foreign and off-shore trade should be relieved of the payment of pier rental and dockage on the ship; and that the revenue heretofore derived from this source be added to the tolls on the cargo.

After due consideration, the board adopted the recommendation of this committee, and on April 1 last put the new system into effect. The elimination of dockage against the ship puts this port on an equality with competitive Pacific Coast ports and our charge of 15 cents a ton against import and export cargo is one of the lowest charges enjoyed in any port in the world. This change has met with almost universal favor.

During the past year the board has issued a new and attractive tariff, which shows the rules and regulations, as well as the rates, governing the operation of the port.

United States Railroad Rulings Affecting This Port

It may be of interest to the public to know that the discrimination which has been in effect against the port of San Francisco for many years has been rectified. The United States Railroad Administration has equalized the absorption charge on through freight, thereby putting San Francisco on an equality with competing northern ports—to be specific, railroads terminating in San Francisco heretofore absorbed 45 cents a ton on through freight—that is, freight passing to and from San Francisco — as against the $1 absorbed by northern roads running into Puget Sound ports, thus putting San Francisco at a disadvantage to the amount of 55 cents a ton. The new tariff putting this rate into effect became effective September 10 last. It will also be of interest to know that recently the railroads have absorbed the switching charge to and from the piers on line hauls, thus relieving the merchant of that charge, which was heretofore borne by them.

Advisory Board

In order to enable the board to keep in closer touch with the commerce of the port and its development, especially the foreign trade, twenty of the leading ship-owners, ship-operators, importers and exporters doing business in San Francisco have been appointed as an advisory committee, which advisory committee meets with the Harbor Commission from time to time and through its co-operation very great advantage has resulted from bringing the commercial interests of the city in closer touch with the harbor. It goes without saying, of course, that in order to develop the commerce of the port to its highest efficiency, it is very essential that complete harmony and close co-operation should prevail between the business interests of San Francisco and the management of the port.

Foreign Trade Quotations

As the most certain means of insuring unmistakable clarity in terms and conditions of sale, the conference voted to recommend to manufacturers and exporters that all use of abbreviated forms of export price quotations be abandoned, and that such terms be written out in full. The conference recognized, however, that this recommendation is not likely to be accepted generally at once; and therefore, in the hope of effecting a simplification and standardization of American practice, it adopted the following statement of definitions of the abbreviated forms in more common and general use in the export trade. The conference strongly recommends to manufacturers and exporters that wherever abbreviated forms of export quotations are employed, the forms herein defined be used, as far as possible, to the exclusion of other forms.

DEFINITIONS OF EXPORT QUOTATIONS AND GENERAL RECOMMENDATIONS FOR A STANDARD AMERICAN EXPORT PRACTICE

adopted by the National Foreign Trade Council, Chamber of Commerce of the U. S. A.; National Association of Manufacturers, American Manufacturers' Export Association, Philadelphia Commercial Museum, American Exporters' and Importers' Association, Chamber of Commerce of the State of New York, New York Produce Exchange, and New York Merchants' Association, at a conference held in India House, New York, December 16, 1919.

EXPLANATION OF ABBREVIATIONS

F. O. B.	Free on board
F. A. S.	Free alongside ship
C. & F.	Cost and freight
C. I. F.	Cost, insurance and freight
L. C. L.	Less than carload lot

Definitions of Export Quotations

These are, in their order, the normal situations on which an export manufacturer or shipper may desire to quote prices. It is understood that unless a particular railroad is specified, the property will be delivered to the carrier most conveniently located to the shipper. If the buyer, for the purpose of delivery, or in order to obtain lower transportation charges, desires that the goods be delivered to a carrier further removed from the shipper and entailing a greater cost than delivery to the carrier most favorably situated, the carrier to which the buyer desires delivery of the goods should be named in the quotation. The term "cars or lighters" as used herein is intended to include river, lake or coastwise ships, canal boats, barges, or other means of transportation, when so specified in the quotation.

F. O. B. (Named Point)

1. When the price quoted applies only at inland shipping point and the seller merely undertakes to load the goods on or in cars or lighters furnished by the railroad company serving the industry, or most conveniently located to the industry, without other designation as to routing, the proper term is: "F. O. B. (named point)."

Under this quotation:

A. Seller must
  (1) Place goods on or in cars or lighters.
  (2) Secure railroad bill of lading.
  (3) Be responsible for loss and/or damage until goods have been placed in or on cars or lighters at forwarding point, and clean bill of lading has been furnished by the railroad company.

B. Buyer must
  (1) Be responsible for loss and/or damage incurred thereafter.
  (2) Pay all transportation charges, including taxes, if any.
  (3) Handle all subsequent movement of the goods.

F. O. B. Freight Prepaid

2. When the seller quotes a price including transportation charges to the port of exportation without assuming responsibility for the goods after obtaining a clean bill of lading at point of origin, the proper term is: "F. O. B. (named point) Freight Prepaid to (named point on seaboard)."

Under this quotation:

A. Seller must
  (1) Place goods on or in cars or lighters.
  (2) Secure railroad bill of lading.
  (3) Pay freight to named port.
  (4) Be responsible for loss and/or damage until goods have been placed in or on cars or lighters at forwarding point, and clean bill of lading has been furnished by the railroad company.

B. Buyer must
  (1) Be responsible for loss and/or damage incurred thereafter.
  (2) Handle all subsequent movement of the goods.
  (3) Unload goods from cars.
  (4) Transport goods to vessels.
  (5) Pay all demurrage and/or storage charges.
  (6) Arrange for storage in warehouse or on wharf where necessary.

F. O. B. Freight Allowed

3. Where the seller wishes to quote a price, from which the buyer may deduct the cost of transportation to a given point on the seaboard, without the seller assuming responsibility for the goods after obtaining a clean bill of lading at point of origin, the proper term is: "F. O. B. (named point) Freight Allowed to (named point on the seaboard)."

Under this quotation:

A. Seller must
  (1) Place goods on or in cars or lighters.
  (2) Secure railroad bill of lading.
  (3) Be responsible for loss and/or damage until goods have been placed in or on cars or lighters at forwarding point, and clean bill of lading has been furnished by the railroad company.

B. Buyer must
  (1) Be responsible for loss and/or damage incurred thereafter.
  (2) Pay all transportation charges (buyer is then entitled to deduct from the amount of the invoice the freight paid from primary point to named port).
  (3) Handle all subsequent movement of the goods.
  (4) Unload goods from cars.
  (5) Transport goods to vessel.
  (6) Pay all demurrage and/or storage charges.
  (7) Arrange for storage in warehouse or on wharf where necessary.

F. O. B. Cars

4. The seller may desire to quote a price covering the transportation of the goods to seaboard, assuming responsibility for loss and/or damage up to that point. In this case, the proper term is: "F. O. B. Cars (named point on seaboard)."

Under this quotation:

A. Seller must
  (1) Place goods on or in cars.
  (2) Secure railroad bill of lading.

- (3) Pay all freight charges from forwarding point to port on seaboard.
- (4) Be responsible for loss and / or damage until goods have arrived in or on cars at the named port.

- B. Buyer must
  - (1) Be responsible for loss and / or damage incurred thereafter.
  - (2) Unload goods from cars.
  - (3) Handle all subsequent movement of the goods.
  - (4) Transport goods to vessel.
  - (5) Pay all demurrage and/or storage charges.
  - (6) Arrange for storage in warehouse or on wharf where necessary.

F. O. B. Cars L. C. L.

5. It may be that the goods, on which a price is quoted covering the transportation of the goods to the seaboard, constitute less than a carload lot. In this case, the proper term is: "F. O. B. Cars (named port) L. C. L."

Under this quotation:

- A. Seller must
  - (1) Deliver goods to the initial carrier.
  - (2) Secure railroad bill of lading.
  - (3) Pay all freight charges from forwarding point to port on seaboard.
  - (4) Be responsible for loss and / or damage until goods have arrived on cars at the named port.
- B. Buyer must
  - (1) Be responsible for loss and / or damage incurred thereafter.
  - (2) Handle all subsequent movement of the goods.
  - (3) Accept goods from the carrier.
  - (4) Transport goods to vessel.
  - (5) Pay all storage charges.
  - (6) Arrange for storage in warehouse or on wharf where necessary.

F. O. B. Cars Lighterage Free

6. Seller may quote a price which will include the expense of transportation of the goods by rail to the seaboard, including lighterage. In this case, the proper term is: "F. O. B. Cars (named point) Lighterage Free."

Under this quotation:

- A. Seller must
  - (1) Place goods on or in cars.
  - (2) Secure railroad bill of lading.
  - (3) Pay all transportation charges to, including lighterage at the port named.
  - (4) Be responsible for loss and / or damage until goods have arrived on cars at the named port.
- B. Buyer must
  - (1) Be responsible for loss and / or damage incurred thereafter.
  - (2) Handle all subsequent movement of the goods.
  - (3) Take out the insurance necessary to the safety of the goods after arrival on cars.
  - (4) Pay the cost of hoisting goods into vessel where weight of goods is too great for ship's tackle.
  - (5) Pay all demurrage and other charges, except lighterage charges.

F. A. S. Vessel

7. The seller may desire to quote a price covering delivery of the goods alongside overseas vessel and within reach of its loading tackle. In this case, the proper term is: "F. A. S. Vessel (named port)."

Under this quotation:

- A. Seller must
  - (1) Transport goods to seaboard.
  - (2) Store goods in warehouse or on wharf if necessary, unless buyer's obligation includes provision of shipping facilities.
  - (3) Place goods alongside vessel either in a lighter or on the wharf.
  - (4) Be responsible for loss and / or damage until goods have been delivered alongside the ship or on the wharf.
- B. Buyer must
  - (1) Be responsible for loss and / or damage incurred thereafter, and for insurance.
  - (2) Handle all subsequent movement of the goods.
  - (3) Pay cost of hoisting goods into vessel where weight of goods is too great for ship's tackle.

F. O. B. Vessel

8. The seller may desire to quote a price covering all expenses up to and including delivery of the goods upon the overseas vessel at a named port. In this case, the proper term is: "F. O. B. Vessel (named port)."

Under this quotation:

- A. Seller must
  - (1) Meet all charges incurred in placing goods actually on board the vessel.
  - (2) Be responsible for all loss and/or damage until goods have been placed on board the vessel.
- B. Buyer must
  - (1) Be responsible for loss and / or damage incurred thereafter.
  - (2) Handle all subsequent movement of the goods.

C. and F.

9. The seller may be ready to go farther than the delivery of his goods upon the overseas vessel and be willing to pay transportation to a foreign point of delivery. In this case, the proper term is: "C. & F. (named foreign port)."

Under this quotation:

- A. Seller must
  - (1) Make freight contract and pay transportation charges sufficient to carry goods to agreed destination.
  - (2) Deliver to buyer or his agent proper bills of lading to the agreed destination.
  - (3) Be responsible for loss and / or damage until goods have been delivered alongside the ship and clean ocean bill of lading obtained. (Seller is not responsible for delivery of goods at destination).
- B. Buyer must
  - (1) Be responsible for loss and / or damage thereafter and must take out all necessary insurance.
  - (2) Handle all subsequent movement of the goods.
  - (3) Take delivery and pay costs of discharge, lighterage and landing at foreign port of destination in accordance with bill of lading clauses.
  - (4) Pay foreign customs duties and wharfage charges, if any.

C. I. F.

10. The seller may desire to quote a price covering the cost of the goods, the marine insurance on the goods, and all transportation charges to the foreign point of delivery. In this case, the proper term is: "C. I. F. (named foreign port)."

Under this quotation:

- A. Seller must
  - (1) Make freight contract and pay freight charges sufficient to carry the goods to agreed destination.
  - (2) Take out and pay for necessary marine insurance.
  - (3) Be responsible for loss and / or damage until goods have been delivered alongside the ship, and clean ocean bill of lading and insurance policy have been delivered to the buyer or his agent. (Seller is not responsible for the delivery of goods at destination, nor for payment by the underwriters of insurance claims.)
  - (4) Provide war risk insurance, where necessary, for buyer's account.
- B. Buyer must
  - (1) Be responsible for loss and / or damage thereafter, and must make all claims to which he may be entitled under the insurance directly on the underwriters.

(2) Take delivery and pay costs of discharge, lighterage and landing at foreign port of destination in accordance with bill of lading clauses.

General Recommendations

In reaching the conclusions set forth in this statement, the conference considered the fact that there are, in more or less common use by manufacturers in different parts of the United States, numerous variations of these abbreviations, practically all of which are employed to convey meanings substantially synonymous with those here defined. For instance, there are manufacturers who quote "F. O. B. Cars," "F. O. B. Works," "F. O. B. Mills," or "F. O. B. Factory," meaning that the seller and buyer have the same responsibilities as those set forth in Section 1. The conference considered all those variations and determined to recommend the use of "F. O. B. (named point)," as "F. O. B. Detroit," "F. O. B. Pittsburg," etc. Of the considerable number of these abbreviations which are used in the United States, the conference felt that the form "F. O. B. (named point)" is most widely used and understood, and therefore should be adopted as the standard practice.

The chief purpose of the conference is to simplify and standardize American practice, and to that end it urges manufacturers and exporters to cease the use of synonymous abbreviations and quote habitually in the terms here recommended, just as far as these terms will cover the price conditions which it is desired to arrange with the buyer.

Variations of the abbreviations recommended in other sections also are in more or less common use throughout the United States. The recommendations of the conference set forth above apply to them with the same force as to those cited under Section 1.

Manufacturers and exporters are urged to bear in mind that the confusion and controversies which have arisen have sprung in part from the use of an excessive number of abbreviated forms with substantially similar meanings, as well as from the use of abbreviations in a sense different from their original meanings, or in an application not originally given them and different from the sense of application understood by foreign buyers.

In simplified and standardized practice lies the best hope of reducing confusion and avoiding controversy.

The conference urges upon manufacturers and exporters the very great importance at all times of making their intention in whatever quotations they employ so thoroughly clear as to be impossible of misunderstanding or misinterpretation. It is much better to take the time and space at the outset to make the quotation clearly understood, than to be compelled in the end to go through vexatious controversy or litigation, which costs not only time and expense but customers as well. Misunderstandings can best be avoided if the seller will formulate a written statement of the general conditions under which his sales are to be made, and will see that the foreign buyer possesses these terms of sale when considering a quotation. The items which may be included in such a statement deal with: delivery, delays, partial shipments, shipping instructions, inspection, claims, damage, and payment. If all contingencies are thus covered by carefully considered conditions of sale, disputes will largely be prevented.

The quotation "F. O. B. (named port)," as "F. O. B. New York," "F. O. B. New Orleans, "F. O. B. San Francisco," is often used by inland producers and distributors to mean merely delivery of the goods at railway terminal at the port named. This abbreviation originated as an export quotation and had no application to inland shipments. It was used only to mean delivery of the goods upon an overseas vessel at the port named. That, in fact, is the meaning universally given to the phrase among foreigners, and is the meaning which the best practice among exporters requires it invariably to have. But because of the confusion which has arisen through the use of that form with a different meaning by inland producers and distributors, and in the interest of unmistakable clarity, the conference most strongly urges the invariable use by American manufacturers and exporters of the form "F. O. B. Vessel (named port)." This adds only one word to the abbreviated form and has the great advantage that it cannot be misunderstood. It also avoids the difficulty which might arise among foreigners not always well versed in American geography, through confusing an inland forwarding point with a shipping port at seaboard.

The conference calls attention to the fact that in selling "F. A. S. Vessel" manufacturers and exporters should be careful to have their agreements with buyers cover explicitly the question of responsibility for loss after goods have been delivered on the wharf or alongside the vessel and before they are actually loaded on the ship. There is no generally established practice on this point. The recommendation of the conference in the definitions of responsibility under Section 7 sets up a rule which it is hoped will lead to the establishment of a standard practice.

It is understood that the provision of lighterage covered in several of these recommendations is only within the usual free lighterage limits of the port, and that where lighterage outside such limits is required, it is for buyer's account.

In order to avoid confusion in another particular, attention is called to the care which must be exercised in all cases in making weight quotations. The net ton, the gross ton and the metric ton, all differ in weight. Similarly there is a variation in the use of the term "hundredweight" to mean either 100 pounds or 112 pounds. It is, therefore, not sufficient to quote a price per "ton" or per "hundredweight." Instead, the conference recommends the use of the terms "ton of 2000 pounds," "ton of 2240 pounds," or "ton of 2204 pounds," etc., whichever is intended.

It is also important to note that a carload lot in the United States means the quantity of the particular commodity in question necessary to obtain the carload freight rate for transportation on American railways. This quantity varies according to the commodity and also varies in different parts of the country. Certain commodities being more bulky than others, the minimum carload for them is less than for heavier products occupying less space. The load required may range anywhere from 12,000 to 90,000 pounds. Consequently it is important, when quoting prices applicable to carload lots, to so state and to specify the minimum weight necessary to make a carload lot of the particular commodity for the particular shipment in question.

The conference points out that in quoting "C. & F." or "C. I. F." manufacturers and exporters moving large quantities of material by one vessel should be careful to ascertain in advance the buyer's capacity to take delivery. This because, under these terms and as a condition of making the freight rate, transportation companies may require a certain rate of discharge per day, and that rate of discharge might be in excess of the buyer's capacity to take delivery. In such event, an adjustment with the transportation company would be necessary, which might affect the freight rate and consequently the price to be quoted.

The conference also strongly urges shippers clearly to understand the provisions of their insurance protection on all foreign sales, irrespective of the general terms used thereon. In almost all cases it should be possible, when making shipments by steamer, to obtain insurance cover giving full protection from primary shipping point to designated sea port delivery, and/or foreign port delivery. As ordinary marine insurance under F. P. A. conditions, i. e., free of particular average, gives no protection against deterioration and/or damage to the merchandise itself while in transit, when caused by the recognized hazards attending such risks, shippers should endeavor in all cases to obtain insurance under W. P. A. (S. P. A.) conditions, i. e., with particular average (subject to particular average), when in excess of the customary franchise of 3 per cent to 5 per cent. Under such form of insurance, underwriters will be called upon to pay claims for damages when these exceed the stipulated franchise.

The conference points out that inasmuch as fees for consular invoices and similar items are arbitrary charges fixed by foreign governments, they are not included in the terms of C. & F. or C. I. F. quotations, and it is part of the duty of the buyer to meet them.

Finally, the conference strongly recommends, as a most effective measure of simplification, the general practice of quoting for export, as far as possible, either "F. A. S. Vessel," F. O. B. Vessel," or "C. I. F." Concentration on this small list, all of which terms are readily understood abroad and are difficult of misinterpretation, will, it is felt, be markedly influential in avoiding confusion and controversy.

BOAT WINCH WITH COUNTER-BALANCE

THERE has been developed in the Fifth lighthouse district a new type of boat winch for light stations to replace the old winches which have been the source of numerous casualties, such as fingers being caught in the gears while lowering, and keepers being ruptured while straining on the cranks in hoisting boats; conditions which were intensified by the introduction in recent years of motorboats to replace the old sail boats, with consequent increases in the weights to be lifted.

The new winch has on its main shaft a spool divided into three sections, two of which carry the boat falls, the third carrying the tail-weight fall, which winds to the opposite hand from the boat falls and hoists a ballast ball equal to about half the weight of the boat.

The old cast cogwheels are replaced by cut gears, further increasing the efficiency, and both gears are closely housed in gear guards. The old pawl, which could be thrown clear out of gear and which was then useless, is replaced by a safety pawl which can not be thrown out of gear, but must be held back by hand while the boat is being lowered. A rolling rip has been fitted on the crank, making it easier to turn and the bearings fitted with removable bronze split bushings.—Lighthouse Service Bulletin.

LORD DRY DOCK COMPANY

EXTENSIVE development work is now under way on the west shore of the North River, at the port of New York, on a marine repair plant for the Lord Construction Company. Nineteen-twenty, the twenty-fifth anniversary of the Lord Electric Company (parent organization of all the Lord interests), sees the launching of a new venture, the Lord Dry Dock Company. This new organization will specialize in the repair of ships at the port of New York.

Land just opposite the center of Manhattan, with 2000 feet of river frontage, has been purchased. This property is being bulkheaded and filled 300 feet from the present shore line, so that all the shops may be located on the river side of the railroad right-of-way. The present plans call for six piers 1000 feet long by 60 feet in width. Construction work has been started and is well under way on these piers.

The shops will be of steel and concrete, and will include machine, plate and boiler, and carpenter shops. There will also be a pattern loft, a rigging loft, copper and steel metal shop, pipe and brass foundry, and power house.

Before the end of 1920 a 20,000-ton floating dock will be ready for work. Additional dry-dock equipment is to be ordered at once, including one 10,000-ton floating dock in five units, one 6000-ton dock in three units, and one 4000-ton dock in two units. The 4000 and 6000-ton docks can be united at any time, if necessary, to form another dock of 10,000-ton capacity.

The new company is a consolidation of the Providence plant of the Lord Construction Company and the Weehauken plant of the Weehauken Dry Dock Company, now located on a leasehold one mile south of the land just purchased by the new corporation. Both of the consolidated companies will continue operations at their present locations at least until the new plant is completed. The equipment of the Weehauken Dry Dock Company includes one 600-ton, one 1000-ton, two 1200-ton floating dry docks, one tug, one small yacht, two floating machine shops, a wood-working mill, and a large quantity of heavy timber.

It is apparent from the list of equipment that the Lord Dry Dock Company will be able to handle any repair job from a small coasting schooner up to the large trans-Atlantic liners.

Mr. Richard D. Roddermond, president of the Weehauken Dry Dock, has been made vice-president of the new organization. The other officers are: F. W. Lord, president; J. M. Watters, secretary and treasurer; H. M. Waite, vice-president, and H. B. Moore, vice-president.

A Successful Co-operative Plant Cafeteria

A DESCRIPTION OF THE CAFETERIA METHODS AT THE MARE ISLAND NAVY YARD CAFETERIA

Exterior view of the co-operative Cafeteria at Mare Island Navy Yard

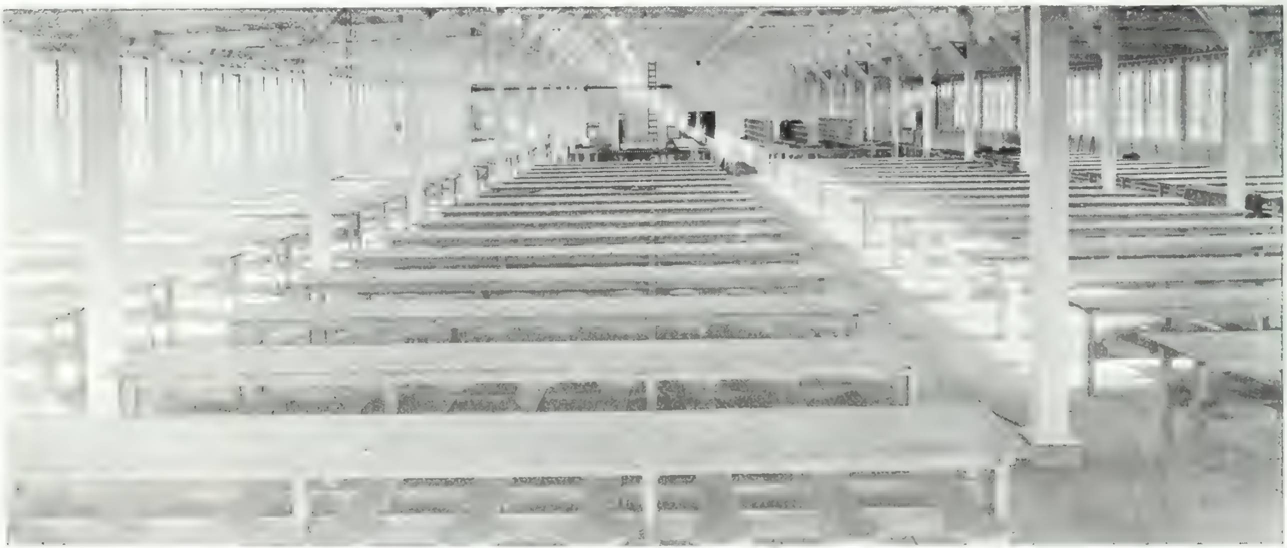
SINCE Napoleon's famous statement that "an army travels upon its stomach," the importance of an ample supply of wholesome food for the fighting man has been constantly held in mind. Indeed, it is common knowledge that those in control of the highly developed German military machine readily sacrificed the food supply of the civilian population to insure that the army should not be stinted.

But it is only within the last few years that a realization has dawned upon the management of most manufacturing plants of the equal importance of taking a real personal interest in the supplying of good quality fuel to the human industrial machine. There is now, however, a clear appreciation of the fact that the furnishing of ample portions of palatable, reasonably priced food to the working force of the plant at the mid-day meal is reflected in the increased quantity and quality of labor output just as surely as these gains appear in the presence of proper plant lighting, heating, ventilation and safety. No man produces well on an empty or improperly filled stomach, any more than he fights well under the same condition.

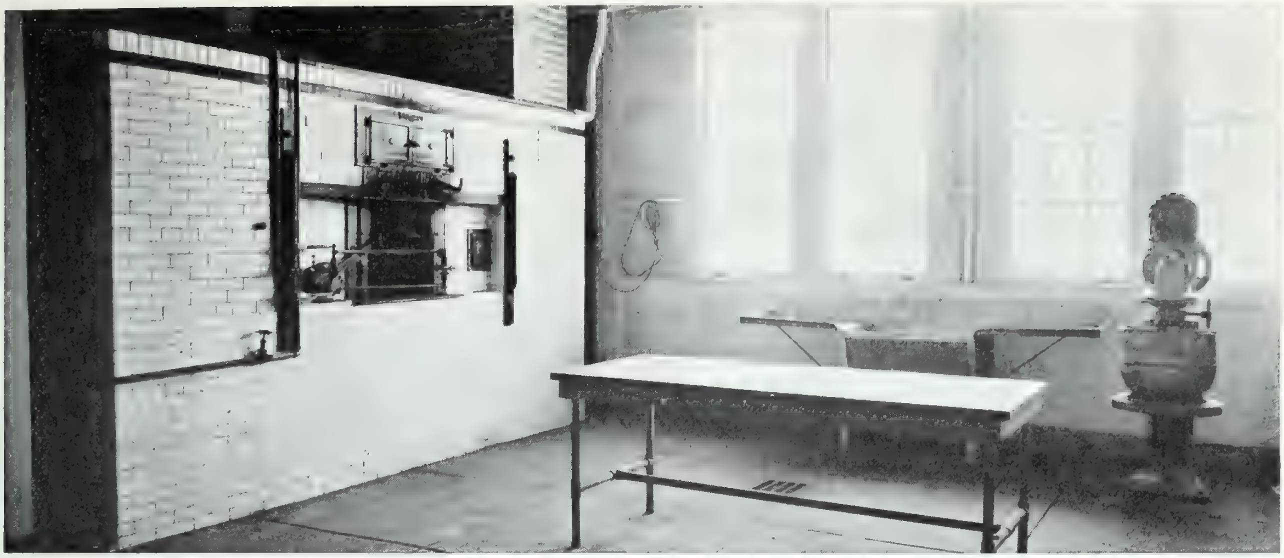
The co-operative cafeteria system at Mare Island was started early in 1913 by a committee of employes with the approval and assistance of the commandant. The initial expense was met by a subscription of one dollar each from several hundred of the employes of the navy yard and this money was refunded to the subscribers within two years after the cafeteria was started. The government, with exceptional generosity in such a matter (for those days), furnished the building, heat, light and partial janitor service, but the cost of the equipment and all supplies, as well as the operating expenses, were met from the receipts.

At first the management was vested in the hands of a round dozen representatives from the various shops, most of these representatives being foremen and quartermen; but this committee, like a big board of aldermen, was found to be unwieldy; there was no individual responsibility, and through lack of interest, diversity of opinion, and conflict of authority, the operation of the cafeteria became extremely unsatisfactory, and a deficit of $1700 was easily accumulated.

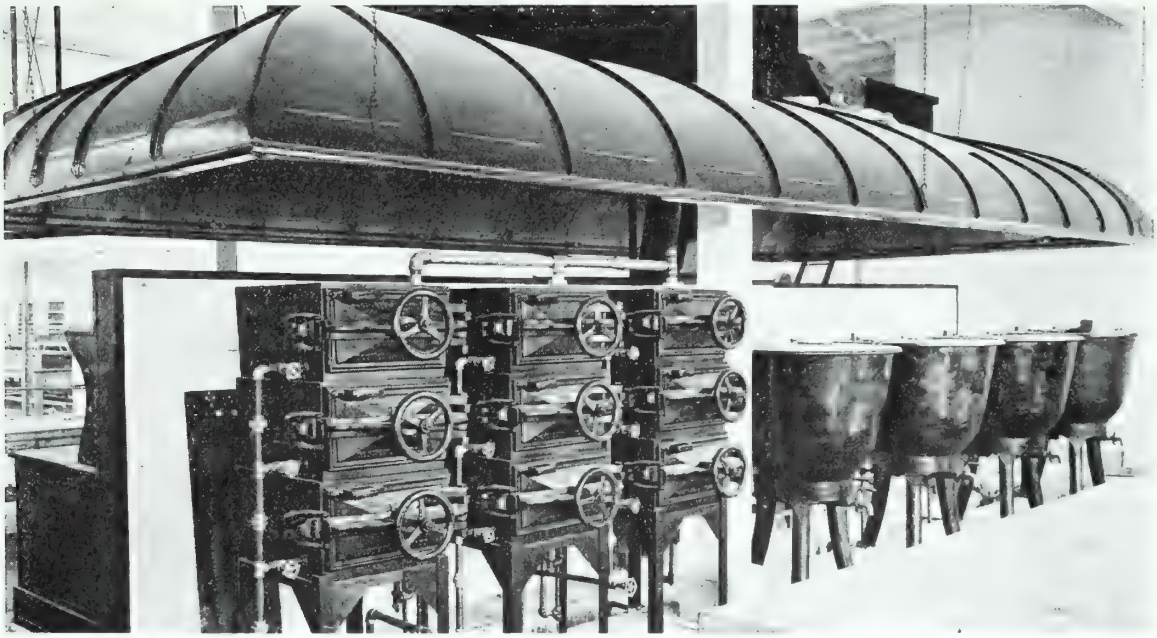
The commandant then took charge of the situation, relieved the old committee and appointed a new one consisting of three members, the desig-



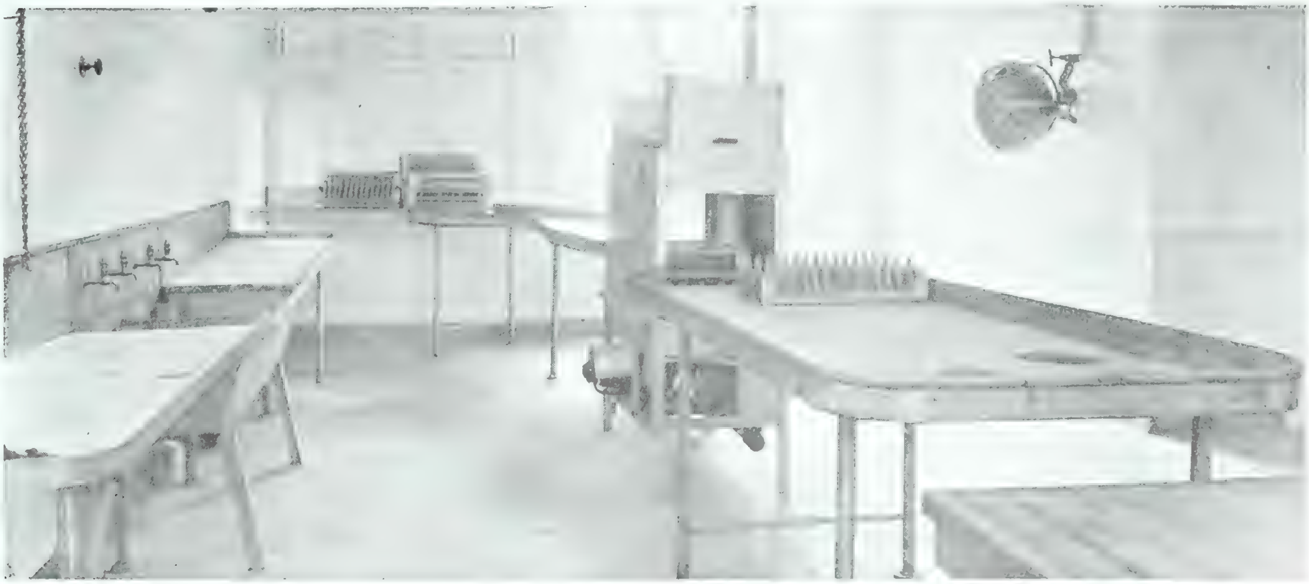
Interior of the Cafeteria showing tables and seating arrangement



Baking oven and dough-mixing machine. Pies, cakes, biscuits and muffins are baked here. All bread is purchased



Steam cooking equipment. Note the steam cookers with pressure covers at the left. These are used for steaming vegetables and puddings, while the kettles on the right are used for soups and stews



Dishwashing equipment. The dishes come in through window at the left, passing to the right through the machine. The dishes are re-distributed to serving tables in carrier baskets on rubber tired hand trucks nated chairman being an officer of the supply corps in the Navy. Under his direction the affairs of the cafeteria were thoroughly overhauled and placed on a business basis, the building itself being completely renovated, the equipment repaired and replaced where necessary, and a proper purchasing and check system installed, with the result that in the early part of 1918 the old indebtedness had been liquidated and a pleasing cash credit of $2000 had been established.

During the first year of the war the old cafeteria, with its seating capacity of 400, became entirely inadequate on account of the tremendous increase in the number of employes due to war work—from 3200 to 8700, approximately. Request was made on the Navy Department early in 1918, and promptly approved, for $65,000 for the erection of a new building to house the cafeteria, the equipment to be purchased by the committee. The building shown in Figure 1 is the result. In designing this building, careful study was given to the latest practice in industrial plants throughout the country and no expense was spared in installing the finest equipment obtainable. The exterior is painted artillery green, which is a particularly pleasing shade for California exteriors. In fact, all frame structures at Mare Island, except officers' quarters and the cream white hospital buildings, are now painted this color. The cost of this equipment was $6000 and this expense is being defrayed from the operating profits.

Since the opening of this new building, the cafeteria committee has been enlarged to six members, who comprise the "managing board." The chairman, who is also the auditor, is an officer of the Naval Supply Corps, detailed to this additional duty by the commandant, while the remaining members are chosen by the heads of each of the five principal yard departments. One member of the board serves as "managing director and treasurer," while a third member is the "chief cashier." The managing director and the cashier are elected by a majority vote of the managing board.

An experienced cafeteria operator is employed by the board as the active manager in direct charge of the running of the cafeteria. The remaining three members of the managing board, who are not assigned to active details of the management, form an advisory committee to receive complaints, criticisms, suggestions and to make recommendations to the commandant for the improvement of the service. The desire to have the work of this advisory committee quite distinct from the active details of administration was responsible for the increase of the committee from three to six members.

The original intention was to discontinue the old cafeteria when the new building was placed in commission, but on account of the central location of the former and the large patronage it was then enjoying, decision was made to retain this for serving soft drinks, ice cream, sandwiches, etc., and this service has proved most popular as well as profitable.

The following points in connection with the new cafeteria are especially interesting:

1. Double entrance (each side of building).
2. Excellent lighting and ventilation.
3. The type of table and of stationary seat fitted.
4. Ease of cleaning throughout.
5. Cooking and dishwashing equipment and layout.

Thirteen hundred patrons can be served at one sitting in the new cafeteria and 3000 during the hour allowed employes for lunch.

The cafeteria staff consists of one bookkeeper, two chefs, three bakers, one vegetable man, eight counter girls, two salad girls, one canteen girl, one dishwasher, two janitors.

The cafeteria is not yet working up to full capacity, so no doubt the above staff will have to be augmented when that occurs. At the present time the average expenditure of each person for the midday meal is 35 cents. Prices are lower than those asked for similar portions of equal quality in the Vallejo restaurants.

NOTABLE BRITISH LAUNCHING

At Dalmuir on Tuesday, December 23, 1919, Messrs. William Beardmore & Company, Limited, launched the Anchor Line steamer Cameronia. The Cameronia is the first large liner to be laid down and floated since the armistice was signed, and constitutes a record in rapid construction. The keel of the vessel was laid March 7 last, so that only about nine and a half months have been required to bring her to the launching stage. The liner, which is intended to replace a vessel of the same name lost during the war, embodies many novel features, the most notable being that she is to be fitted with geared turbines and is intended to use oil fuel. The launch at the naval construction works of the builders was attended by a large company.

The dimensions of the vessel are as follows: Length over-all, 578 feet 6 inches; length between perpendiculars, 550 feet; breadth (molded), 70 feet; depth (molded), 42 feet 9 inches; and measurement, 16,500 tons gross. The vessel is being built under special survey and class 100 A1 Lloyds. In accordance with general practice in recent years a cruiser stern has been adopted. One funnel and two pole masts are fitted. On her designed load draft of 29 feet it is estimated that the vessel will be capable of carrying about 11,000 tons of deadweight. Accommodation is provided for about 265 first-class and 370 second-class passengers in two and four berth cabins, and for about 1150 third-class in two, four and six berth cabins. The machinery, which is supplied by the builders, consists of two sets of Brown-Curtis turbines, each set comprising one high-pressure, one intermediate-pressure and one low-pressure turbine, and having astern turbines incorporated in each intermediate and low-pressure casing. The turbines drive the propeller shafts through helical gearing of the double reduction type. Steam is supplied by three double-ended and three single-ended boilers, burning oil fuel. The launching displacement of the vessel was 7000 tons, and the time taken in the movement of the ship was one minute fifty-eight seconds. The naming ceremony was performed by Lady Hermione Cameron of Lochiel, who also named the first Cameronia, launched from Meadowside shipyard in 1911.

Piece Work System at Hog Island

By C. S. Bundesman, Superintendent Piece Work Department.

A PIECE work system usually develops with the expansion and natural growth of an organization through years of experience and application. Hog Island's piece work system was developed and successfully installed by our piece work department in weeks, under the supervision and direction of W. B. Ferguson, assistant to the president. New standards, methods and systems radically different from old-time methods were inaugurated with the thought in mind of absolute control, accuracy and protection against irregularities.

The problem of control was tremendous—even larger than the following figures would indicate:

Our program calls for a total of 62,500,000 driven rivets—bolting, reaming, chipping and caulking and drilling in proper ratio. We have, in one calendar month, set prices, counted and tested 4,500,000 rivets; 2,400,000 bolts; 5,000,000 drilled, reamed and countersunk holes — each craft counted and paid without interruption—on schedule time.

We have driven 227,000 rivets with 761 riveting gangs in eight hours. Our "all" average drive an hour has reached forty-five rivets. This average represents the production of each and every man on the ways as well as the wet basin, and includes the student, day worker and piece worker.

Our first problem in control was the building of the piece work organization — securing men with years of practical experience, who could set prices and, if necessary, do the work themselves at the prices set. This was vital because our supervising force alone employed more than 300 men, each with different ideas as to proper rates that a piece worker should be paid.

Each piece work supervisor is responsible for all rates set in his division, consisting of ten shipways, and we have one supervisor for rates in the wet basin. He also is responsible for counting of work, workman's receipt, money voucher for completed work, and all piece work records for his division; interpretation of the various rules and regulations of the Black Book, Macy awards, etc.

We have not experienced labor trouble with the piece work crafts throughout our shipbuilding program, which in itself speaks how well they have done their duty.

A fabricated ship offered many rate-setting difficulties, especially when a scale of rates drawn up to function for old practices and methods of ship construction was applied to our fabricated hulls. Trials have been many, and numerous difficulties were encountered, before our piece work system finally reached its present standard of efficiency and accuracy.

Organization

The entire counting force for ways and wet basin consisted of only 150 counters developed from raw material, starting as learners through the following stages: bolting, reaming and countersinking, riveting, chipping and caulking. This method compels each counter to master all branches of piece work and become acquainted with all rates, and is the only way that he can assume positions of greater responsibility; all positions carrying advancement are given to the boys who have had their trials.

The operation of the forms and the system is independent of all hull supervision—that is, the entire piece work system is an independent unit.

Through constant field checking—first, by the auditing department; second, by a spot checking system used by the Emergency Fleet Corporation; and third, by the piece work checking system—we believe our piece work system is as nearly proof against irregularities as any piece work system in operation today.

That the readers may have full details of the operation of the system, the following description is given for the riveting craft:

Straight Piece Work

On completion of work, the riveter's work is tested and a slip given to the workman by the tester, bearing the tester's signature, for production, location, hull, etc.—Form No. 2733. The slip must be given to the counter by the workman before the count is made. No work is counted unless a tester's slip is given to counter. After counting and checking against tester's slip, the workman is given a receipt—Form No. 2306—or voucher which is in duplicate, the counter retaining the duplicate copy and attaching the tester's slip; he paints out the work with a quick drying solution, returns to his division office and enters count on piece work money vouchers in duplicate — Form No. 02628. These vouchers have the hull number, piece work craft, names and numbers of piece workers entered by the piece work checkers; for each voucher made out by the checker the counter must have a workman's receipt form and tester's slip. This method acts as a double check to accurate reports of production and absolutely prevents missing of work-

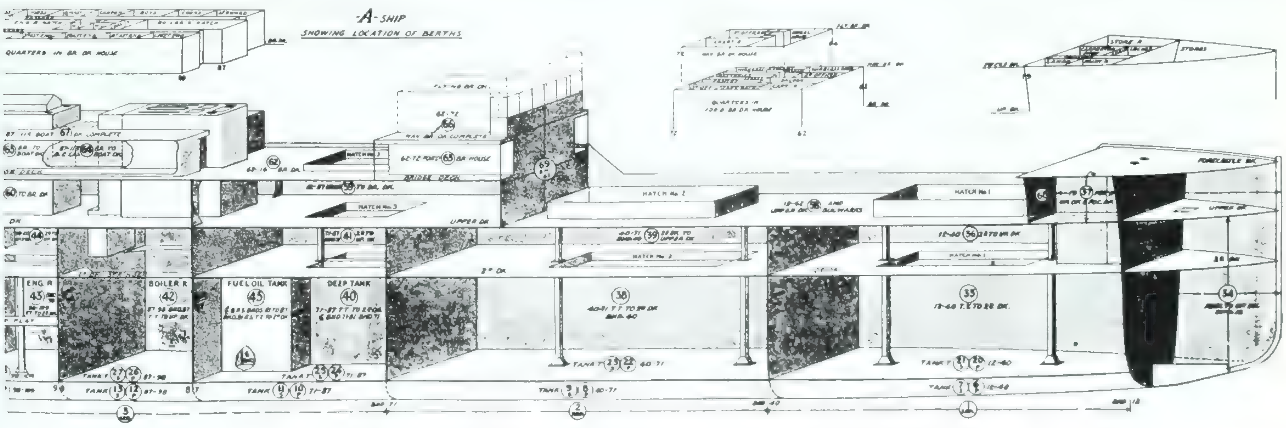
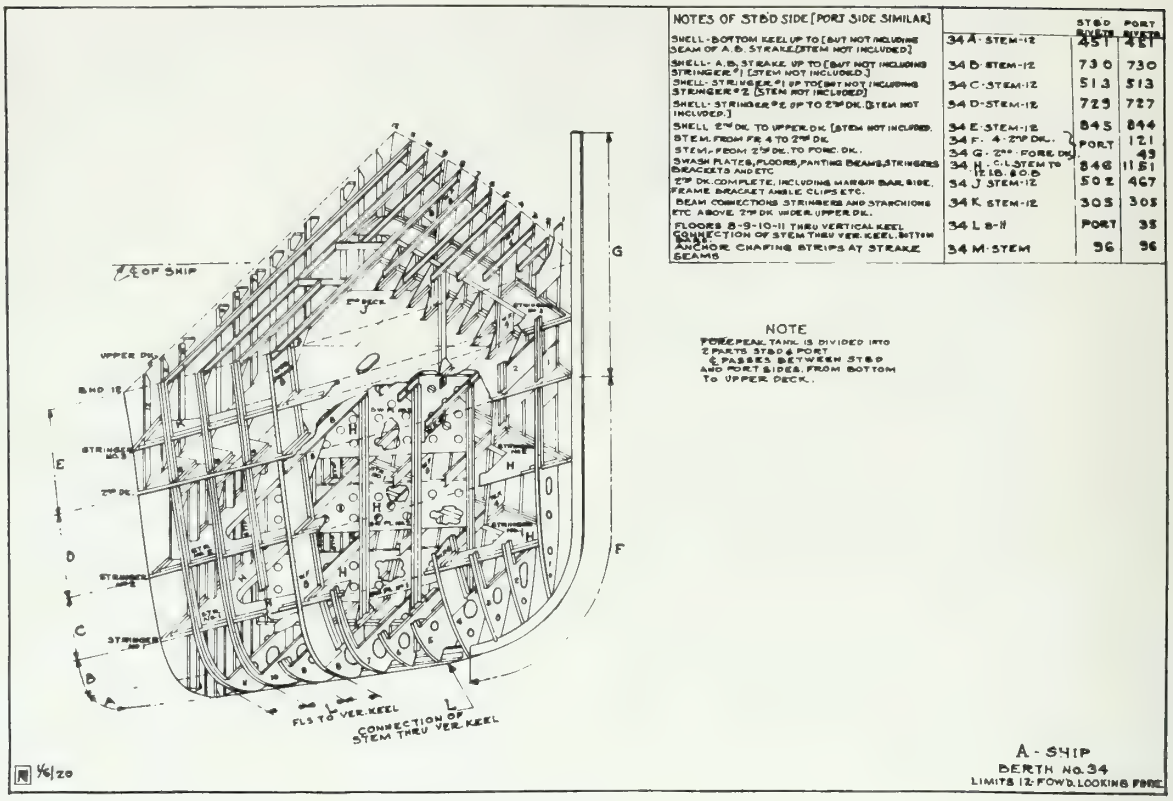


Figure 1, showing the major berths for part of type A ship, Hog Island



NOTES OF STB'D SIDE [PORT SIDE SIMILAR]		STB'D RIVETS	PORT RIVETS
SHELL-BOTTOM KEEL UP TO [BUT NOT INCLUDING SEAM OF A.B. STRAKE [STEM NOT INCLUDED]	34 A-STEM-12	451	451
SHELL-A.B. STRAKE UP TO [BUT NOT INCLUDING STRINGER #1 [STEM NOT INCLUDED]	34 B-STEM-12	730	730
SHELL-STRINGER #1 UP TO [BUT NOT INCLUDING STRINGER #2 [STEM NOT INCLUDED]	34 C-STEM-12	513	513
SHELL-STRINGER #2 UP TO 2ND DK. [STEM NOT INCLUDED.]	34 D-STEM-12	729	727
SHELL 2ND DK. TO UPPER DK. [STEM NOT INCLUDED.	34 E-STEM-12	845	844
STEM. FROM FR. 4 TO 2ND DK.	34 F. 4-2ND DK.	PORT	121
STEM.-FROM 2ND DK. TO FORE. DK.	34 G-2ND-FORE DK.		43
SWASH PLATES, FLOORS, PANTING BEAMS, STRINGERS BRACKETS AND ETC	34 H-C.L. STEM TO 12 I.B. & O.B.	846	1151
2ND DK. COMPLETE, INCLUDING MARGIN BAR, SIDE, FRAME BRACKET ANGLE CLIPS ETC.	34 J STEM-12	502	467
BEAM CONNECTIONS STRINGERS AND STANCHIONS ETC ABOVE 2ND DK. UNDER UPPER DK.	34 K STEM-12	305	305
FLOORS 8-9-10-11 THRU VERTICAL KEEL CONNECTION OF STEM THRU VER. KEEL, BOTTOM BARS.	34 L 8-11	PORT	35
ANCHOR CHAFING STRIPS AT STRAKE SEAMS	34 M-STEM	96	96

NOTE
FOREPEAK TANK IS DIVIDED INTO 2 PARTS STBD & PORT ℄ PASSES BETWEEN STBD AND PORT SIDES, FROM BOTTOM TO UPPER DECK.

A-SHIP
BERTH No. 34
LIMITS 12-FOW'D. LOOKING FORE

Figure 2

men, and is a check against counter and checker, because both men's reports must tally.

A copy of the original tester's slip is made out and attached to copy of the piece work slip—Form No. 02628—by the counter as evidence to the Emergency Fleet Corporation that the work has been done and inspected. The original tester's slip and workman's receipt voucher are then filed by hull numbers in fire-proof vaults.

Form No. 02628 is signed in duplicate by the counter, certified as to correct count by the foreman directly in charge of the work for production, and by the piece work supervisor for rates and payment, audited and delivered to the time office, which receipts for same and enters money on payroll. Original copy of Form No. 02628 is retained by the time office, checked for time against clock cards; the other is sent to auditing department of the Emergency Fleet Corporation, which again checks all signatures, rates and locations before authorizing payment. Any irregularity found must be corrected before the workman receives his money.

With an average of 650 gangs of riveters employed, five divisions in keen competition for leadership, it is only natural that an effort would be made to entice the best men from one division to another; this is usually easily accomplished by giving to favorites the cream of work and inducements other than straight work ahead. This condition was foreseen during the construction of the first hulls. A plan of development and installation of the berthing system (together with the education of the men in its functioning) caused a radical departure from this practice.

Berthing System

The berthing system as developed on the Type A ship consists of theoretically dividing a ship into

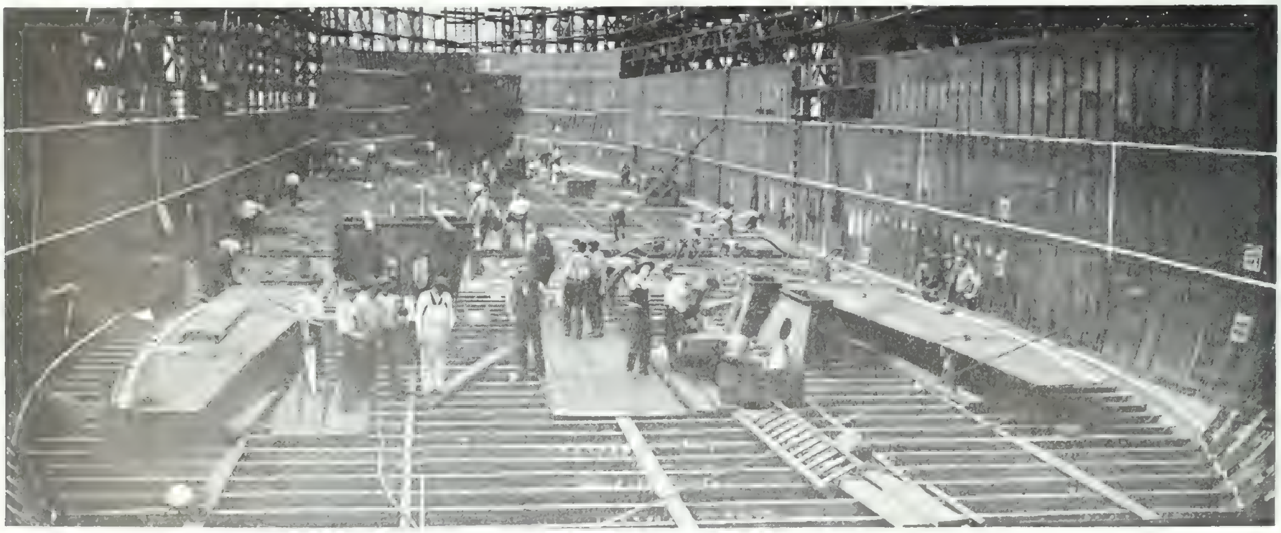


Figure 3

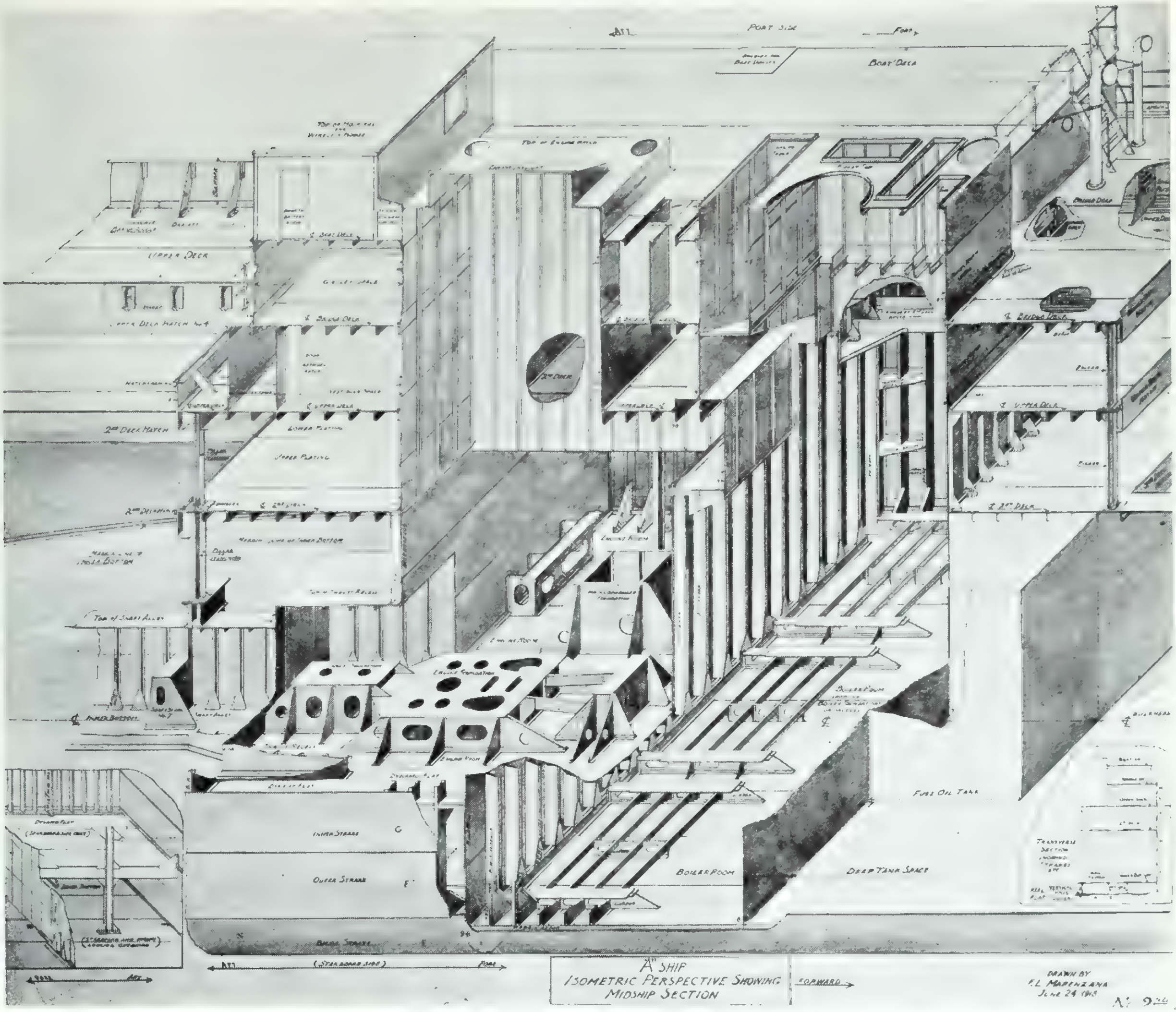


Figure 4

a number of sections or berths, as illustrated in Figure 1. The seventy major sections or major berths of the ship, as shown in perspective, have been established for purposes of closer planning out of the work day by day for the various trades, which must follow each other in regular sequence or rotation. These seventy major berths are subdivided into a number of smaller berths, each of which is given a distinctive number, making altogether about 1500 separate minor berths on the ship, each considered a unit in planning and following up, inspecting, triple counting and checking the work trade by trade.

Figure 2 shows division of one of the major berths, all information, data, etc., for counting all crafts as planned. Figure 3 shows berthing system as applied to ship. Figure 4 shows isometric perspective of midship section of engine and boiler room, etc. This detail was necessary in order that the berthing system could be intelligently conveyed to the minds of the entire supervising force in a simple picture form, the various relations of one berth to another, as applied to actual construction on the hull—the only practical way that a system of this kind could be applied in a uniform method to fifty ships under construction at one time in various stages of completion. That this plan was successful cannot be more forcibly demonstrated than by the results obtained as shown in Figure 5.

The seventy major berths in the ship are simply the logical sections or compartments which are caused by the vertical and horizontal structural divisions — that is, the decks and bulkheads and outer shell of ship.

The primary object of the berthing system is to make it simple for the supervisors to plan out the work for the men under them and to make assignments of workmen day by day by berths in such a way that the trades will follow each other in the necessary sequence, beginning with the erection of the steel, the regulating, the shipfitting, bolting, reaming—and finally, when the berth is ready for riveting, placing the riveting gangs on with plenty of straight piece work ahead of them—with no odd or scattered work. This makes certain that tanks and compartments are ready as soon as the riveters have finished and the work has been caulked.

A simple system of following up the work by the foreman consists of a separate card for each berth—Figure 6. The card is signed up by the foreman in charge of the particular trade when his work is completed, ending with the rivet testing.

Results

Riveting is the one operation which is usually considered the measure or criterion of ship production and the number of rivets driven daily by each gang is considered a very good index of the general producing efficiency of a shipyard. Judged by this standard, Hog Island's production is nothing short of remarkable at the present time, having 650 riveting gangs at work with an average daily rivet drive of over 300 rivets a gang day of eight hours. Before it is possible to install the berthing system, this same average was in the neighborhood

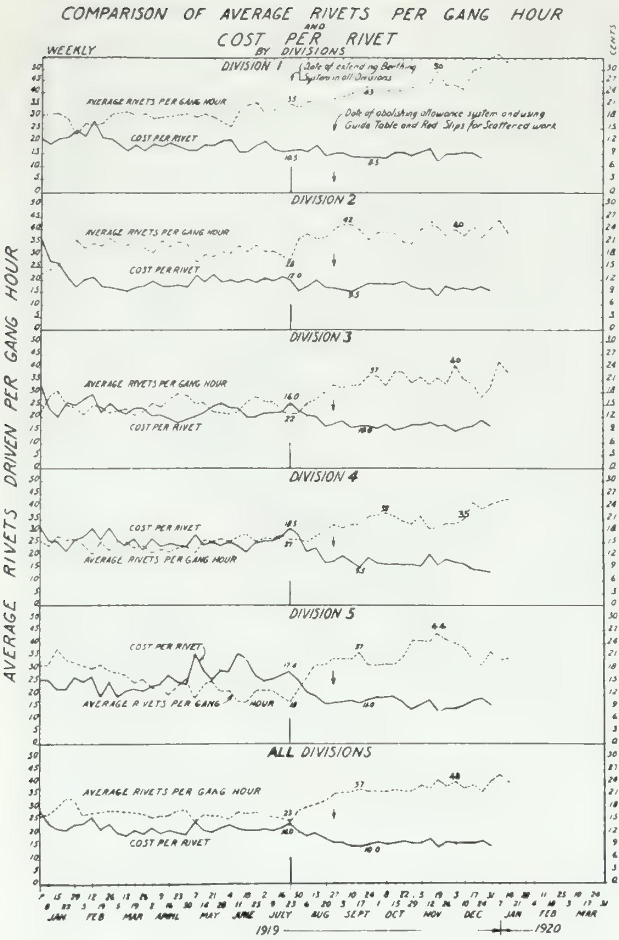


Figure 5, above; figure 6 at right

A. I. S. C. 8-19 E-3305

CARD No. ....

HULL .... **BERTH**

FRAME ....

SEQUENCE	**Date Finished**	**Foreman's Signature**
ERECTING		
REGULATING **LINERS** **SHIPFITTING**		
FIRST BOLTING		
FIRST REAMING		
SECOND BOLTING		
SECOND REAMING		
INSPECTED		
RIVETED		
RIVETS TESTED		

I have inspected the above Berth, and it is completed.

____
General Foreman Fitter

DATE______________

____
General Foreman Riveter

Note: This Card must be Returned to Planning Board Clerk, after you have completed your work.

A I S C 10-19 E-3351

GUIDE TABLE FOR SETTING AGREEMENT PRICES FOR RIVETS

No. Rivets in one Location	3½c. RIVETS CLASS 1	2	3	4	4c. RIVETS CLASS 1	2	3	4	5c. RIVETS CLASS 1	2	3	4	6c. RIVETS CLASS 1	2	3	4	7c. RIVETS CLASS 1	2	3	4
10	10	17	24	31	11	18	25	32	12	18	26	33	13	19	26	33	13	20	27	34
15	8	13	17	22	8½	13	18	22	10	14	18	23	10	15	20	24	11	15	20	24
20	7	10	14	17	7½	10	14	18	8¾	11	15	18	9	12	16	19	10	13	17	20
25	6½	9	12	14	6¾	9¼	12	15	7½	10	13	15	8½	11	14	16	9½	12	14	17
30	5¾	8	10	12	6¼	8¼	10	13	7	9	11¼	13	8	10	12	14	9	11	13	15
40	5	6½	8	10	[illegible]	7¼	8½	10	6½	8	9½	11	7½	9	10½	12	8½	9¾	11	13
50	4¾	5¾	7	8¼	5¼	6½	7½	9	6¼	7¼	8¼	10	7	8¾	9¼	10	8	9	10	11
60	4½	5¼	6¼	7¼	5	6	6¾	8	5¾	6¾	7½	8½	6¾	7¾	8½	9½	7¼	8½	9¼	10
70	4¼	5	6	6¾	4½	5½	6¼	7¼	5½	6¼	7	7¾	6½	7¼	8	8¾	7½	8¼	8¾	9½
80	4	4¾	5½	6	4½	5¼	6	6¾	5½	6	6¾	7¼	6½	7	7½	8¼	7¼	8	8¼	9
90	4	4½	5¼	5¾	4½	5	5½	6¼	5½	5¾	6½	7	[illegible]	6¾	7¼	7¾	7¼	7¾	8	8½
100	4	4½	5	5½	4¼	5	5½	5¾	5¼	5¾	6¼	6½	6¼	6¼	7	7½	7¼	7½	8	8
120	3¼	4¼	4¼	5	4¼	4¾	5	5½	5½	5½	5¾	6¼	6¼	6½	6½	6¾	7	7¼	7½	7½
140	3¼	4	4¼	4½	4¼	4½	4¾	5	5¼	5½	5½	5¾	6¼	6¼	6¼	6½	7	7	7¼	7¼
160	3¼	4	4	4¼	4¼	4½	4½	4¾	5½	5¼	5¼	5¼	6	6	6¼	6¼	7	7	7	7
180	3½	3¼	4	4¼	4¼	4¼	4½	4½	5	5½	5¼	5¼	6	6	6	6				
200	3½	3¼	4	4	[illegible]	4¼	4¼	4½	5	5	5	5								
220	3½	3½	3¾	4	4	4	4¼	4½												
240	3½	3½	3¾	4	4	4	4	4¼												
260	3½	3½	3¾	3¾	4	4	4	4¼												
280	3½	3½	3½	3½	4	4	4	4												
300	3½	3½	3½	3½																

No. Rivets in one Location	8c. RIVETS CLASS 1	2	3	4	9c. RIVETS CLASS 1	2	3	4	10c. RIVETS CLASS 1	2	3	4	12c. RIVETS CLASS 1	2	3	4
10	15	21	28	35	15	22	29	36	17	23	30	36	19	25	31	38
15	12	16	21	25	13	17	22	26	14	18	23	27	16	20	24	28
20	11	14	18	20	12	15	18	21	13	16	19	22	15	17	21	23
25	10½	13	15	18	11¾	14	16	18	12½	14	17	19	14½	16	19	21
30	10	12	14	16	11	13	15	16	12	13½	15	17	14	15	17	19
40	9½	10½	12	13	10¾	11½	13	14	11½	12½	14	15	13¼	14	15	16
50	9	9¾	10¾	12	10	10¾	11½	13	11	11½	12¾	13½	12¾	13¼	14	15
60	8¾	9¼	10	11	9¾	10¼	10¾	11¾	10¾	11	11¾	12½	12½	12¾	13¼	13¾
70	8½	9	9½	10¼	9½	10	10¼	11	10½	10¾	11¾	11¾	12¼	12½	12¾	13½
80	8¼	8½	9¼	9¾	9¼	9¼	10	10½	10¼	10½	10¼	11¼	12	12¼	12¼	12¾
90	8¼	8½	8¾	9¼	9¼	9¼	9¼	10	10¼	10¼	10½	10¼	12	12	12	12¼
100	8	8¼	8½	8¾	9	9¼	9½	9½	10	10	10¼	10½	12	12	12	12
120	8	8	8¼	8¼	9	9	9	9	10	10	10	10				
140	8	8	8	8												

Moving Time has been taken care of in these prices, as follows:

CLASS 1 1-4 hour, for short move, such as from one Berth to adjoining Berth.
CLASS 2 1-2 hour, such as Crossing over a Bulkhead.
CLASS 3 3-4 hour, such as from Upper Deck to Tank Top.
CLASS 4 1 hour, as from Ship to Ship, or Bow to Stern.

APPROVED AUGUST 29, 1919

Signed, W. B. Ferguson
Asst. to Pres.

J. D. Andrew
Mgr. Hull Construction

Figure 7

					DAY WORK		PIECE WORK			
NAME	CRAFT	HULL	DATE	HRS	PROD.	AMT PAID	PROD.	ALLOW.	AMT. PAID	SIGNATURE
TOTAL										

REMARKS ____________________

Figure 8

of 200 to 225 rivets a gang day. That is to say, the producing efficiency or output per gang has increased nearly 50 per cent and nearly 80 per cent of the rivets are driven in accordance with the system. Not only has it cut the cost per rivet very materially, but it has made possible substantially greater earnings by the men. The same general principle is also applied to electrical installation, piping and machinery.

The system insures systematic and thorough supervision and planning on the part of the foreman, the interesting feature of which is that this planning is now demanded of the foreman, not so much by exhortation from above as by pressure from their own men, so that they may accomplish more with less effort.

Figure 5 graphically shows riveting cost and production before and after installation of berthing system.

Prices for Scattered Work

Some conditions of work (due to faulty fabrication, moving time and other causes) required rates other than the standard for the berthing system. Careful studies were made and the guide table for setting prices (see Figure 7) was designed. Any rate in excess of the guide table prices must be requested by the general foreman riveter, approved by the piece work supervisor, and requested in quadruplicate on an emergency rate slip—Form No. 3329—by the general foreman riveter only. If the piece work supervisor after viewing work does not approve the rate, it is necessary to have the division superintendent's approval. The signature of the superintendent shows that the piece work supervisor agreed to the rate under protest. This procedure has automatically eliminated requests for excess rates, because a request for an excess rate will usually show, on investigation of the work, conditions that could be eliminated with proper supervision.

In connection with the piece work department, a vital aid to production is the daily production report. This report is delivered to the offices of every official and supervisor each morning, gives to each official the records of all piece work crafts for the preceding day as to production, costs for every division, both for day work and piece work, and cumulative totals of all.

The following brief summary shows the scope of the work covered by this daily report:

The production report gives condition of weather at 8:00 a. m., and noon, as both periods govern the production.

Report of late piece work slips held for signatures, absentees, etc.: This report credits production to the proper days of actual production.

Daily production summary is a résumé of riveting, bolting, reaming, drilling, showing production of each yard, number of gangs, average production a gang hour, and the all average for the entire day's production.

Daily rivet report gives the record of drive, cumulative total to date, average number of rivets a gang hour by yards and divisions; also total rivets driven in each hull to date. A certified copy of the report is sent daily to the treasurer's office.

Report of number of men employed gives to each division superintendent and supervisors information as to the number of men employed in piece work crafts, the percentage working piece work and day work.

Bolting and reaming report by hulls, giving cumulative totals to date, hours and averages.

Daily riveting analysis—the most important part of the production report—gives the unit cost of riveting by hull, average rivets an hour, also the workmen's names and the total production of all men not delivering production equal to the guaranteed hourly gang rate. A supervisor can spot the non-producer daily from this report.

Cut-out report shows number of rivets cut out, condemned, etc.

General foreman's rivet report gives the comparison of production of each general foreman and his standing, based on production a man hour of each riveter under his supervision, also the number of gangs employed.

Foreman rivet report is a production record of each foreman by hull and gives the standing of each foreman along similar lines as the general foreman's report.

In order that each division superintendent may have pay roll records of each man of the piece work crafts, the auditing department furnishes a weekly pay roll record of all men taken from piece work slip, signed by the foreman, as shown in Figure 8. Elimination of non-producers is based on these records and the production efficiency of each foreman is easily gauged.

The aim of the piece work department has been to furnish the men responsible for production with accurate statistical information in such a manner that each man responsible for costs would be able immediately to detect his weakness and, by cooperation and competition with his fellow supervisors, build ships for a price that will enable us to compete successfully with our competitors.

Notable Drydocking Record

By Joe L. Murphy

WHAT shipping men concede to be the world's record in drydocking achievement was accomplished recently when the 30,000-ton floating drydock of the Morse Drydock & Repair Company of Brooklyn, New York, lifted the United States Shipping Board steamer Minnesota, the world's greatest deadweight carrier, with a cargo capacity of 30,000 tons, excluding her reserve bunker space.

The successful lifting of the Minnesota gave that ship the signal honor of being the largest ship that has as yet tested the strength of a floating drydock. All sections of the six-section dock of the Morse Company were commissioned in the work of raising her hulk in the air, and only twenty-five minutes of actual pumping time was consumed.

Of twin-screw type, and 630 feet long, the Minnesota, sister ship of the Dakota, was built in America primarily as a cargo carrier for President James J. Hill of the Great Northern Railway. She now has accommodations for twenty-four hundred steerage passengers.

The propelling machinery of the Minnesota consists of two sets of three-cylinder, vertical, triple-expansion engines of the direct acting surface condensing type, with cylinders 29 inches, 51 inches and 89 inches in diameter. Her boilers, sixteen in number, are of the Niclausse water-tube type, and were built by Stirling & Company. These were constructed for a steam pressure of 250 pounds a square inch.

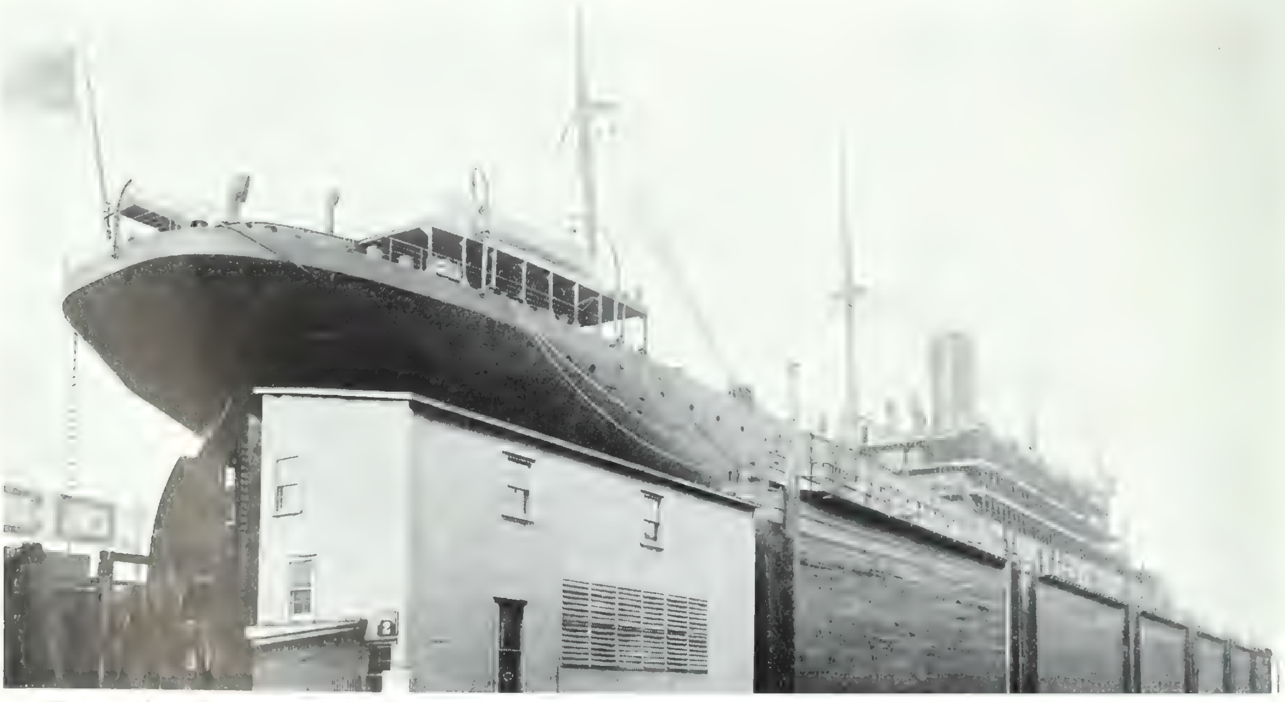
Centrifugal pumps, circulating 7000 gallons of water an hour through the ship's condenser, are driven by 10-horsepower motors. The ship's decks are supported by box-shaped girders, dispensing with the portable pillars, which is the usual practice. The Minnesota and the Dakota were the first vessels fitted in this manner and so classed by Lloyds.

The establishment of such a notable record followed close the lifting of another Shipping Board steamer, Eastern Cross, in eleven minutes' actual pumping time, and the American Army transport Powhatan in twenty-two minutes. The speed attending the raising of the Eastern Cross is remarkable in view of the fact that only three sections of the six-section dock were used and that the Eastern Cross held 4000 tons of general merchandise when she was lifted. Only four sections of the dock were required to raise the Powhatan, weighing 12,000 tons.

Exactly eleven minutes after the pumps started the operation of getting the Eastern Cross out of water, workmen were busy erecting riggings and preparing to dismantle her broken rudder parts, which are clearly shown in the accompanying picture. The quick and most efficient "first aid" treatment administered to this ship was given in a time of urgent need, for the vessel had sustained the broken rudder when more than two days out at sea, with her general merchandise bound for a European port. Her rudder rendered useless, the ship was buffeted about by winds and seas, and she made eight complete circles in a watch of as many hours.

The rigging of a jury rudder was instrumental in getting her back as far as Sandy Hook after she had abandoned further attempt to reach Europe. Anchored off Scotland Light, in Sandy Hook, the Morse Company tugs Dewitt C. Ivins and Anson M. Bangs reached her, towing her to Brooklyn and the yards of the Morse Drydock & Repair Company.

The ship's weight combined with her cargo totaled close to 10,000 tons. While the new drydock of the Morse Company is capable of lifting vessels 725 feet in length and of 30,000 tons, the raising of the Eastern Cross by only three sections of the dock has amply demonstrated that all six sections can give a large steamship an outside hull in-



The steamship Minnesota on the 30,000-ton floating dry dock of the Morse Dry Dock & Repair Company, Brooklyn, New York. The ship was lifted in 25 minutes' actual pumping time

Angle bending slab and furnaces with an insert view showing part of the machine shop, Morse Dry Dock & Repair Company

spection in almost a space of actual pumping time

As regards expediency, this big floating drydock of the Morse Company has given the port of New York drydocking facilities second to none in the world, and a distinctive advantage as pertains to the maintenance of repair equipment to keep in commission a prosperous American merchant marine. It proves conclusively the claim of the Morse Company that large steamers can be lifted in from twenty minutes to half an hour.

When the sailing ship Alejandrina came to the Morse yards recently, she occupied the big drydock simultaneously with a modern steamship. Thus with two vessels, one bespeaking by her very looks the vanished days of powerful sailing craft, pirates and treasures, and the other communicating an impression of modern ocean travel—the big drydock was as a stage set to show the extremes of ocean navigation.

But nineteen feet of docking space remained unoccupied as repairers worked on the Alejandrina and the steamship sharing the same dock. This was a little less room than existed on another occasion, when the United States Shipping Board steamer Lake Fariston and the steamship Farmouth, first steamship of the Black Star Line Corporation (composed entirely of American negroes), occupied the dock at one and the same time.

The massiveness of the dock is not altogether responsible for its sectional features. Built of six sections, two or more sections may hold a steamer, while the remaining sections are submerged, ready to lift another ship. Repair work is facilitated. Steamers come and go quickly. What was once a matter of hours and days is reduced to minutes.

As concerns its method of operation, the new dock is an exact duplicate of the company's older drydock, which was the first electrically equipped dock in the world; the first on which centrifugal pumps were used for emptying it; the first on which alternating current induction motors were used, and the first to be equipped with an auxiliary draining system. In many respects the older drydock has been the most successful and efficient dry dock in the country, lifting in one year three times the tonnage of any other dock in the same amount of time.

The launchings of the huge sections of the new drydock were events of more than passing notice. A channel of sufficient depth was dredged in the main yard of the Morse Company preparatory to the floating of the sections. These were slipped from the ways at intervals of several weeks.

Surpassing in eventful importance, however, was the initial test of the dock's lifting power. The Black Arrow was the first vessel raised. With only three sections, this ship, 409 feet long, was lifted at the rate of a foot a minute. Later the twin-screw steamer Patria, a French liner never before docked on this side of the Atlantic, was raised.

View of the stern of the steamship Minnesota on the 30,000-ton dry dock, ready to be lifted

European Marine Notes

Exclusive Correspondence of Pacific Marine Review

PRESUMABLY by the time these lines appear in print, shipbuilding reviews of last year will have been done to death, but still a few words may be in order with regard to Great Britain's position. That this is not regarded at all cheerfully can be gathered from the fact that one of the leading reviews of shipbuilding in this country last year was headed "British Stagnation; Great American Output." In that phrase the whole thing may be summed up from the point of view of most people in the business. The total production of merchant vessels here for the past twelve months did not exceed 1,800,000 tons gross. That is slightly under the standard to which the British industry had attained in the years immediately preceding the war, and that standard is far from being good enough for today. Circumstances demand output on a much larger scale than that which sufficed in pre-war years, if Great Britain is not to lose ground, industrially and commercially, in competition with other nations. America has increased her shipbuilding capacity from a pre-war standard of less than 250,000 tons to 4,250,000 tons; Great Britain has fallen short of her pre-war standard of 2,000,000 tons' production by a considerable margin.

But while the year's achievement in mercantile production has been unsatisfactory, having regard to the necessities of the case, the confidence in the shipbuilding industry of the United Kingdom—the belief that it will yet rise handsomely to the occasion—remains strong. The industry, it is generally recognized, has not had a fair opportunity during the past twelve months. It has been handicapped in several ways by the aftermath of war. A good deal of naval work had to be completed, and there was much to do in the repairing and "reconditioning" of merchant vessels which had been engaged on war service, in order to fit them again for ordinary trading. These requirements meant the withholding for a considerable part of the year of a large proportion of the shipbuilding organization of the country from the class of work of which the results are now being reviewed, namely, the production of new commercial tonnage.

Then there was in labor a reaction after the strain of the war years, an easing off in effort, a waning of enthusiasm, a chafing at discipline. That, combined with the reduction in the working hours and the shortage of operatives in certain skilled shipyard trades, made the labor difficulty a very important factor in the slowness of the recovery of normal productive power. The conditions have improved greatly in every respect over the turn of the year.

Shipping Delays

The congestion of shipping in British ports is a never-ending topic, and also a very bad commentary upon government management. It is urged that if even now shipping managers were given sufficient authority to deal with cargo there would be a rapid clearance. Obviously, the interests of both shipping managers and merchants are served by quick despatch of vessels, but quick despatch is the last thing that happens nowadays. One of the side lines of government interference, apparently, that has helped to jam us up in all our ports and harbors was the action of certain government departments in buying enormous quantities of foreign produce. These goods were bought, their shipment to this country was urged, but no provision was made for the passage of these goods into and through the ports here, nor of maintaining prices. Criticism of government methods appeared in the evidence of Sir Joseph Maclay, the shipping controller, before the select committee on national expenditure dealing with the affairs of the Ministry of Shipping. Sir Joseph Maclay stated that the government cargoes come piling into the principal ports and accumulate, instead of rapidly passing through to numerous purchasers in different parts of the country. Before the war some 60,000,000 tons of imports were dealt with annually without congestion or delay, whereas at the present time imports at the rate of 40,000,000 tons are handled with difficulty.

Tea is cited by a writer in the London Times as an instance of government action. There is reason to believe that, some months ago, the Ministry of Food brought pressure to bear on the Ministry of Shipping, with a view to increasing imports largely. Shipping companies were urged to provide all possible tonnage for this trade. There was then most severe congestion in the port of London and the tea trade realized that, unless special provision were made, congestion at the ports would be greatly aggravated. The inevitable has happened, and there were recently fourteen ships waiting in the Thames to discharge their cargoes of tea. The idea of the Ministry of Food apparently was that, by increasing imports, prices would be lowered. Dealers, however, are concerned with the supplies with which they can deal and not with those that cannot be got to market.

Many Steamers Idle

Similar congestion has occurred in the case of meat. Lord Devonport, chairman of the Port of London, has shown that there were fourteen ships recently waiting to discharge their cargoes. Lack of storage accommodation for the meat is the cause. As this letter is despatched there were thirty-three steamers of all descriptions waiting to discharge in the Port of London alone, and the capital represented by the idle ships and their cargoes amounts to many million dollars. The cost of all this waste has to be borne by the goods which get into circulation, and in the long run the consumer pays. The Port Authority officials say that the facilities at the port were designed to provide for normal trading conditions and that for such they were adequate. There is now a deadlock, and since the port facilities cannot be immediately increased, the best hope for the resumption of order seems to lie in the gradual return of trading to ordinary commercial lines. Left to themselves, merchants and shipping managers would not have overwhelmed the ports within short periods with vast shipments which were bound to aggravate existing congestion.

Extraordinary Rise in Ship Prices

I have been looking down Lloyd's List record of shipping sales for the concluding three months of last year, and once more the prices, where the ships have changed hands, exhibit tremendous rises.

Here are a few examples: The Flixton, 7700 tons deadweight, which was sold in March last year for $650,000, has just been resold for $925,000; the Doonholm, 7500 tons, has just changed hands for $830,000, after having first been sold in December, 1915, at $575,000, and resold January, 1918, for $600,000; the Craonne, 7300 tons, was sold in October, 1913, for about $150,000. She was sold again by auction in 1914 for about $100,000—substantially less, it will be seen. When she was sold again in June, 1915, however, the price had risen to $290,000. She has now been sold for no less than $1,000,000, or ten times the figure that she went at auction for in 1914. This must be something of a record. The Bellagio, 5850 tons, which was sold as recently as April, last year, for $385,000, has just been resold for more than double that figure. Another interesting record is that of the Silversand, 4950 tons. She was sold in January, 1911, for $105,000 and resold in May, last year, for $537,500. Now she changes hands for $600,000. A good indication of price variation over a longer period is given by the Dacre Hill, 4930 tons. She was sold in December, 1905, for $175,000 and has now been sold for $625,000. Then there is the Angel B. Perez, 3750 tons, sold in 1909 for $35,000, and then resold for $625,000. Smaller vessels show very frequently the same enormous rise in price. For example, the Pert, of 195 tons, sold in November, 1907, for $14,000, has now been re-named the Pooleena and sold for $50,000.

Light Craft

Sir John Thornycroft has been giving his views upon the position of light craft. He finds that, while British builders maintain their hold in a great many parts of the world, American and Continental builders have now become serious competitors, especially in the export trade. He shows that British shipbuilders have led so far as the design of the vessel itself is concerned, but with the exception of comparatively few of the smaller types, with internal combustion engines, they have been fitted with steam machinery. In Russia a considerable number of quite high-powered boats were fitted with Diesel engines of various types some years prior to the war, and there seems little doubt that in countries like Russia, where oil fuel is readily available, builders will have to be prepared to fit internal combustion machinery. The internal combustion engine would hardly be looked upon as a type that will be likely to be fitted to drive paddle wheels, but a number of the Russian vessels were so fitted, and apparently with considerable success.

Before the war foreign countries were beginning to undertake the construction of their own river craft, and the higher costs of labor at home, and difficulties of exchange in many countries now, are serious hindrances to British builders securing orders at the present time, and the very great difficulties of securing light plates make it impossible to give early deliveries in cases where buyers are prepared to accept the present very high cost of construction. There are a number of companies abroad who had intended to place orders, but have held their hands in view of the high cost of building, and have been considering the possibility of securing the material and building for themselves. At present it does not seem that there is much likelihood of the material being forthcoming from the United States, and it is too soon to form an opinion of what supplies may be coming from the Continent.

Australian Shipping Competition

The shipping policy of the Australian government met with unfavorable criticism by the chairman at the meeting on December 30 of the Orient Steam Navigation Company. The fleet acquired at the commencement of the war by the Commonwealth authorities had brought very large profits, and these were to be used apparently in assisting the development of the service, which inevitably would mean active and increasing competition with the various companies which had provided Australia with steamer services consistently in excess of the requirements of Australian trade. State-aided or controlled steamship lines may have the result of modifying the policy of those companies which have hitherto placed their best shipping at the disposal of the country, and the Orient Company, while anxious to re-establish the fleet and maintain a full mail service, were naturally reluctant to commit themselves to any particular design until the outlook was more assured and the intentions of the government had been made plain. Fortunately, the financial position of the undertaking is a strong one, and although working costs remain extremely high and the compensation received for lost steamers would be insufficient to replace them, the future is regarded by the chairman with every confidence.

THE ISHERWOOD SYSTEM OF SHIPBUILDING—LILLIEHOOKS ABANDON THEIR PROCEEDINGS FOR PROLONGATION OF BRITISH PATENT

IN the chancery division of the High Court of Justice, England, on Tuesday, January 13, before Mr. Justice Sargent, the application for the prolongation of the Lilliehook British patent for improvement in the construction of floating vessels was abandoned, the opponent being Mr. Joseph William Isherwood, the inventor of the longitudinal system.

Mr. Moulton said the petitioners had given notice to the other side some three weeks ago and they intended to withdraw the petition, which was a petition for prolongation.

His Lordship: Is this the petition which has stood over from time to time in order that the petitioner, a professor at the Swedish University, might attend?

Mr. Whitehead, who appeared for Mr. Isherwood, said that was the case.

His lordship said he had adjourned this petition several times for the convenience of the parties and now they were not prepared to offer any evidence.

Mr. Moulton: We withdraw the petition.

His Lordship: You will have to pay the costs.

Mr. Whitehead said there was one other point. A sum of £50 was ordered to be paid into court as security for costs by the petitioner. He asked his lordship that that sum should be paid out to the opponent after taxation.

Mr. Moulton said he thought the costs would exceed the £50.

His lordship ordered that the petition should be dismissed with payment out of the money in court with respect to costs.

The World's Time and Time Zones

By Elmer Beauchamp Collins

IN this busy commercial world of ours "Time is Money." The life of the whole industrial nation is regulated by mean sun time, and a most important public duty of the government Naval Observatory at Washington is to determine and send out to its people accurate clock time of some adopted standard meridian.

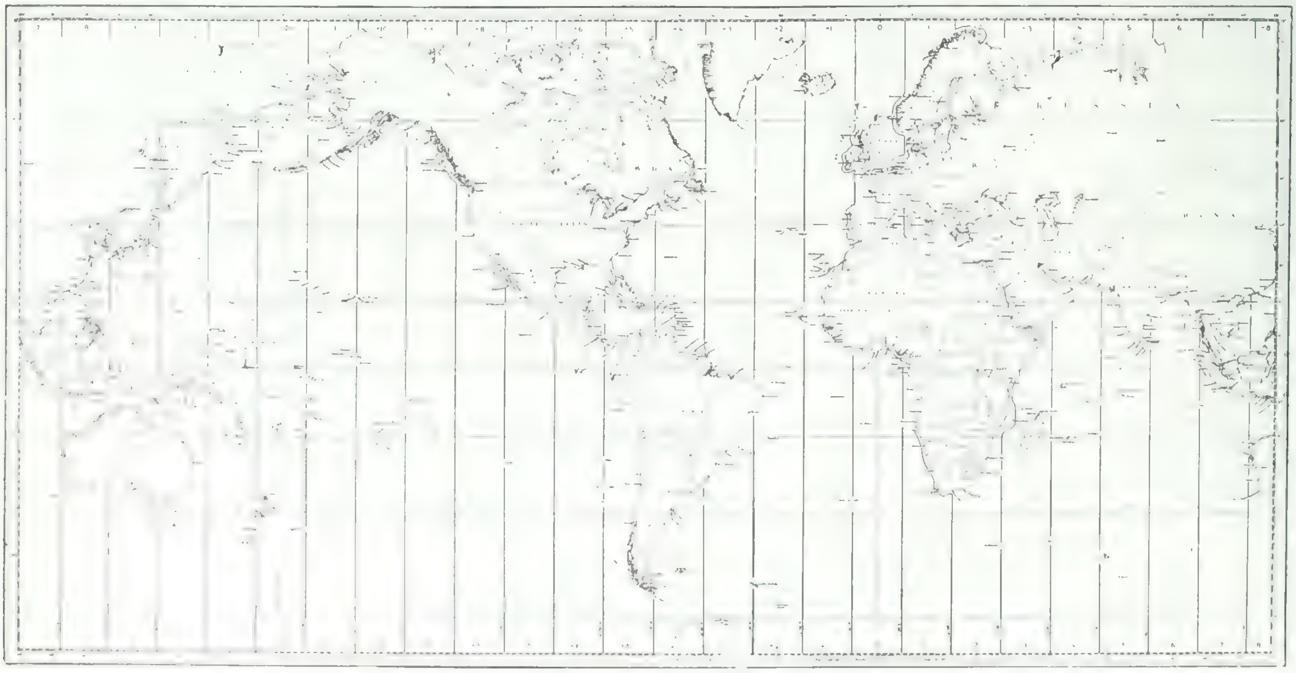
Growing commercial relations, national and international, state and interstate, by the steamships, the railroads, the telegraph and the cable, caused a troublesome state of affairs to exist, on account of the clock time of contiguous countries differing by a certain number of hours, minutes and seconds, having no clear or definite meaning, and vexatiously taxing the memory of the busy commercial man. Still more bewildering and inconvenient was the confusing variety of local times kept by countries extending over wide zones of longitude, such as over the United States and Canada, and such large countries as Russia, China and Brazil; hence it became necessary to arrive at some kind of an agreement to accept some prime meridian and keep a standard system of time differing by exact hours, one from another. In 1884 the government of the United States called a conference at Washington to devise some scheme for a system of universal time, and also to consider the proposition of selecting some prime meridian. The result of this conference brought forth the system of our Standard Time known as Inter-colonial, Eastern, Central, Mountain and Pacific, differing by exact hours from the prime meridian of Greenwich, England.

This practical scheme of time, favorably received by most of the world's people, has spread through the greater part of the civilized land and so successful and simple has the arrangement been that it is today proposed to extend it to cover the waters of the globe; hence all vessels steaming or sailing the world's Seven Seas will soon keep the time of the zone through which they pass, instead of the many and various local times of their different respective meridians. In Figure 1 will be seen the globe divided into twenty-four zones, bounded by meridians fifteen degrees apart, or one hour of time in longitude. The meridian of Greenwich is still the initial zone and extends from the meridian of 7° 30′ East to 7° 30′ West. This is called the zero zone, because the difference between the standard time of this zone and Greenwich mean time is zero. Each zone is designated by a number representing the hours by which the standard time differs from the Greenwich mean time. Zones in east longitude are numbered from minus one to minus twelve, because the zone number must be subtracted from standard time to give Greenwich mean time. In west longitude the zones are numbered from plus one to plus twelve, because the zone number must be added to standard time to give Greenwich mean time. The meridian of 180° divides the twelfth zone, in west longitude in plus twelve, and in east longitude in minus twelve.

The International Date Line is a modification of the 180° meridian, so drawn as to include islands of any one group on the same side of the line, in order that the American or Asiatic date may be used. Vessels crossing this line on a westerly (true) course advance the date one day and when crossing on an easterly (true) course put back the date one day.

While civilized man regulates his movements by the sun, and the time to be determined is mean solar time, the Washington Naval Observatory does not take observations on the sun for regulating our daily clocks. Instead, stars called "clock stars" are used whose positions in the heavens are precisely determined with respect to the sun by a series of numerous observations extending over long periods of time. Many reasons could be given why a "clock star" is preferable to the use of the sun; and one is that the sun's motion in the heavens

TIME ZONE CHART OF THE WORLD



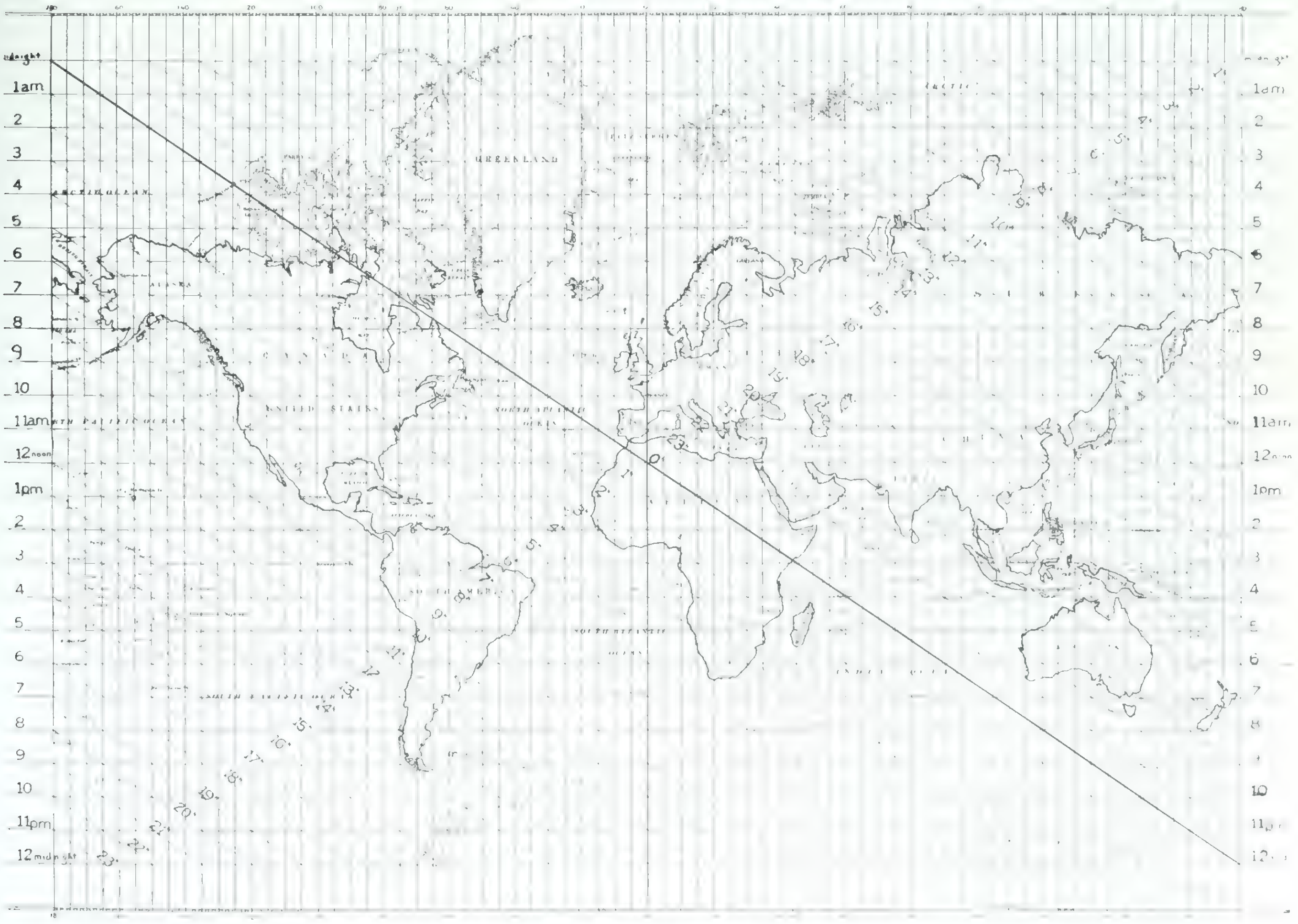
is not uniform, therefore the time of its arrival at the meridian of a place on the successive day is variable. Such is not the case with a star. Again, a clock star can be observed at almost any hour of the day or night when the sky is clear for even a short interval of time. Our Nautical Almanac office has computed tables showing the relationship between a star directly observed with astronomical instruments and the mean sun time which is derived from this observation, being the kind of time needed to regulate our every-day clocks. With this information, the Naval Observatory each day at noon of the 75° meridian (five hours slow of Greenwich) flashes the official time by telegraph and wireless signals to all parts of our country. At most important sea ports, for the convenience of shipping, a time ball electrically connected with a clock is dropped automatically at a certain Greenwich mean time.

When the earth revolves, all of its meridians are brought under the sun in succession, or relative to the earth, noon continually travels around the earth from east to west, making the circuit in twenty-four hours. It follows that noon, or any other hour of the day, is later by four minutes of time for every degree of longitude toward the west; hence it is evident that a steamship on a voyage eastward or westward will keep time deviating from the local time of a place by an amount proportional to a change of the vessel's longitude. As she steams eastward she sets the clocks ahead, as she steams westward she sets the clocks back. Navigators determine the latitude of their vessels at noon when the sun is directly on or near their meridian, and their longitude, or their daily local watch time, from an observation of the sun in the morning or afternoon when it bears most eastward or westward of them; thus the position of a vessel is determined each day at noon.

A Pacific Mail liner in the harbor of San Francisco keeps Pacific Standard Time. Now, suppose that on February 10, 1920, at 5:00 o'clock a. m., she sails for Honolulu and the Orient on the great circle, steaming fourteen knots. At noon the captain desires to have his clocks show the time when the sun will be on his meridian to know when to observe it for latitude. As he steams out of the Golden Gate on this particular morning, he sets all of the vessel's clocks back twenty-four minutes; then every significant event, such as perhaps a birth or a death, happening on board that Pacific liner, which event may later involve complicated legal proceedings, according to its importance, will be recorded in the vessel's log book by the kind of time that the clocks are then keeping. Under the new scheme of things, the vessel's clocks would keep San Francisco or Pacific Standard time until about 11:00 p. m. that same night. The clocks would not be set back until the steamship had crossed the meridian of 127° 30′ west, at which time the captain would order the quartermaster to change the clocks one hour, thus keeping the new time of the plus nine zone. Therefore, every vessel within the ninth zone would carry the same identical time throughout this zone.

Since we have chosen the meridian of Greenwich

TIMECHART OF THE WORLD



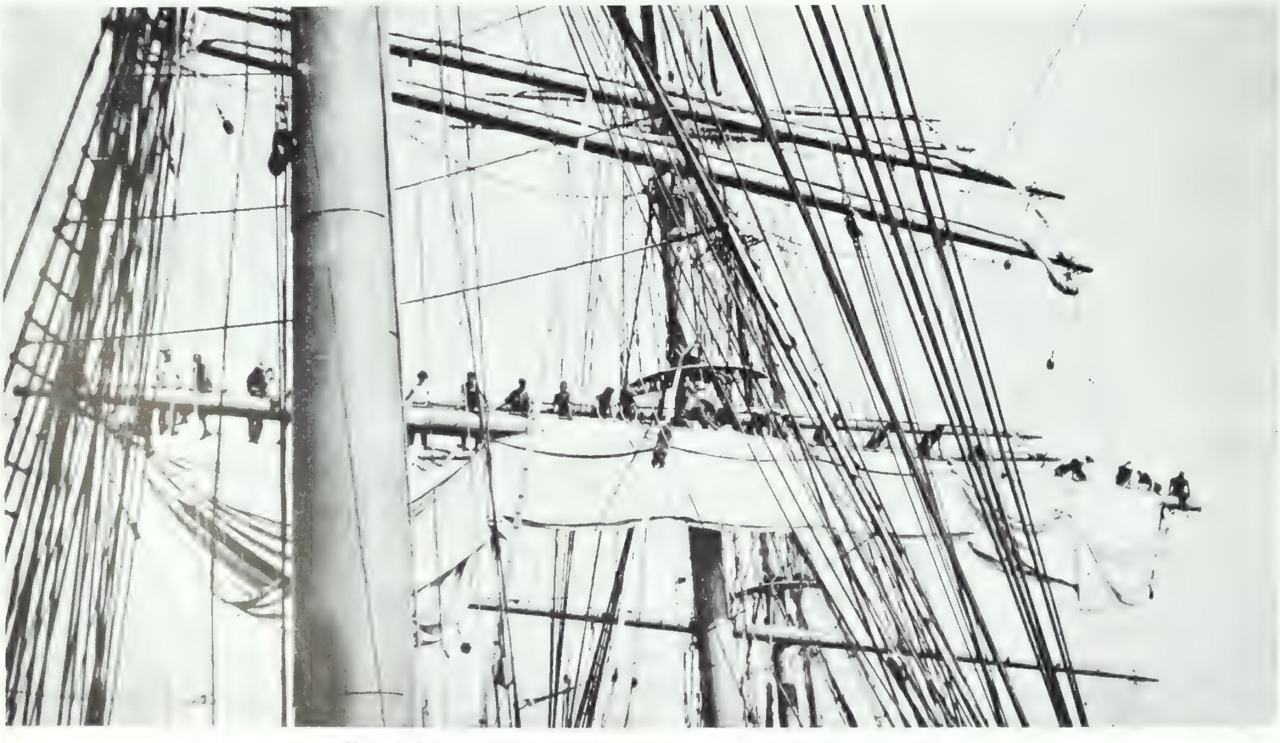
The diagonal lines from zero h to 24h represent Greenwich mean time. The upper 24 lines refer to the hours of the previous day, and the lower 24 lines to the hours of the same day. The horizonal lines represent the time shown by every-day clocks for the prime meridian, all time should be first referred to this initial meridian. Commencing at noon, Greenwich time is divided into twenty-four hours, numbered successively from 0 to 24. For the common purposes of life it is more convenient to begin the commercial day at midnight, or twelve hours before the Greenwich day of the same date. This day is divided into two periods of twelve hours each, namely, from midnight to noon, marked a. m., and from noon to midnight, marked p. m. To change the time of the eastern hemisphere to the western, or vice versa, in order to cause no confusion in the correct date, it becomes necessary to first refer the time of the place in the eastern hemisphere to Greenwich, and then from Greenwich to the place in the western hemisphere; therefore all places westward have earlier time and all places eastward have later time than Greenwich.

On the time chart shown in Figure 2 will be noted a system of lines so drawn that for any given time at a place, any corresponding time for this same instant can be told with almost a glance of the eye for all places in other parts of the world. The horizontal lines represent the ordinary clock time of any port on shore or place at sea, and the diagonal lines the Greenwich mean time at the zero meridian. The upper triangular portion, formed by diagonal lines above the heavy diagonal zero hour line, represents the hours of the previous day, the lower triangular portion the time of the same day. When crossing from western to eastern longitude add one day, and when crossing from eastern to western longitude subtract one day.

On March 2, 1920, at 6:00 a. m. in New York City, what is the time in London, England; Aden, Arabia; Philippine Islands; Melbourne, Australia; and New Caledonia Islands? Look on the time chart for the meridian of New York, 75° west; on the side of the chart, on the horizontal line, look for the watch time of 6:00 a. m.; follow this 6:00 a. m. horizontal line until it intersects the vertical line of the 75° meridian. At the intersection is a diagonal line showing the time at Greenwich to be twenty-three hours of the previous date; follow this 23-hour diagonal line until it intersects the zero meridian. At this intersection follow the horizontal line to the side of the chart; here the reading is found to be 11:00 a. m.; therefore this is the time shown by all street clocks in London. Likewise follow the twenty-three hour diagonal to the meridian of Aden (45° E.), then at this intersection follow across on the horizontal line; here the time at this port is found to be March 2, 2:00 p. m. Now follow the twenty-three hour diagonal to the meridian of the Philippine (120° E.), and the time here is March 2, 7:00 p. m.; then to Melbourne (145° E.) and the time noted is March 2, 8:40 p. m.; then to the meridian of New Caledonia (165° E.), showing the time here to be March 2, 10:00 p. m.

A wireless message leaves San Francisco at 11:00 a. m. on March 4, 1920, passing instantaneously to Manila, Philippines. What was the time of the arrival of the message? At the intersection of the meridian of 120° west and the horizontal line 11:00 a. m., we find the time at Greenwich to be the same day or seven hours March 4. Since you cannot follow this seven-hour diagonal to the Philippines, pass to the upper seven-hour diagonal until it intersects the meridian of 120° east; then follow the horizontal line to the reading of 3:00 a. m.; therefore the message arrived at Manila March 5, 1920, at 3:00 a. m.

Other ways are obvious in which the time chart may be utilized to excellent advantage. In conclusion, a word as to the immense value and importance of the powerful wireless stations distributed everywhere throughout the broad land, flashing daily and nightly to vessels at sea the correct time to tenths of a second, in order that the uncertain sea rates of the chronometers carried on board can be accurately checked and determined, thus affording better positions in latitude and longitude for fast steaming liners.



United States Shipping Board Training School cadets furling sail

AMERICAN BOYS FOR AMERICAN SHIPS

Washington State Nautical School

ON January 12, 1920, there was formally opened on board the school ship Vicksburg a State of Washington Nautical School. The State of Washington is fortunate in having a state university located on Lake Union, the great fresh water harbor of Seattle. The Vicksburg, at the time of the opening of the nautical school, was moored to the pier connected with the university.

This nautical school is conducted by the State of Washington with the co-operation and assistance of the Federal government through a nautical school board, in accordance with the provisions of an act passed in 1917 entitled, "An Act providing for a State Nautical School and for the Governing and Maintenance Thereof." Only bona-fide residents of the various counties of the State of Washington are eligible for attendance at the school, and the purpose is to train these youths in the "science and practice of navigation." In exceptional cases, at the option of the nautical school board, a very limited number of residents of other states may be admitted.

Conditions of Entry

The terms and conditions upon which the students shall be received and instructed in the school are as follows:

First: They must, at the time of their examination for admission, be between the ages of seventeen and twenty-one years.

Second: They must be of normal size, sound constitution, and free from physical defects, especially those of sight, hearing and speech, and they must pass a physical examination.

Third: They must, before admission, produce at least two testimonials of good character.

Fourth: They must have an inclination for a seafaring life and enter the school of their own free will.

Fifth: They must pass a satisfactory mental examination, in arithmetic (oral and written), elementary algebra, United States history, geography, grammar and spelling.

Sixth: They must be residents of this State and their parents or guardians, citizens of the United States and residents of the State of Washington; except as mentioned above.

Seventh: The sum of $130 must be deposited upon entrance into the school to defray the expense of white and blue uniforms, technical textbooks and other requirements during the first year on board. A deposit of $25 will be required at the beginning of the second year. With proper care, the deposit of $155 should be sufficient for the two years' course.

Course of Study and Instruction

Two years are required to complete the course and to obtain a certificate of graduation. The school year will begin about November 1 and will be divided into the winter term, from November 1 to about April 1, and the summer term, from about May 1 to October 1.

During the winter term the training ship Vicksburg is moored alongside a pier in Lake Washington, Seattle, and the time is devoted to both theoretical and practical instruction.

At the beginning of the summer term the training ship sails from Seattle for the cruise and the time is devoted to practical work and study.

The students are instructed in dead-reckoning, the methods of finding the latitude and longitude by the sun, moon, planets and stars, in the deviation of the compass, the duties of a seaman, and in theoretical and practical marine engineering. They will also have practice in steering a vessel under both sail and steam, in heaving the lead and in handling boats under both oars and sail.

The candidates that are admitted are provided with their board and education at the expense of the state.

The courses cover seamanship, marine engineering and the theory and practice of naval architecture and shipbuilding, insofar as that is considered necessary to prepare the students as officers in the American merchant marine.

It is intended that the training ship Vicksburg on her cruise will touch at some of the ports of Alaska, British Columbia, Hawaiian Islands, Guam,

A look aloft

China, Japan, Mexico and South America, returning to Seattle about the last of August; thus giving the cadets a complete circuit of the Pacific Ocean and bringing them in touch with conditions of marine life, port rules in the Orient, and in South American ports.

Routine

During the winter, while the Vicksburg is at her moorings, reveille is sounded at 6:30 every morning. From that time until 9:00 o'clock the cadets are occupied in lashing hammocks, washing, setting quarters in order, and breakfast. Inspection takes place at 9:00 a. m., after which the day is spent in study and recitation, with suitable periods for meals and recreation until 9:00 p. m., when hammocks are put down and the boys turn in for the night.

The discipline is largely that maintained in the navy, and the boys are taught to conduct themselves in a manly way, uprightness and straightforwardness in dealings being insisted upon. Although the discipline is firm, all cadets are made to feel and understand that the sole object of the faculty is the welfare of the boys.

The program at the opening exercises, although short, was full of interest. The cadets were addressed by W. F. Meier, who briefly outlined the history of the American merchant marine, and in a few words of well chosen counsel admonished the young men to be true at all times to the flag and the ideals of their country. Commissioner E. J. Griffith then introduced Rear Admiral H. A. Field, whose address laid particular stress on "Unity of Purpose and the Necessity for Co-operation Between the American Merchant Marine and the United States Navy."

The ship was then thrown open to inspection by the visitors, and the exercises closed with the ceremony of hoisting an unofficial state flag which will be in the nature of a house flag for the Vicksburg.

The board of commissioners appointed in charge of this school is composed of Captain J. S. Gibson, chairman; Frank Waterhouse, and E. J. Griffith. The office of the school is located on the campus of the State University of Seattle, where the secretary-treasurer, Grover C. Gaier, will be glad to receive inquiries from anyone interested in this work.

The State of Washington is certainly to be commended for this effort to give its young men a chance for sea training along right lines, and it would seem that there is room for such an institution in every seaport state of the Union. Working in harmony with the Sea Training Bureau of the United States Shipping Board, such schools cannot help but prove of great benefit in directing the attention of our best young men toward the seafaring life. We need American officers for American ships.

Old Friends of the Sea

By Ralph E. Cropley

PART II

THE French Line has been one of the few steamship companies which created a shipyard for the purpose of building its own vessels in order that they, flying the flag of France, might be constructed on the shores of France by French workmen. In the struggle for the "Blue Ribbon of the Atlantic" in the eighties, the French Line exhibited six flyers, exceedingly popular in their day. At the beginning of the war in 1914, all but one were afloat, this one, the La Bourgogne, having met a tragic end off Sable Island in 1899.

The La Touraine, which the French brought out in 1890 to hold their own against the Germans and the English in the matter of speed, is still in regular service between New York and France and has been all through the war, although she is twenty-nine years old. She deserves a croix-de-guerre as much as her 1907 compatriot, the La Provence, which was torpedoed in the Mediterranean, carrying down with her over 3000 troops.

All four of the American liners which were speed rivals of the Cunarders, White Star and German boats in the nineties, are still afloat after having been auxiliary cruisers in two wars. Born in 1888, the City of New York and City of Paris dropped the "City" from their names when they hoisted the American flag in 1892. During the Spanish war they were the auxiliary cruisers Harvard and Yale, respectively. Reconstructed in 1900, the Paris became the Philadelphia, the New York retaining her original name. With their clipper bows and three funnels (which now are only two,) these ships were the first ever built with twin screws. Their model was that of an improved City of Rome. During the past year [illegible] the New York has been known as the cruiser transport Plattsburg and the Philadelphia as the Harrisburg.

As for the St. Paul and St. Louis, which also did such valiant work during the Spanish war, the latter has recently been the cruiser transport Louisville. The St. Paul was to have been the Knoxville, but no sooner had she been taken over by the Navy when she turned turtle at her dock in New York, costing over $1,000,000 to raise. At present, with the New York, Philadelphia and St. Louis she is being reconstructed for passenger trade. Without their war records we should be proud of these four moth-eaten American liners, as for twenty-five years they were four of the six American passenger ships in trans-Atlantic trade. Antiquated in size and accommodations, they kept the American flag on the seas, whereas so many Americans have done their best to lower it. Now being entirely rebuilt as to interior, these four veterans are to have a new lease of life. With the sole exception of the La Touraine, they are the only examples left of days when shipbuilders made ships a thing of beauty to the eye, and not only that, but safe to travel on.

To complete this tale about old liners of our fathers' day, it is necessary to speak of the flyers of the Hamburg-American Line and North German Lloyd. Many of us have crossed on German liners some time or other and their express steamers of bygone days have had interesting careers. Take the Saale, for instance, built in 1886, which, with her sister, the Aller, were the first express steamers equipped with a triple-expansion engine. In 1900 the Saale was a victim of the big Hoboken fire and after being sunk on the flats off the Statue of Liberty to put out the furnace within her, she was sold for a song by the insurance underwriters and within a year appeared as the cargo tramp J. L. Luckenbach, under the American flag. All over the world she has been making millions of dollars for her owner. In 1915 she made her first visit to Germany in fifteen years, by taking there a cargo of cotton allowed by the Allies. In 1918, while a transport with a naval crew aboard, she ran afoul of a submarine. For four hours the old Saale proved she loved America best and fought for her—fought a fight which goes down in history as the longest and gamest fight an armed merchant ship ever put up against a submarine without being eventually sunk. Shots passed through her boilers—they made her look like a sieve above the water line, yet the Saale, an ex-German, fought the German and won. With temporary patches on her sides as if they were Croix-de-Guerres, the old Saale continued to tempt submarines. Today she is being given a new lease of life, for her owner is re-boilering her and making her into an oil burner. Cargo ship though she is, the J. L. Luckenbach is as graceful and trim a lady as ever she was as the flyer Saale.

There were nine ships in the series of practically sister ships with which the North German Lloyd rivaled the English companies for passengers and speed. Beginning with the Elbe in 1881, they were the Werra, Fulda, Ems, Eider, Aller, Trave, Saale and the Lahn, which came out in 1887. In 1889 the first Kaiser Wilhelm II appeared and ran on the New York-Mediterranean route. When the second Kaiser Wilhelm II, now the U. S. N. Agamemnon, came out in 1903, the old one became the Hohenzollern and was wrecked off Sicily in 1909. All the other nine have been sunk or broken up with the exception, of course, of the Saale. The Lahn for fourteen years was the Russian balloon ship Russ. The last I heard of her was in 1917. In view of what has happened in Russia, I doubt if she still floats.

In 1898 the North German Lloyd sold the Havel and Spree, which were built in 1890. These vessels with other German liners became Spanish cruisers. Known as the Meteor, the Havel was retained by the Spaniards and as the Alfonso XII now regularly is seen in New York harbor. The Spree was repurchased by the German Lloyd. Today she reposes on the bottom of the Sea of Japan. After her return to German ownership the Spree was cut in two, lengthened seventy feet, turned from a single-screw into a twin-screw ship, given three funnels and foisted on the public as the new Kaiserin Maria Theresa. Russia bought her in 1904 for over a million dollars, renamed her the cruiser Oural, and Japan finished her.

The Spree and Havel were the North German Lloyd's reply to the four ships with which its German rival also entered the speed contest in 1889-90. These four Hamburg ships, all built in England, were the first twin-screw ships the Germans had. Long, low, rakish, yet graceful, with three stubby little funnels, they looked the racing devils they really were. I reckon there are few of the older generation who do not remember the Auguste Victoria (first), whose passenger accommodations were considered the height of folly and luxury; the Normania, Columbia and Furst Bismarck (No. 1)—every one of which saw war service before they ended their careers. In 1898 Spain had the Normania and Columbia as auxiliary cruisers and afterwards sold them. The Normania was purchased by the French Line to replace the lost La Bourgogne and became the L'Aquitaine till broken up in 1907. The Columbia was repurchased by the Germans and in 1904 was sold to the Russians, becoming the Terec. Together with the Auguste Victoria, known as the Russian cruiser Rion, she was sunk by the Japanese. The Furst Bismarck, called the Don, was in the same battle but escaped and later appeared in New York as the emigrant ship Moskova. Since 1908 she has been operating out of Vladivostock, and only a few months ago I saw she made a Pacific Coast port while in the service of the Allied Council.

To complete the story, mention must be made of the famous Kaiser Wilhelm der Grosse, built in 1897. Being the first to boast four funnels, she wiped up all speed records before her and reigned supreme till displaced by the four-funnel Deutschland, which in turn gave up her speed laurels to the Mauretania. In 1914 the Kaiser Wilhelm der Grosse was turned into an emigrant ship, carrying 1000 third-class passengers and 3000 steerage. When the war broke out she became a commerce raider, lasting as such just one month. Today she rests on her side on an African shore, where the British cruiser Highflyer had fought her. As for the Deutschland, she, too, followed in the footsteps of all good ships, but instead of a step downward she took a step which put her in a class by herself, for she became the cruising yacht Victoria Luise, taking Americans to Norway in the summer and to the West Indies in the winter. Her great speed was reduced by the removal of two boiler rooms, resulting in two of her four funnels becoming dummies. During the war the Victoria Luise was interned in Hamburg and since has been assigned to England. Another Kaiser, the Friedrich, with her three funnels, couldn't make her contract speed. Eventually she became the Burdigalia and fought her native land as a French auxiliary cruiser.

As a matter of record, it might be interesting to know the new names of the German ships we took over. The most famous of them are now known as:

Leviathan, ex Vaterland.
George Washington, ex George Washington.
America, ex Amerika.
Mount Vernon, ex Kronprinzessin Cecilie.
Agamemnon, ex Kaiser Wilhelm II (No. 2).
Von Steuben, ex Kronprinz Wilhelm.
Covington, ex Cincinnati (sunk).
Mobile, ex Cleveland.
President Grant, ex President Grant.
President Lincoln, ex President Lincoln (sunk).
Aeolus, ex Grosser Kurfurst.
Pocahontas, ex Prinzess Irene.
Princess Natoika, ex Prinzess Alice.
Powhatan, ex Hamburg.
Huron, ex Friedrich der Grosse.
Mercury, ex Barbarrosa.
Philippines, ex Bulgaria.

As New York passenger liners, these ships were very popular. It is a great satisfaction that they now fly the Stars and Stripes.

Audible Code Calling in Shipbuilding Plants

By V. Karapetoff

SHIPBUILDING is one of the oldest human arts, and it is probably for this reason that improvements in it have been sometimes difficult to introduce. Certain traditions have been established, certain difficulties and inefficiencies in the handling of men and materials have been found unavoidable at a given stage of the art, and when this or that new improvement has made these limitations unnecessary, routine and tradition have often been found to be so firmly entrenched that it sometimes takes almost a generation of engineers to introduce the innovation.

The stress of the great war has shaken the shipbuilding industry probably more than it has many others, and improvements have been introduced which otherwise would have been postponed for another half century. But the war has likewise stirred up more progressive industries to radical changes, so that in some respects the shipbuilding industry is again near the tail-end of the procession.

An illustration in point is the use—or, rather, the non-use—of acoustic signals for calling important men in a shipyard, according to a prearranged code. This great convenience was not possible until a few years ago; therefore the industries had to be satisfied with the usual private telephone exchange. If the person called happened to be at his desk, well and good; if not, and no one knew where he went, the calling person muttered a short, expressive word to relieve his feelings, and patiently waited for better luck the next time. Of course, business suffered, but every one's conscience was clear. There was no way for promptly reaching a person within a large shipyard, not even by means of an intelligent, willing and Marathon-like office boy, if there ever was such a being. This status of inefficient communication has been of such long standing as to be considered by many almost a fundamental law of nature, second only to Newton's laws.

Then a solution came in the form of what is known as the audible **code-calling system** whereby each important employe may be instantly located anywhere within the yards or shops and called to the nearest telephone. The new progressive industries and those in highly competitive fields have been quick to see the tremendous advantages of the new system of intercommunication, its convenience, saving in overhead charges, better esprit de corps, and the stimulation of production. But the shipbuilding industry seems to be still playing the part of Rip Van Winkle, for while there are hundreds of large industrial institutions of all kinds in this country in which such a code-calling system is in successful use day after day, we know of no installation of this kind in any important shipbuilding plant.

The installation of a code-calling system has been considered by the management of some large shipbuilding organizations on more than one occasion, but each time the old inertia has been able to advance a seemingly plausible argument against an investment of a few thousand dollars, which would save annually hundreds of hours of time for many high-priced men.

A code-calling system is but a further scientific development of the old-fashioned electric bell in a hotel which you rang twice for hot water and three times for ice water. Only, instead of one bell, we now have a number of suitable electric horns, single-stroke bells, whistles and other acoustic devices mounted throughout the plant in such locations that at least one of them can be heard distinctly, no matter where the person called may be.

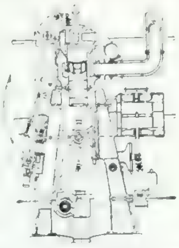
With many requests during the day it would be impracticable for the telephone operator to push an electric button a certain number of times for each person called. To obviate this difficulty, a simple electrical commutator has been developed, called the klaxocator, which performs this operation automatically. Let us suppose, for example, that the manager wants to speak to Mr. Jones, the engine specialist, on some very important matter. His secretary tries to get Mr. Jones in his office, and the reply comes that Mr. Jones is out in the yard and that no one knows where he is. The telephone operator is then instructed to sound Mr. Jones' code number throughout the works. She either remembers this number or consults a list before her and finds it to be, say, 3-4. She sets the klaxocator on this number and pulls a handle. This is all she has to do and can return thereupon to her regular duties. As soon as the handle has been pulled, all the horns, bells, whistles, etc., in the plant begin sounding three strokes and after a short interval four strokes. This code is automatically repeated three times and then stops by itself. If Mr. Jones is anywhere within the premises, he will hear the call the first or second time and will report to the operator over the nearest telephone. She immediately connects him with the manager's office and the important conference takes place without further delay.

The convenience of such a method of instant communication between any two important persons within the plant should be perfectly evident to anyone familiar with the elements of industrial management and efficiency. No plant can be operated in such a way that every head of department or his assistant has a definite place where he can always be promptly found. The usefulness of many of them is in direct proportion to the amount of time that they spend away from their desks and in actual touch with their work of supervision and direction. With the code-calling system they may be safely urged to spend practically all of their time in this way, knowing that they would be promptly located whenever needed.

Actual experience in steel plants, in bridge shops, in bolt-and-nut factories, and in similar places, shows conclusively that a comparatively small signal can be distinctly heard in the most noisy location, provided that there is sufficient contrast between the character of the prevalent noise and the sound emitted by the devices employed, and provided that these are properly located.

The annual turn-over of a shipbuilding plant is so large and the need for greater efficiency and economy is becoming so much more pressing every year that a small investment in a code-calling system should not be delayed any longer. Even if it should not be used much in the beginning, due to old habits and inertia, one person after another will find it valuable on some special occasion and will use it regularly after that.

Oil Engines and Motorships



Motor Shipbuilding in Europe

SO much activity is being shown by shipbuilders and shipowners in Europe in regard to motorships that it is rather difficult to keep in touch with all that is being accomplished. During the past month the Glen Line has added to its growing fleet of motorships the Glenluce and the Fritz. The Elmaren has been launched at Gothenburg for the Transatlantic Steamship Company to trade between Scandinavia and America, and the Salerno has just been completed at Amsterdam for the well-known Norwegian shipowner, Otto Thoresen, who incidentally has half a dozen more motorships under construction in Holland.

The Glenluce, with a carrying capacity of 10,000 tons, is a vessel of a type which has been standardized by the Glen Company specially for their trade to the East, where it is found that this class is particularly economical. She is 406 feet in length and her two 1800 i. h. p. four-cycle engines, built by Harland & Wolff, give her a speed of about eleven and a half knots.

The second vessel mentioned as being acquired by the Glen Line, the Fritz, is a German vessel built in 1914, which has never been put into commission and has been lying at Hamburg for the past five years. She recently made her maiden trip from Hamburg to Leith, where she is now being overhauled and the engines opened up for inspection prior to her despatch on the first long voyage to India. She is a 10,000-ton cargo vessel and is fitted with two of the German double-acting engines, upon which so much time and money were spent just before the outbreak of war. The two motors develop 850 b. h. p. each and have four cylinders; therefore, as the ship will be run by the Glen Line virtually in competition with motor vessels equipped with the British Burmeister & Wain type of four-cycle Diesel engine, some interesting comparative data will no doubt be obtained.

It may be of interest to American shipowners to note how carefully some of their British confreres are investigating the whole problem of motorships and marine oil engine construction. Lord Pirrie, for instance, who is head of the Glen Line and also controls Harland & Wolff, the biggest builders of motorships in Great Britain, is building standard motorships with four-cycle engines at Harland & Wolff's works at Glasgow, and has installed in his Belfast works one of the 4000-horsepower Sulzer two-cycle engines, from which a great deal of information based on experience can no doubt be obtained. In addition, he is operating this German vessel with double-acting engines, so that he is able to obtain first-hand information regarding the relative values of every important type of Diesel engine now on the market. As Lord Pirrie may be considered practically the biggest shipowner and shipbuilder in Great Britain, this policy is not without its significance.

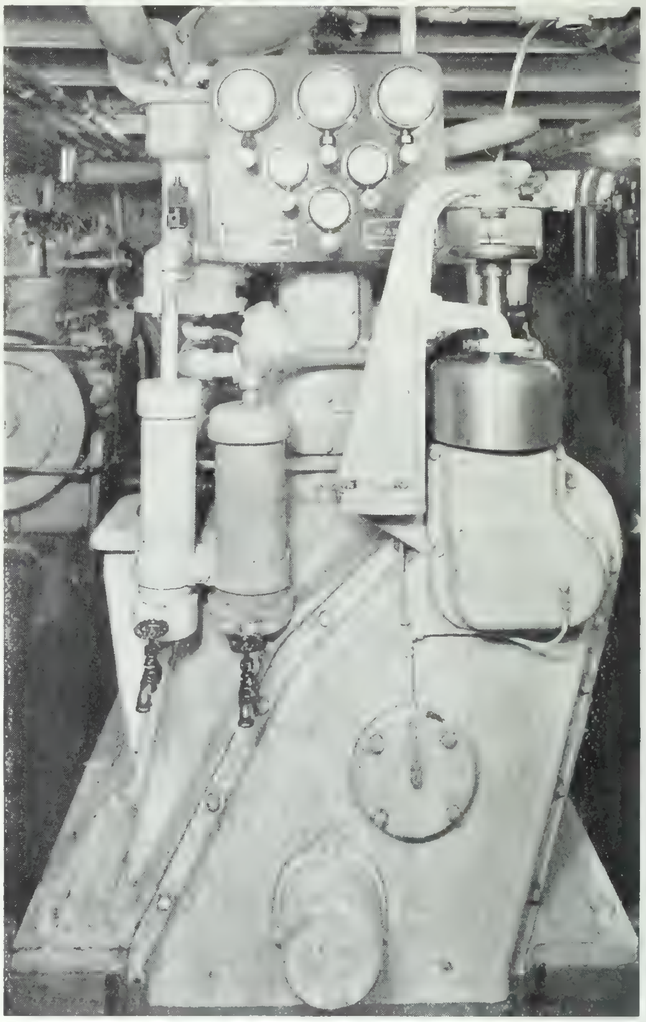
The Elmaren, which will no doubt shortly be seen in America, is a sister ship to the Bullaren and Tisnaren, which are now making regular trans-

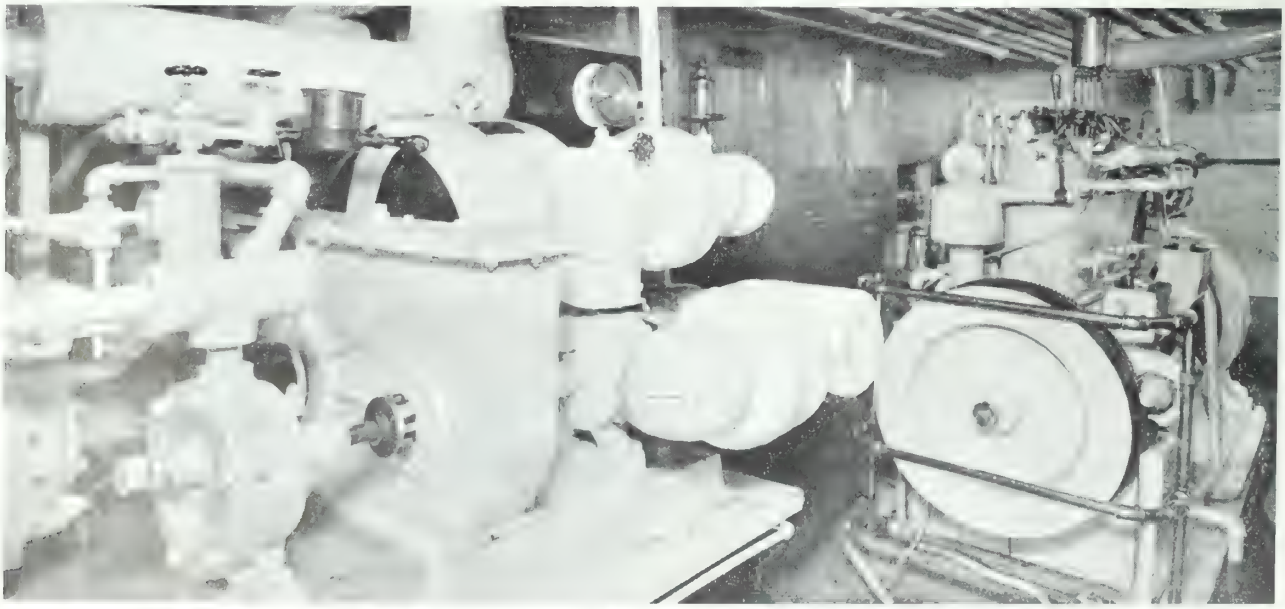
Motorship Tisnaren, sister ship to the Bullaren and Elmaren. Under the picture of this efficient cargo carrier which appeared in the January issue of Pacific Marine Review, the caption stated that the vessel consumed 2612 tons of heavy oil fuel on a certain trip. This was an error; the figure 2612 referred to the number of hours at sea, and the actual fuel consumption was 1261.25 tons.

Atlantic voyages. She is 440 feet over-all, with a beam of 56 feet, the carrying capacity being 9400 tons, while the machinery installation comprises two 2000-i. h. p. six-cylinder Diesel engines of the Burmeister & Wain type. The speed will be twelve knots, and as the oil consumption of this ship will not exceed twelve and a half tons a day of twenty-four hours, the cost of operation is remarkably low. According to the owners, the saving effected by the installation of oil engines in vessels engaged upon the trans-Atlantic service is so great that the cost of carrying cargo from America to Europe is reduced by 50 per cent, as compared with the cost in a similar hull propelled by reciprocating steam engines and coal-burning boilers.

The fourth new vessel mentioned above, the Salerno, is 375 feet in length and carries 6500 tons. The machinery installation comprises two 1450 i. h. p. Werkspoor engines, with six cylinders 560 m.m. diameter and 1000 m.m. bore. It is worth noting that the engine builders, the Werkspoor Company of Amsterdam, have followed the lead of other large marine oil engine manufacturers, such as Burmeister & Wain and Harland & Wolff, and have adopted a very complete system of standardization, building this 1450-i. h. p. type of engine on a large scale and applying it in single screw or twin screw vessels according to the size. In this way they now have orders on hand for about thirty engines of the same size, with the result that the cost of manufacture is very considerably reduced, while the time needed for construction is greatly diminished. One advantage which the marine oil engine possesses over the steam machinery is that a very advanced degree of standardization can be employed, and in Europe marine oil engines are being manufactured virtually on a basis of mass production.

Armstrong, Whitworth & Company, who during the war built submarine Diesel engines to their own design and under license from Schneider & Company, have now taken up the manufacture of the Sulzer two-cycle engine for mercantile work, and it is reported that some very large sets will be built for installation in the biggest motorships that have yet been constructed. The Sulzer engine is specially adapted for high powers, and already Diesel motors of this design have been constructed of 4000 horsepower. It is understood that a liner with machinery of 12,000 horsepower is contemplated, and there would even now be no insuperable difficulty in constructing a twin screw vessel of this type. Already the large passenger lines, such as the Peninsula & Oriental, are taking a keen interest in the possibilities of motor liners, which are so evident with the prices of oil and coal at approximately the same figure a ton.


End view of Winton six-cylinder Diesel oil engine showing governor and engine instrument panel


Electrically driven ice machine and auxiliary generating set on the yacht Elfay

The First Diesel Electric Yacht

THE merits and demerits of electrically-driven ships have for some time past engaged considerable attention from marine engineers, but there have been only a few steam turbine electric propulsion installations from which to draw any practical conclusions.

Quite recently the attention of electric manufacturers and Diesel engine makers has been directed toward the use of the crude oil Diesel engine as a prime mover, connected to the propeller shaft through an electric generator and motor, thereby gaining the advantages of a high-speed non-reversible Diesel engine and great flexibility of control of the ship.

The engineers of the Winton Engine Works and the Westinghouse Manufacturing Company have worked out a very satisfactory system of Diesel electric drive, using Westinghouse D. C. generators and motors and Winton Diesel oil engines.

The first practical installation of this system has been completed and is now in use on the pleasure yacht Elfay, belonging to Russell A. Alger. This installation is said to be the first of its kind in marine engineering history. The Elfay was originally the Katoura, designed by that wizard of Bristol, Nat G. Herreshoff, in 1913 and completed in 1914 to the order of Robert E. Todd of Rochester, New York. She is 152 feet over-all, 30 feet beam and 21 feet 2 inches extreme draft, with a water-line length of 115 feet. She was originally built as a sailing schooner yacht and as such was a competitor in a number of long distance races during 1914, 1915 and 1916. The yacht is very elaborately equipped with luxurious stateroom accommodations and furnishings, and has a very handsome appearance. Mr. R. A. Alger bought the Katoura in 1916, but during the war she was very little used and it was not until the summer of 1919 that her owner decided to put her in commission.

Mr. Alger and Mr. A. Winton of Cleveland have long been very close friends; in fact, Mr. Alger bought the first two-cylinder automobile that Mr. Winton built. It was therefore but logical that Mr. Alger should consult Mr. Winton on an auxiliary drive for his yacht and that he should decide to actually purchase this Diesel electric drive which is the latest creation of the brain of his friend.

The power plant consists of one 125-horsepower Winton Diesel oil engine of the four-cycle type with six cylinders 7½-inch bore and 11-inch stroke, running 425 revolutions a minute and direct-connected to 75-kilowatt Westinghouse D. C. generator. The engine also drives through a noiseless chain a 9-kilowatt field exciter. The exciter runs at 900 revolutions a minute. The propelling motor, which is installed as far aft as possible, develops 90 horsepower at 360 revolutions a minute. The propeller is of the three-blade type, 42 by 42 inches,

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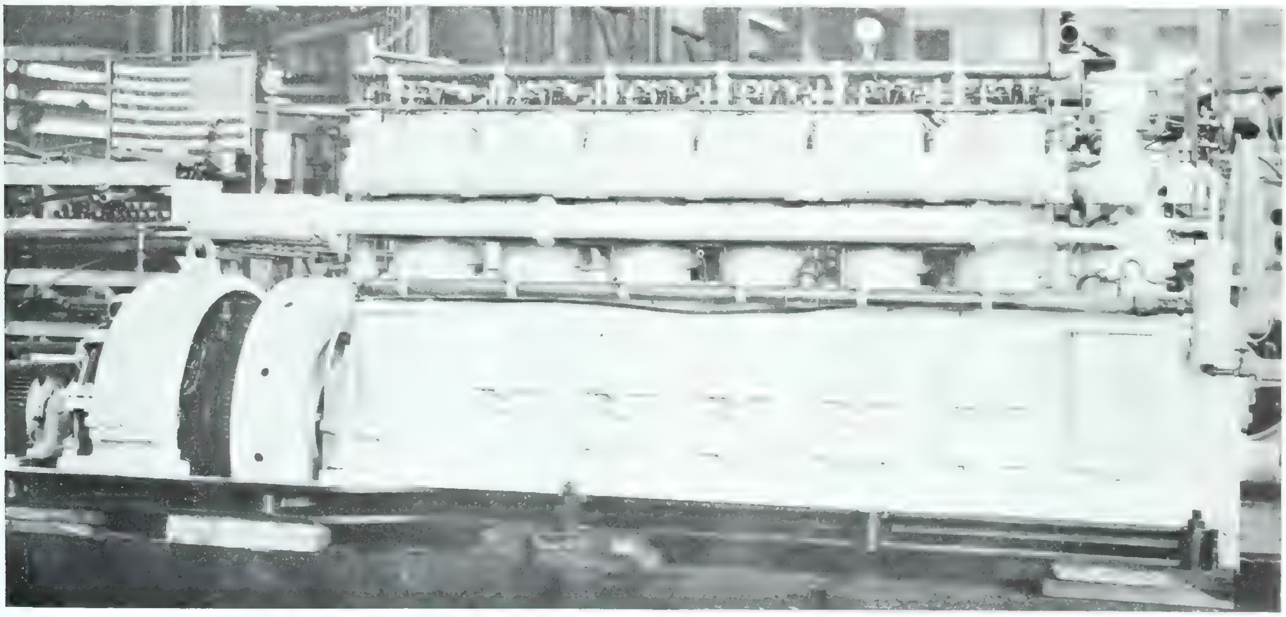
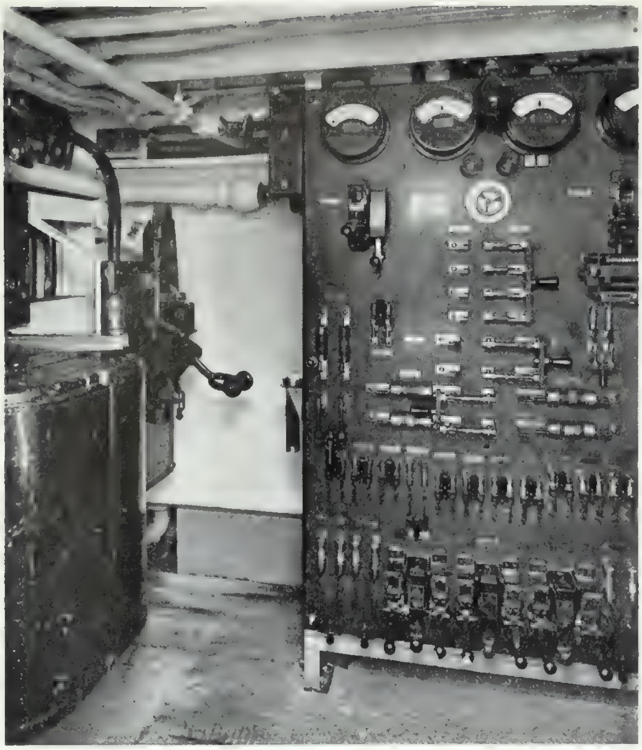
The yacht Elfay, formerly the Katoura


Side view of Winton six-cylinder full Diesel oil engine, and Westinghouse generator of the type used on the yacht Elfay



Central control station on the yacht Elfay

and drives the hull at eight to eight and a half knots an hour. The engine is equipped with a very sensitive governor which controls through a fuel pump the amount of fuel fed into the engine in such a way that practically constant speed is maintained under all conditions. The variation of engine speed from driving the hull full ahead to driving full astern is never more than twenty revolutions a minute. Control of the motor speed is entirely regulated through the field of the generator.

In actual operation the control is very simple. Suppose the engine started and running idle. When ready to get under way the engineer closes the cam controller switch and builds up the field of the motor. Then the main switch is closed connecting the main generator to the motor. Now the motor has a full field and generator field circuit is open. The officer at the deck control stand sees this condition indicated on his instrument panel and knows that the plant is now ready for deck control. From this point in the operation the engineer is responsible only for the steady running of the engine, and all variations in motor speed necessary for maneuvering are under the control of the deck officer.

This control is effected in a very simple manner by building up, diminishing or reversing the field current of the generator to regulate the voltage supplied to and hence the speed delivered by the motor. As will be seen in the illustration, the control stand is simply a crank handle and shaft supported by a cast housing. The shaft moved by the handle in either direction closes the generator field circuit through gradually reduced resistances, so that a half circle movement in one direction brings the motor from stop to full speed ahead, and a half circle movement in the opposite direction results in full speed astern.

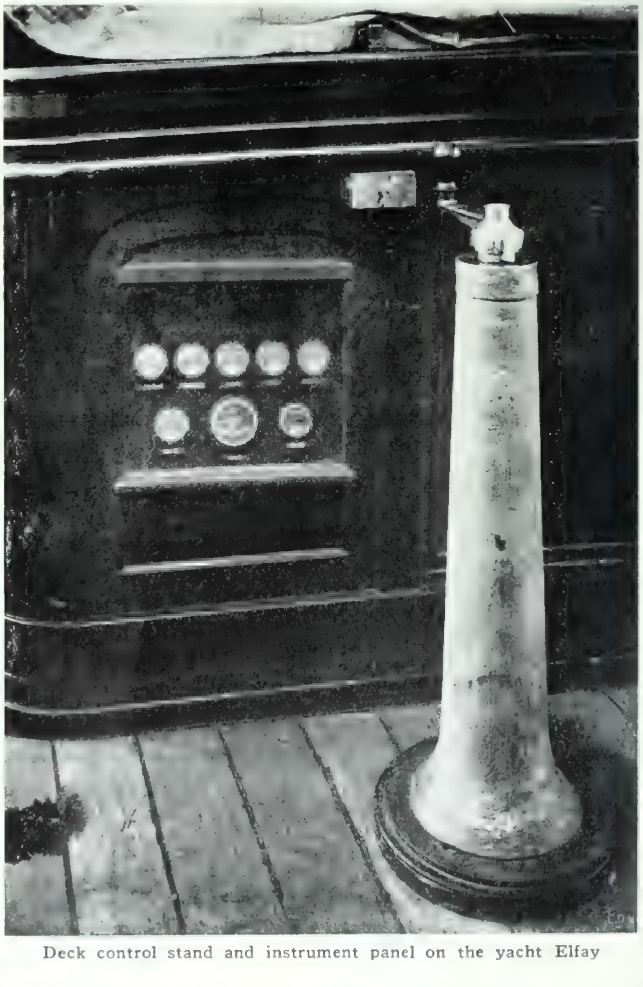
Directly in front of this control stand is the control panel, on the instruments of which are indicated all variations in voltage and amperage in the circuits of both motor and generator, and all variations in speed of motor, whether ahead or astern.

All movements of a vessel can thus be regulated from the bridge or any deck station as simply as the movements of an electric street car are controlled by the motorman.

All the auxiliary machinery on the yacht is driven by electric power, and electricity is used for lighting, heating, and ventilating the living quarters. The anchor winch is equipped with a 10-horsepower motor, and each of the two small winches amidship for handling the sails is driven by 4-horsepower motors. In the engine room is installed a one-ton ice machine operated by a 7½-horsepower electric motor. The water pump, bilge pump and oil pump are all electrically driven, and the Winton air compressor in the engine room is driven by a 12½-horsepower Westinghouse motor. A one-half kilowatt wireless set is installed aft and numerous electrically operated ventilating fans keep the air sweet in all the compartments of the yacht. For possible repair work, the engine room is equipped with electrically operated grinder and drill press.

In addition to the main generating plant, there is a 25-horsepower Quayle oil engine connected to a 15-kilowatt generator, installed purely as an auxiliary outfit and used mainly to charge a set of Philadelphia storage batteries which are used when the boat is laying to or at dock for any length of time. The storage battery installation has a rated capacity of sixty amperes an hour for five hours, which is sufficient to supply all of the lighting, heating and ventilating requirements for forty-eight hours without recharging.

The capacity of the fuel oil tanks is 2400 gallons, which is ample to give the vessel a cruising radius of 2000 miles with a consumption of approximately



Deck control stand and instrument panel on the yacht Elfay

7½ gallons an hour. Three hundred and sixty gallons of lubricating oil are carried so that this yacht is in very fair shape for a world cruise; in fact, Mr. Alger is now on the way to the West Indies and expects, after returning to New York in the spring, to make a trip around the world via the Mediterranean, the Suez Canal, the Orient, Australia, Honolulu, the Panama Canal and back to New York.

The performance of this installation and others of its kind which are now in contemplation on ships of commerce will be watched with great interest by marine engineers. The Diesel engine has been acknowledged to be the most economical prime mover and its combination with the simple and flexible direct current electrical drive will undoubtedly prove of great advantage to the shipowner.

High Efficiency Obtained Through Scientific Carburetion

WITH the increasing scarcity of the light motorboat fuels and decreasing gravity of number one engine distillate, the problem of efficient carburetion becomes more difficult. Motorboat operators of long experience remember the day when the carburetor as it exists today was unheard of and the old mixing valve, even now used in a number of stationary engines, was coming to the front and replacing the early excelsior gasoline vaporizers which were used with more or less success when the high grade fuels were obtainable in large quantities. Mixing valves were in time replaced by the carburetor, which was really a development out of the mixing valve and employed a needle valve to spray the fuel into a venturi tube through which air was drawn at high velocity. If it were true that the amount of fuel drawn past the needle valve by the action in the venturi was directly proportional to the amount of air passing through the venturi, carburetion by this method would be greatly simplified in so far as obtaining correct proportions of fuel and air are concerned. As a matter of fact, increasing the quantity of air drawn through the venturi draws a far greater amount of fuel in proportion. To overcome this excess of fuel, additional air must be admitted to the mixture above the venturi and the amount controlled by some sort of spring valve. Good results have been obtained with instruments employing the above described principle.

Other carburetors using jets or nozzles instead of a needle valve have also been used with success and manufacturers of these carburetors assert that fine disintegration of the fuel is obtained by the use of jets. This would make the jet carburetor a better distillate carburetor than the needle valve type as breaking up the fuel as fine as possible results in greater efficiency, especially when dealing with the heavier fuels. One of the problems to be overcome with the jet carburetor is the difficulty of obtaining perfect adjustment and uniform mixture at all speeds. Also, just as with the needle valve carburetor, the fuel and air are hurried through the venturi into the manifold and to the motor before they have had time to become thoroughly mixed. Realizing this, many engineers have conceived the idea of using a long, high velocity manifold. The fallacy of this practice has been proved and the present practice is to use as short a manifold as possible with sufficient capacity to carry the unburned gas with minimum restriction.

In recent years there has been placed upon the market the Ensign carburetor, which is different in principle from any other instrument previously used. This carburetor has no jets, no spray needle valve, no springs and no venturi tube. Suction is not developed by means of restriction of the air in a venturi, but is obtained through application of the law of centrifugal force. The air is drawn into the mixing chamber at a tangent to the bowl, thus creating a violent whirl. At the center of the whirl there is an area of low pressure or a partial vacuum. At this point where the motion of the air is practically zero, the fuel is drawn from four large holes and is picked up by the whirling mass of air. Thus, before the mixture passes into the engine, it is whirled for an instant at high velocity in the mixing chamber of the carburetor. It is this whirling action which breaks up the fuel into a fog-like mist and mixes it evenly with the air.

There are listed below a few instances of installations of Ensign carburetors on boats operating in San Francisco Bay showing the change in performance in each case:

Crowley 22—110 h. p. Union—Increased speed 25 r. p. m.; reduced fuel consumption from 20 g. p. h. to 13½ g. p. h.

Jim Wilder 2—110 h. p. Standard—Increased speed 20 r. p. m.; reduced fuel consumption from 15 g. p. h. to 11½ g. p. h.

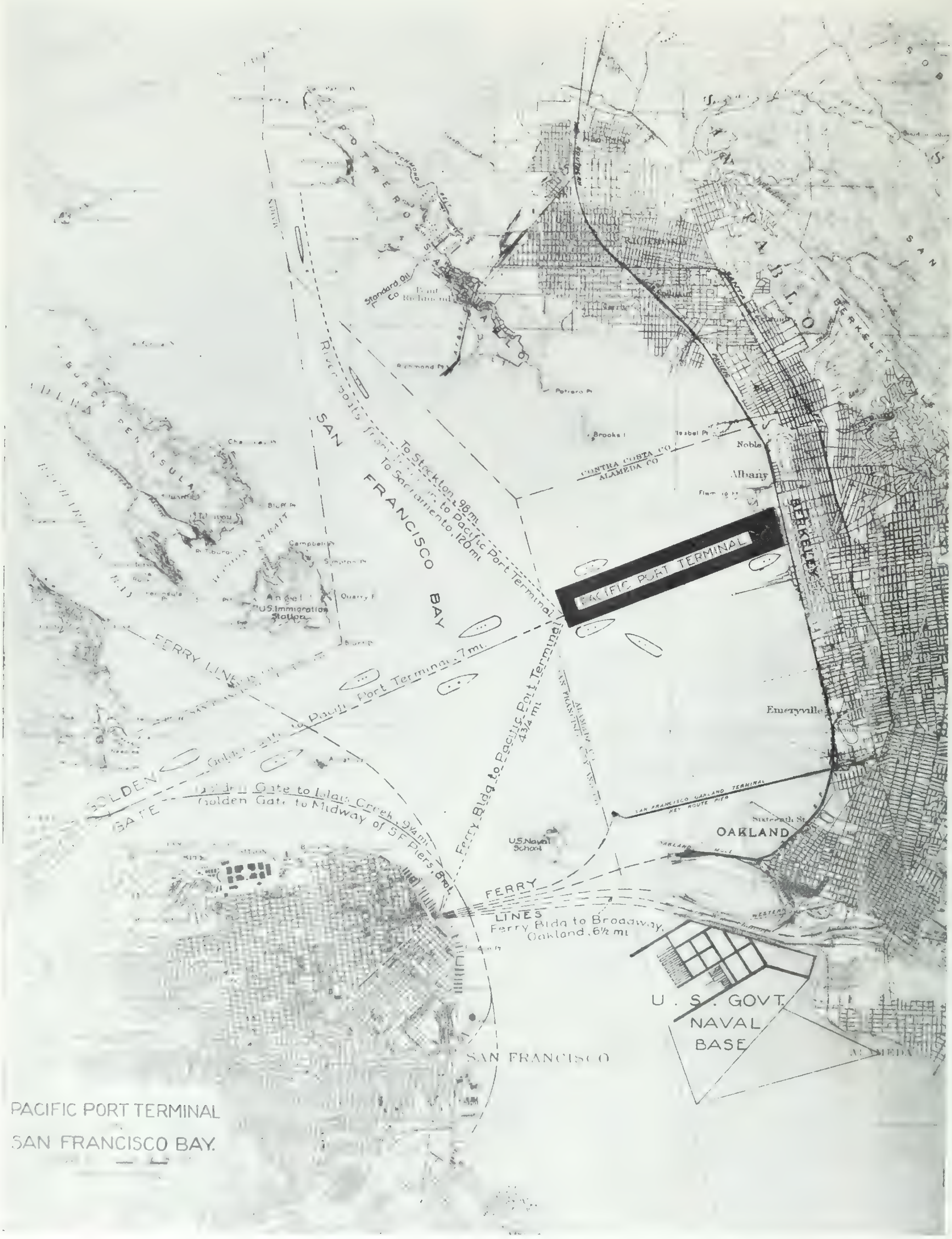
Vera—125 h. p. Atlas—Increased speed 20 r. p. m.; reduced fuel consumption from 21 g. p. h. to 15 g. p. h.

Tilly W.—65 h. p. Atlas—Increased speed 15 r. p. m.; no data regarding fuel consumption.

Western California Fish No. 1—80 h. p. Standard—Increased speed 20 r. p. m.; reduced fuel consumption from 9 g. p. h. to 7 g. p. h.

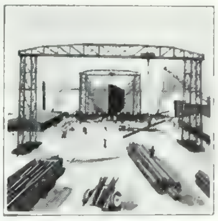
Crowley No. 21, engined with 110-horse power Union gas engine

Pacific Port Terminal



Map showing the central portion of San Francisco Bay and the location of the proposed Pacific Port Terminal. The promoters of the terminal [illegible] a magnificent dock, warehouse and industrial site with an eye to the future development of Pacific coast trade.

Material Handling



Pacific Port Terminal

By B. F. Cresson, Jr., and C. W. Staniford
Consulting Engineers

THERE has been great activity at Pacific Coast seaport cities during the last few years in arousing public opinion to the necessity for increasing the shipping facilities in order to prepare for the manufacturing, industrial and commercial growth that is inevitable, provided the opportunity is presented. There is now a very definite public opinion on the Coast that the future holds out very great promise if the necessary facilities are created.

The time has now arrived when active steps must be taken toward constructing wharfage and warehouse facilities adequate for the use of our ever increasing merchant marine. Most cities have restricted their activities simply to the construction of docks, with little consideration to the development of adequate storage and terminal facilities, due sometimes to lack of foresight, but very often to the lack of physical opportunity to do so.

New York undoubtedly will hold its premier position as the leading port on the Atlantic Coast, while San Francisco, now in the same relative position on the Pacific Coast, must expand its facilities and be augmented from tributary territory in San Francisco Bay, in order to hold its pre-eminence as the leading port on the Pacific Coast.

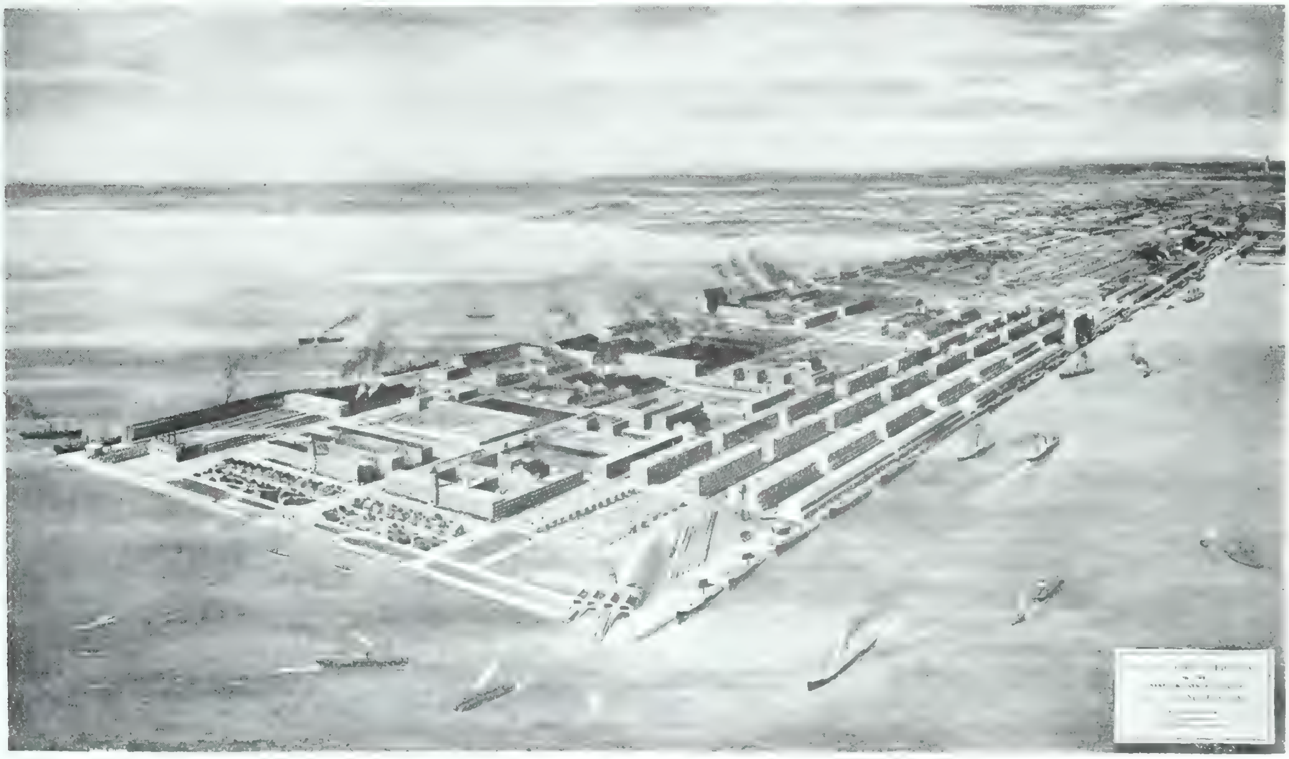
On the Atlantic, the congestion in the port of New York, at a time when trade routes are increasing the demand for more room, offers the inducement for all other Atlantic Coast cities to endeavor to obtain some of this trade, and there is an intense rivalry between them for this purpose.

Here on the Pacific, the increase in the population of coast cities, the near future influence of the Panama Canal, the many absolutely necessary new routes of trade to the Orient, together with the surety of more manufacturing being carried on in future on the coast, all demand the location of additional terminals on San Francisco Bay.

San Francisco Bay

San Francisco has retained its leadership on account of its commanding position on San Francisco Bay, the world fame of which as regards size, depth and security from storm, together with its two great feeding tributaries, the Sacramento and San Joaquin rivers, bids fair to retain for the city its present supremacy as the maritime metropolis of this coast.

San Francisco may best expand its ocean trade possibilities and thereby increase its assets in other lines of commercial activity if it will take advantage of the natural resources of the bay distant



A City that is to be

from the city itself, and establish terminals whereby deep water shipping may be served with direct rail connection to the transcontinental railroads, and where warehouse and storage facilities may be provided, fortified with the addition of sufficient back land for the creation of manufacturing establishments on a large scale.

Berkeley Waterfront—San Francisco Bay

An ideal site, combining all these factors, lies along the east bay waterfront at the city of Berkeley. In its present natural state this whole site is admirably equipped to produce all the above necessary adjuncts, from the engineer's standpoint, in the cheapest manner known for producing deep ship wharfage by the pumping method, and at the same time create the necessary nearby land for intensive development which will make it exceedingly valuable.

Mechanical Handling of Freight at Shipside

One of the reasons which has retarded the more extensive use of machinery for handling freight direct from railroad cars to deep draft vessels has arisen from the unwillingness of the operator to surrender necessary space, which has been not only produced in a very costly manner on piles, but which was also greatly needed for storage. The Pacific Port Terminal is so designed that all these difficulties are overcome and the necessary room will be created in the most economical manner by hydraulic dredging through pump and fill. In this way land is produced, fulfilling the ordinary function of the deck floor in a covered pier, and instead of being costly in construction and expensive in maintenance, is a solid surface, levelled, ready for the reception of tracks and for inexpensive foundations for buildings.

The plan provides for the placing of two railroad tracks adjoining the ship's side, so that semi-portal cranes may be operated between a ship and the wharf shed, and in other places for certain classes of trade the railroad tracks are brought to the rear face of the wharf shed, but leaving sufficient space between shed and ship properly and economically to handle cargo and at the same time permit of operation of motor trucks. Track or switching arrangements are such that cars may be taken from and delivered to the nearby classification, holding and delivery yards with no loss of time.

The lack of sufficient warehousing facilities and adequate industrial or factory assets, together with the lack of the proper use of the best handling machinery, has been caused by the fact that American seaports have been built up piece-meal, each expanding with the growth of the city, and, in almost all cases, in very restricted areas; hence most of them present simply pier systems, with barely room for the reception of the actual freight between steamers, and scarcely enough room for the ships to operate in the slips.

Ideal Living Conditions Here

All well managed manufacturing plants and industries are increasingly looking after the welfare of their workers, and the spaces reserved in the plans for parks and playgrounds are considered absolutely necessary for any well ordered community. We know of many instances where firms have not only laid out parks, but have built, in beautiful surroundings, open swimming pools for the benefit of the employes.

Another waterfront feature which may be admirably located at some point along the inner quay, where no special dredging would be required, is a yacht harbor center. We do not necessarily mean by this a harbor for the accommodation of yachts of large size only, but the small yachts and boats.

Although a sport or pleasure feature, it is a natural product of any maritime community, and possesses at the same time certain assets of trade. Sad to say, it is being driven out of almost every big commercial seaport, on account of congestion and lack of room, but should be encouraged by creating proper protective barriers and moorings with space to locate boat houses nearby.

The plan shows harbor works, warehouses and factory developments worked out in an ideal way. This will require many years for its consummation, but the plan is arranged so that a beginning may be made along the waterfront immediately, and future construction work follow gradually along exact lines.

It is expected to start the development by dredging a channel from deep water inshore to the outshore end of the unit selected, and create here a wharfage face sufficient for several ship berths, with reception sheds at proper distances from same in order that modern machinery may be utilized for handling freight economically. Simultaneously, the wharfage channel will be extended at a lesser depth further inshore to a point where a bulkhead line has been established and an interior basin has been located. The pumped material from this approach channel may be further utilized to create a bank upon which will be located a roadway and railroad approach track outshore to the first ship wharfage platform and shed. In connection with the dredging at the inner end of the wharfage channel, the pumped product from this widened turning basin will be conveyed inshore from the bulkhead, thus creating a large area outshore from the present shore proper. This area will be immediately available for the location of new industries needing large areas, whereby direct rail connection may be had, together with wharfage facilities for vessels requiring a lesser depth, and the possibility for barge transmission. After the first installation, as outlined, the work may be progressively carried on by widening and extending the channel at the outer end further inshore, thus creating an extended face of the wharfage platform, and in addition widening the filled-in end for the further extension of the wharf sheds, the erection of warehouses and other buildings. In this operation the already filled-in portion pumped for the purpose of making the first channel and the creation of a roadway, becomes a part of the permanent fill and will disappear as an approach.

Room for Expansion

It is on account of the necessity for large filled-in areas for development that the plan has been adopted in the way it has—namely, the creation of the long wharfage faces of upwards of two miles on each side of the first unit with a distance of three thousand feet between them, flanked by three thousand feet of waterway on each side of the wharfage face. Primarily, these wide channels are necessary for the creation of the fill, but they will become of immense advantage in the future should the need for wharf space become very acute; then these wide waterways may be utilized in the building of piers.

Free Port Opportunity

There has been under discussion for a long time by the United States government some sort of free port policy, and at the present time several bills are pending in the House of Representatives, and much investigating has been done by a commission appointed for this purpose. Some opposition has been created in the past on account of the wording of this theory—namely, in coupling the words "free port" with the words "free trade." Inasmuch as under the conditions of all the bills which have been proposed there is no infringement upon the theory of protection, therefore in all present bills under consideration the term "free port" has been omitted and the words "foreign trade zone" in ports of entry of the United States have been substituted. Recent developments tend to show that public opinion is rapidly accepting this principle, and it is fair to presume that some bill will soon be adopted by Congress so that the foreign trade zone may become a reality in this country. The location of the Pacific Port Terminal makes it an ideal site for a foreign trade zone.

Direct Handling Between Rails and Ships

Every encouragement in the way of rail facilities and direct unloading devices should be provided to encourage the direct handling of commodities between rails and ships.

For the interior movements between wharf sheds and storage buildings, or for movements within either, two types of machinery should be used: First, load-carrying storage battery trucks for the shorter movements; and second, storage battery tractors and trailers for the longer movements. Conveyors and tiering machinery should also be provided. Ample railroad tracks are shown, and each warehouse, each factory and each of the public service buildings has a direct rail approach. At an exterior portion of the quay, ferry facilities are provided for railroad car floats, as well as for passenger and vehicular service.

On the southerly side of the outshore end is indicated a coaling station, either for bunkering ships or for loading cargo coal, and in this location storage will be provided for oil which may be led through pipes along both faces of the quay, so that ships may be supplied with oil while they are loading other commodities.

Grain elevators are shown on the north and south quays with certain separate yards for the direct loading of grain into vessels, and from these grain elevators conveyors may be planned to run along the face of the pier sheds above the roof where desirable, so that ships may be loaded with grain at any point along the commercial quay front.

An area is reserved for the handling of lumber which may come in by rail from the interior and may be loaded directly out of cars into ships or may be stored temporarily and then loaded into ships. For this purpose heavy gantry cranes are planned, serving the lumber area.

An area on the inshore end of the quay is indicated to be available for heavy manufacturing or for plants needing acreage, this area being exceedingly valuable for such purpose, having the rail, track and water connections.

In any such plan as is contemplated above, it is necessary to have ample railroad yard facilities. Such a yard is shown near the shore end of the quay and all cars coming to the various portions of the quay must first pass through this yard. Trains can be brought in from the East, classified and routed for the various industries and storage buildings, or to shipping, and provision would be made also for the classification of particular commodities coming in mixed cars, of the freight originating at the terminal either from ships, the warehouses, or from factories. Freight coming to the yard would there be classified, in so far as possible, into car lots and broken up into trains for various railroads. Another holding yard for the car float service is located at the outer end.

The storage buildings should be equipped on the north and south sides with brackets for whip hoists which could take commodities out of the upper stories of the warehouses lower them to platform along which either railroad tracks run, or trucking ways exist. Spiral chutes should be provided in the warehouses at convenient points for the lowering of cargo that can be handled by this method, and within the storage buildings elevators should be provided with cages designed to hold two trailers.

Conveyor steamer built by the American Shipbuilding Company discharging broken stone at a Great Lakes port. The boom carrying belt conveyor is 150 feet long. The entire hold of vessel is emptied mechanically by two longitudinal conveyors feeding into the hopper for the conveyor carried by the boom.

Pier Design for Ocean and Lake Terminals

By H. McL. Harding
Consulting and Designing Engineer, Harbor Commission, City of Milwaukee, Wisconsin

SUMMARY

An analysis of the problems in connection with the design of piers and the machinery for handling general cargo at ocean and lake terminals leads the author of this article to the following conclusions, which are elaborated in the text:

First: Single unit piers about 700 feet long should be 140 to 150 feet wide, with slips 280 feet to 300 feet wide.

Second: Sheds should be equipped with overhead tiering machinery to give large capacity for storage.

Third: Traveling gantry jib cranes adapted to lifting and swinging miscellaneous cargoes should be installed.

Fourth: Railway tracks should be installed on both sides of the piers and provision made for drayways.

THE following plans and designs are for piers for marine terminals and especially for piers for freight-carrying ships, rather than for passenger liners. The designs for piers differ materially from those for quays. Furthermore, as to piers, there are many features to be considered which do not apply to quays. Concerning these there are differences of opinion that may be called the difference between the rule-of-thumb practice and uninfluenced engineering principles. The one is derived from a limited or local practice at one port and the other from a knowledge and study of all ports throughout the world. Among these may be mentioned the width of piers, width of slips, dimensions and location of sheds, and often of the piers.

There are also questions in determining the width of sheds in proportion to the width of the piers, types of substructures for sustaining the sheds, the number of sheds on piers, number and height of the stories, number and location of the railway tracks, the railway and dray approaches to the piers, the position and cubical contents of the warehouses, location of the dray roads, length of storage railway tracks, and many other features, all of which will be herein treated and the deductions given.

It is the desire that there may be such practical information derived from a study of the facts herein presented that where the conditions are suitable the terminal substructure and pier and superstructure may be planned and designed in accordance with the latest and best terminal engineering practice, free from any prejudice, influence and provincialism.

While there are exceptions to the principles given and also various types of construction, nevertheless it is deemed better to recommend those that, after study and practical experience, seem to be the best for general adaptation.

Such a discussion of terminal engineering should be of more value than to follow a method of giving many examples of different pier design and thereby leave a confusion of ideas as to which should be adopted.

One method of procedure may be as follows:

First, there should be a personal inspection and study of the location, then an examination of existing maps, including those of the Federal government, of the county and city, obtaining full information as to the water currents and prevailing winds, the water elevations above and below mean low water, the types of ships which will use the terminal, possible rail connections—in short, a complete knowledge of all the local conditions; then, if there are no physical limitations, the length of the piers is to be determined.

The width of the piers and the width of the slips depend upon the length of the piers as well as on the carrying capacity of the ships, and hence this length must first be planned.

The longer the pier the wider the pier and the wider the slip, or while there is a certain width of pier and slip for a pier of one unit in length, for a two-unit pier both pier and slip should be wider.

As in the design of the quay unit, there is a pier unit. The pier unit complete consists of the pier, the length of which is made equal to the length of the largest freighter that may there berth or a multiple of that length, and the sheds, railway tracks and mechanical appliances.

A pier may be of several units in length. The outer limit of the length of piers is generally the pierhead line of the Federal government. Longer piers can be obtained by designing the piers at an oblique angle to the bulkhead than at right angles.

If, for example, the length of the longest freighter to be there berthed is between 600 feet and 700 feet, as 625 feet, it is reasonable to suppose that there will be an increase to 700 feet, and therefore 700 feet may be taken as the length of the pier unit. Projected curves indicate what this length will be during the next fifty years. If there should in the future be an increase in length beyond 700 feet, then the pier can be lengthened. It is, however, not advisable to build the unit length of any pier much longer than the probable length of the ship that may be built within some twenty-five years and will use the pier.

For two units the length should be 1400 feet, or twice 700 feet.

If the pier should be 700 feet in length, then the width of the slip should be from 280 feet to 300 feet. If the pier be 1400 feet long, then the width of the slip should be from 325 to 350 feet in width. If the pier be of one unit length, the width of the slip should be four times the beam of the widest freighter that may there berth. As 70 feet, as above, may probably be this width, the slip width has been given as 280 feet to 300 feet, as follows: 25 feet width of barge + 70 feet width of ship + 25 feet width of second barge × 2 = 240 + 40 feet for working space.

If the pier be of two units in length, then the width should be from 325 feet to 350 feet, or about five times the width of the widest freighter. This is divided up as follows:

From pier to ship, 25 feet—this allowance being for barges; then 70 feet, the width of the ship; then 25 feet for a barge or lighter on the outside of the ship; then 85 feet for passageway of a ship from the inner berth; this would make 25 feet +

70 feet + 25 feet × 2 + 85 feet = 325 feet. Barges may be wider than 25 feet, so 350 feet may be taken as the maximum and 325 feet as the minimum width. From projected curves there seems to be no doubt but that there will be an increase in beam within the next ten years. The barges may average 100 feet in length; there may therefore be seven barges alongside one ship lengthwise. If there be four ships, the number of barges alongside of four ships would be twenty-eight barges.

It should be possible for the inner barges to move out without moving the other barges which are being discharged or loaded.

The figure of 280 feet to 300 feet as the width of the slip is correct and will provide berths for many years to come under the assumed conditions.

Congestion in the slips should be avoided when possible, although often there are many barges waiting. It is not deemed advisable to make the slips wider on this account.

The width of the pier should provide for railway co-ordination on each side of the pier and a shed capacity for holding the cargoes of two inbound ships. Outbound cargoes often must be held in the shed for a short time.

For the single-unit pier of a length of 700 feet up to 1000 feet, the width may be 140 feet to 150 feet, divided up as follows: From pier edge to shed 35 feet to 40 feet, shed 70 feet to 80 feet, on the other side of shed 35 feet to 40 feet. Therefore there would be 35 feet + 70 feet + 35 feet = 140 feet. In some cases there might be 40 feet + 80 feet + 40 feet = 160 feet. Whether maximum or minimum width, the plan will depend upon local conditions. There must not be congestion on the pier any more than in the slip, but, on the other hand, berths should not be sacrificed by an abnormal or useless width of pier or slip.

Shed capacity is obtained by making the height of the shed below the roof trusses about 30 to 35 feet. This shed has a greater capacity than a two-story shed of equal height. It is in effect equivalent in capacity to a two-story shed, but at about one-half the cost.

On this pier unit, 700 feet long, 140 feet to 160 feet wide, there are two sheds, each 200 feet long, 70 to 80 feet wide and 30 feet to 35 feet clear height below the girders, or 200 feet × 70 feet × 30 feet, or 420,000 cubic feet capacity. At 80 feet width the capacity would be 480,000 cubic feet for each shed; for two sheds, the capacity either 840,000 cubic feet or 960 cubic feet. This represents the gross shed capacity, and, in addition, there is considerable open space.

It is not advisable to reverse space between the line of the shed and the face of the pier wall for storage, as this should be for the railway tracks and drayways. There is, however, on a pier of a length of 700 feet, an open space at the end of about 70 feet × 50 feet, or 3500 square feet, and between two sheds 70 × 100 feet, or 7000 square feet, and shoreward from the second shed a net area of about 14,000 square feet, making a total of 24,500 square feet, or about 367,500 cubic feet tiering 15 feet in height.

There is therefore over 1,300,000 cubic feet which is equal to the net cubic capacity of two ships, one on each side of the pier. Making allowances for the freight which is transferred over the side of the ship upon lighters, that which is removed as unloaded by railway cars, drays and vessels, it will be seen that there is sufficient capacity for the seventy-two hours' holding time. During and after this time the cargo is transferred from the shed to the warehouse. The number of the warehouses can be increased, being located on the lands to the rear of the waterfront.

The immediate waterfront or the shed location is limited, but there is generally ample space in the rear for many warehouses.

If the pier should be 1000 feet in length, then there would be one additional shed and 100 feet additional open area. A 1400-foot pier would have four sheds.

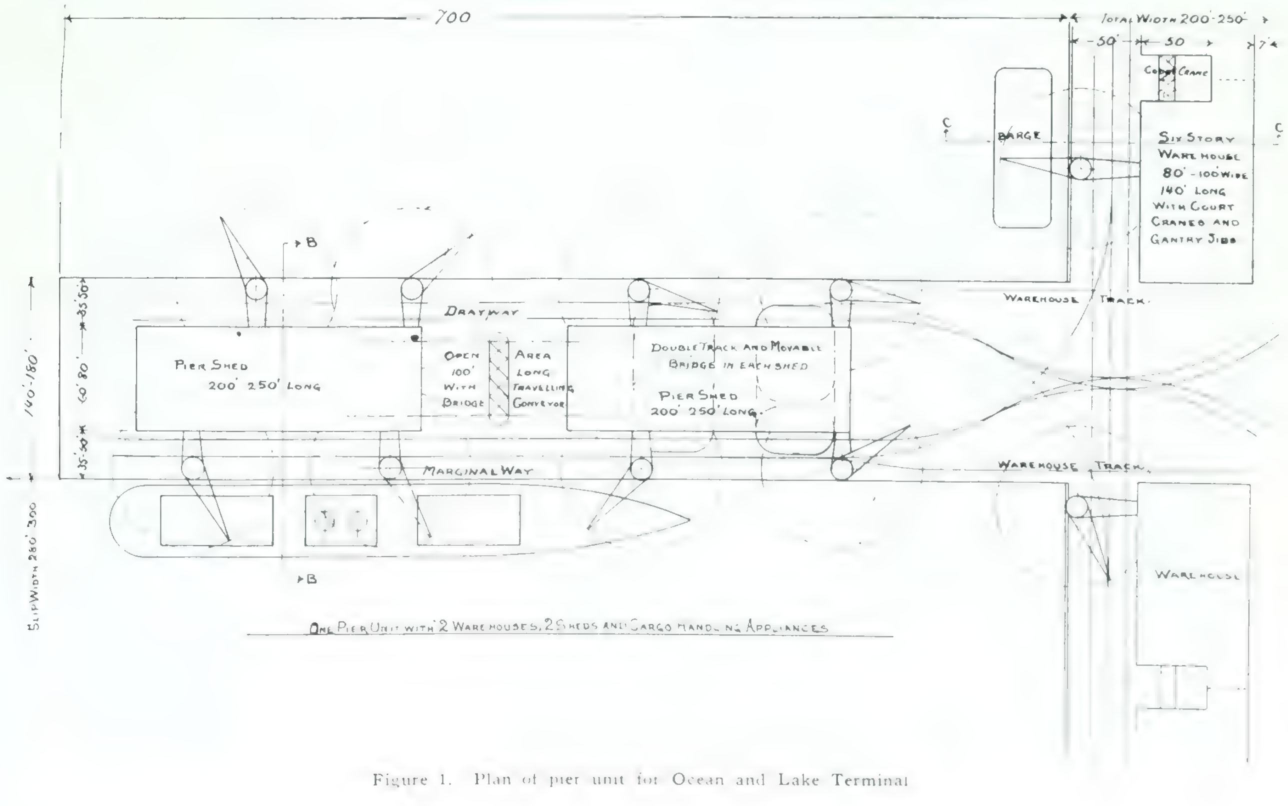


Figure 1. Plan of pier unit for Ocean and Lake Terminal

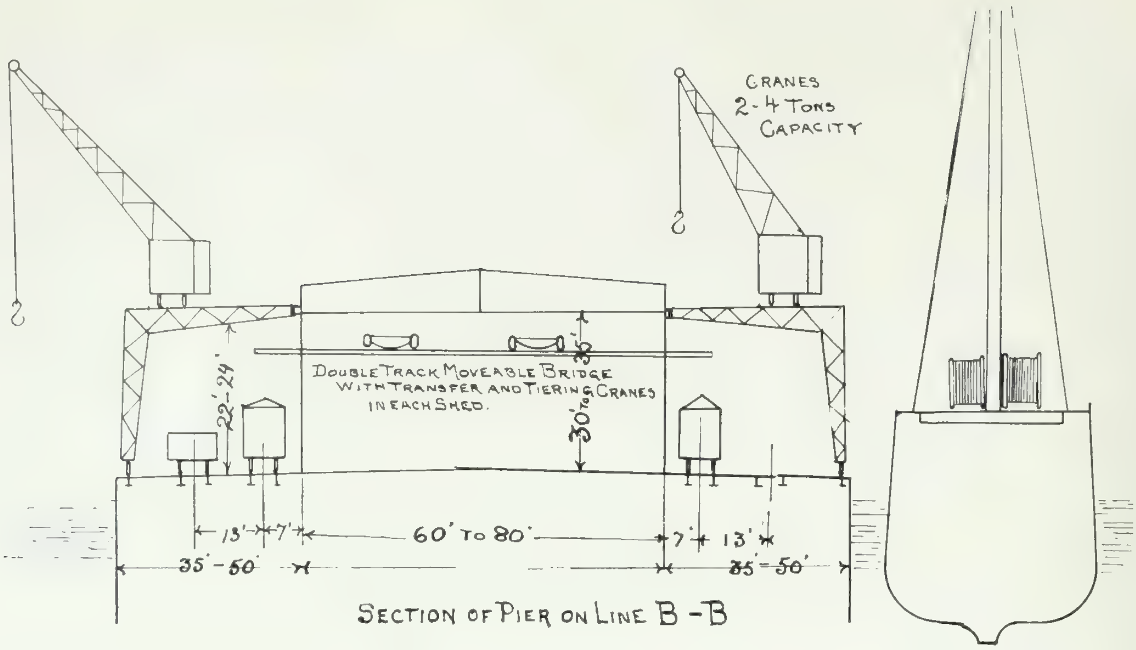

CRANES
2-4 TONS
CAPACITY
DOUBLE TRACK MOVEABLE BRIDGE
WITH TRANSFER AND TIERING CRANES
IN EACH SHED.
22'-24'
30' TO 35'
13'
7'
60' TO 80'
7'
13'
35'-50'
35'-50'
SECTION OF PIER ON LINE B-B

Figure 2. Section through line B. B. on plan shown in Figure 1

As to the mechanical appliances, those outside of the shed should be universal in character and should be able to transfer all the varied kind of freight which must be unloaded and loaded at a public terminal. The traveling gantry jib crane fulfills all the requirements and is generally the type installed. It can serve a larger area without congestion than any other type of unloading or loading machinery and will be found at most ports where modern machinery is installed. There are over twenty companies in the United States which manufacture and sell these cranes.

Such a crane should have a lifting capacity of two to four tons—that is, two tons at 200 feet to 300 feet a minute, with one rope, and four tons at one-half this speed. There should be temporary excess capacity of 50 per cent. The rotary speed should be from two to three revolutions a minute and the traveling speed from 200 to 300 feet a minute. Two such cranes operating at each hatch in conjunction with the winches on the ship will enable wonderful speed of discharging to be attained. The weight of such a crane would be about 50,000 pounds.

To avoid floor congestion in the shed, there should be overhead traveling cranes for assorting, distributing and tiering. The general arrangement of this machinery is indicated in the attached plan and elevation. It will be noticed that provision is here made for transferring freight across the pier.

ERICKSON RETURNS TO MOVIES

JEROME ERICKSON, one of the most successful marine photographers in the country and well known along the Pacific slope as the "wizard photographer," has resigned his position as director of the local photographic division of the United States Shipping Board and accepted a position with the San Francisco Film Producers' Corporation, as art director and chief camera man. Erickson, who will be remembered by those in San Francisco and other coast cities as the young chap who so efficiently aided the Shipping Board in its drive for recruits, with his pictures of life at sea and the making of Yankee sailormen (some of which have been published in Pacific Marine Review), heard the call of the silent drama and with much reluctance left his assignment of taking sea pictures for that of taking "stills" and "movies" of screen stars.

When the local film company learned that Erickson was seeking a new "billet," he was immediately offered the position, although over one hundred applications had been received. It has been announced that Erickson will be in direct charge of the laboratory department.

Erickson has a complete knowledge of lighting effects for movie work as well as handling the various angles of the movie game. He was formerly connected with the Universal Film and American Film companies in the Southland.

So anxious is he to take sea pictures that he has already recommended that the company's first picture be a story of the sea. It is likely that the new company will make its debut with a sea story from Conrad, Morgan Robertson or John Masefield.

WORLD-WIDE SHIPPING BANK

A world-wide shipping bank under the chairmanship of Lord Inchcape, greatest shipping magnate in the British Empire, will be organized with capital of $25,000,000, of which $10,000,000 will be paid up, according to copyright cable to the New York Sun, which says the institution will be called the Peninsula & Oriental Banking Corporation and will be affiliated with the steamship line of the same name and with the "Big Five" banks of the Empire.

Marine Insurance in Japan

FORTY years ago there was no insurance company in Japan. Today there are thirty companies doing marine and fire business and eight transacting fire only. The business received a great stimulus during the European war, no less than sixteen companies having received the sanction of the Department of Agriculture and Commerce, and, in addition, nine other companies have been organized or projected, and, at this writing, are awaiting government authorization.

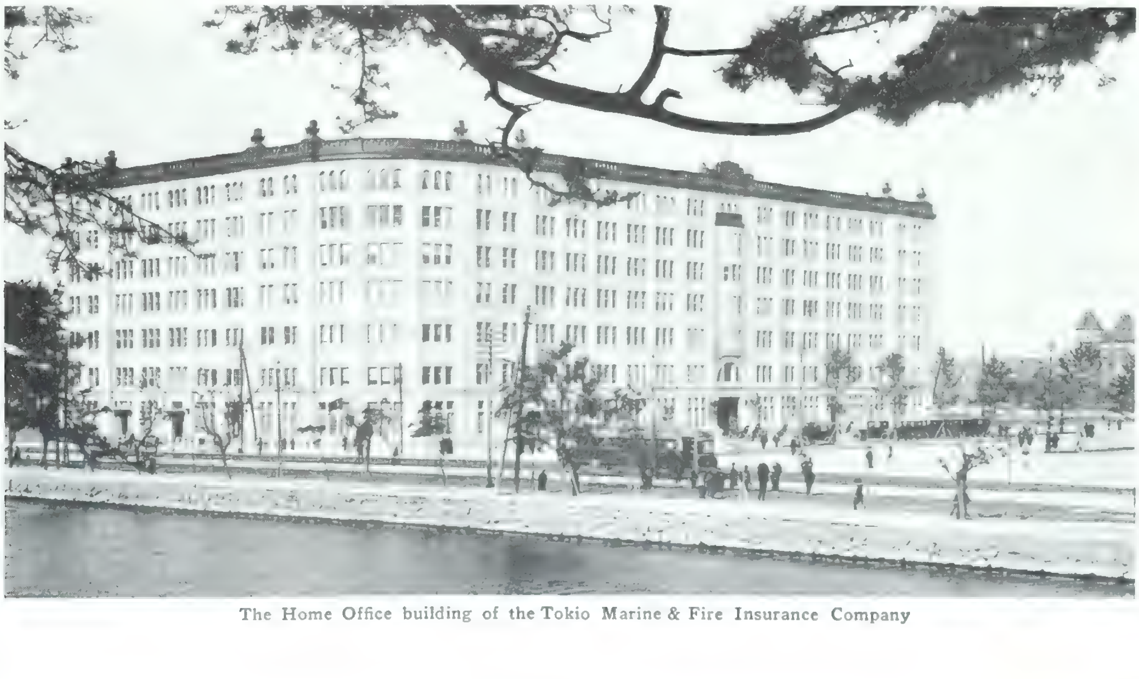
During the war period the shipowners, in obedience to the marked Japanese tendency to control associated businesses and thus to reap more than one profit, formed new companies, among them being the Fuso Marine, Asahi Marine, the Taisho Marine & Fire Company, a Mitsui corporation; a Kawasaki Dockyard insurance company, another belonging to the Mitsubishi group; and still others are spoken of in connection with the Nippon Yusen Kaisha and the newly-organized Kokusai Kisen Kaisha. In fact, the prominent shipping firms regard a marine insurance company as a requisite adjunct, just as either they have come to control shipbuilding yards in great measure or the yards have organized their own operating corporations. Naturally, the enormous values of shipping and cargoes and the opportunities for war insurance enabled the business to make great strides in Japan as well as everywhere else. The Osaka Marine & Fire (ex the Osaka Fire & Marine), which, although organized in 1893, had not been successful, also was reorganized with substantial backing and entered the active marine field.

The abnormal growth of Japanese shipping, due to the scarcity of tonnage caused by the absorption and destruction of the war and the great increase in steamship values and general commodities, contributed to the pressing demand for insurance. There was no German element to replace in Japan, the organization of new companies having been to meet a demand created locally by the war. Japan now finds herself in the position of other countries. It remains to be seen how the war status can be maintained in normal peace times. Some companies of war-times may have to pass through the usual ordeals. Japanese marine insurance companies still have to attain permanency before they can create their own market in the Far East.

Thirty-eight Japanese companies (thirty fire and marine and eight fire) have assets of approximately $85,000,000 all told, of which $45,000,000, or more than half, is in the hands of the Toyo Marine & Fire, subsidiary holdings included. In addition to holding a commanding position in the field, the Tokyo Marine & Fire also is the oldest of the Japanese companies, so that the general early history is its own history as well.

Its story goes back to 1878, and its career is closely interwoven with the commercial progress of Japan. As was the case with many other representative institutions, Baron Shibusawa's name is intimately connected with the earliest history of the company. The daimyo, or old feudal lords, were interested in the commercial movements then beginning to take root in Japan, which, despite the shipbuilding prohibition of centuries, remained primarily a maritime country, and the baron, then Mr. Shibusawa, realized that marine insurance was a necessary corollary of the world-wide activity that Japan was about to display. He secured the backing of the present Count Okuma and Yataro Iwasaki, shipowner and founder of the famous Mitsubishi company, and enlisted the support of the peers.

Government sanction was obtained in 1878, and, early in 1879, the company was organized with a capital of yen 600,000, of which about 80 per cent was contributed by the promoters and the remainder by merchants generally. On August 1, 1879, the Tokyo Marine Insurance Company (the name under which it first operated) opened its doors for business in the Nihonbashi district of Tokyo. Hard times were met, which Mr. Masuda, the manager, tided the company over. With the opening of branch houses abroad by Japanese merchants, the company, which had confined its operations to near waters, also expanded and established a small general agency in London in 1890. A few years earlier it had obtained from the government a guarantee of yen 400,000 for its policies. The story of



The Home Office building of the Tokio Marine & Fire Insurance Company

Japanese government aid to commercial ventures, it may be remarked, unquestionably would be an unusual chapter in the world's economic history, if narrated.

The decade of the nineties brought the company no added prestige, and, despite an expansion of connections in Oriental seas, its business, on the whole, was not profitable. For many years dividends had been uncommon, and disasters at home and by foreign connections were so severe that the capital, which had been increased, was cut down by one-half.

Nevertheless, others were not deterred from trying their hand, and new ventures were launched, some of them after the successful issue of the war with China in 1895. The new companies were: The Imperial Marine Insurance Company, 1893; Nippon Sea & Land Insurance Company, 1893; Nippon Marine Insurance Company, 1896; the Osaka Fire & Marine Insurance Company, which, however, met hard times and was dormant for many years. It was not long before the Nippon Sea & Land Company opened an active agency in London, only to close it quickly because of heavy losses suffered there, and it liquidated in 1901.

Thus, at the end of twenty years, the Tokyo company, the pioneer, was no better off than it was on the day of its founding, and other companies had had no better luck.

In 1899, the Tokyo company brought back from London, Kenkichi Kagami, who had been sent there in 1894 to study the business, and appointed him manager of the company at the Tokyo head offices. After twenty years, all the company had to show was a paid-up capital of yen 375,000, the only working resources. It was do or die. The change in management and methods brought about a recovery from which there has been no relapse.

When the Russo-Japanese war came in 1904-1905, the Tokyo company's finances were on a sound basis, by virtue of progressive executive policies, coupled with conservative underwriting and the husbanding of its marine profits, so that it was able to care for the war risks which Japanese merchants wished to cover. The profits of these years and the successful conclusion of the war were incentives to the creation of new companies and also of established fire companies adding marine departments, and, moreover, of some of the marine companies opening up fire departments.

Both the Kobe Marine & Fire and the Tomei Fire & Marine were started in 1907. Some of the new companies established themselves successfully locally, but the Tokyo alone went in for a world-wide business between the Russo-Japanese and the world wars. The Tokyo has aggregate assets of $42,693,546.27 and surplus over capital and all other liabilities of $28,176,944.32, as shown in its annual statement for 1918 to the Insurance Department. These reserves have been built up entirely on marine business under the management of Mr. Kagami since 1899.

Appleton & Cox, the well-known New York underwriters, were appointed general marine agents for the United States and Canada by the Tokyo company in 1911. The Pacific Coast business is in the hands of Edward Brown & Sons. Since 1914 the company has done only a little fire business, but in 1918 it incorporated fire in its name to assist the establishment of its business in the States. Johnson & Higgins are the fire managers; Joseph A. Kelsey, general agent, is in charge of the United States fire branch, 80 Maiden Lane, New York; and Miller, Henley & Scott, San Francisco, have been appointed Pacific Coast agents.

Japan's Navigation Subsidies

ANY restriction on shipbuilding and foreign trade acts automatically as a restriction on ship-owning; manifestly, if Japan did not permit vessels larger than fifty gross tons to be built between 1635 and 1853, there was virtually no operation of ships, and the revival of Japanese building after the visit of Commodore Perry synchronizes roughly with that of shipping. Roughly, because the weight of the old restrictions still was felt, and enterprise did not appear promptly. The earliest building usually was governmental.

During the first five years of the Meiji era, the Japanese hesitated to buy vessels, especially those of the foreign type, so that the government, in 1869 and 1870, "repeatedly announced," an official record states, that any person was at liberty to own as many foreign-type vessels as he wished and that the government would grant him special protection.

Then, in 1872, the Nihonkoku Yubin Jekisen Kaisha (Japan Mail Steamship Company) was organized, to be superseded, five years later, by the Yubin Kisen Mitsubishi Kaisha (Mitsubishi Mail Steamship Company). There followed the Kyodo Unyu Kaisha (United Shipping Company) in 1882 and the Osaka Shosen Kaisha (Osaka Mercantile Steamship Company) in 1884, both being given government support. The competition between the Kyodo Unyu Kaisha and the Mitsubishi companies was bitter, even ruinous, so that the two were amalgamated under the name of the Nippon Yusen Kaisha (Japan Mail Steamship Company), which, by descent the oldest, still remains the largest of the Japanese lines.

Law No. 15, 1896, promulgated in March of that year, provided subsidies for any Japanese subject or Japanese company, all the partners or shareholders of which were Japanese subjects, engaged in carrying passengers or freight between Japanese and foreign ports or between foreign ports in their own vessels, of at least 1000 tons and of Japanese registry. The amount of the subsidy was determined by the routes and tonnage of vessels.

At about the time this law passed the Diet, the government issued a special order, under which the Nippon Yusen Kaisha opened regular services on the Bombay, Australian and Sea of Japan routes, and soon thereafter the N. Y. K. started sailings to Europe and America, and the new Toyo Kisen Kaisha (Oriental Steamship Company) opened its American trade.

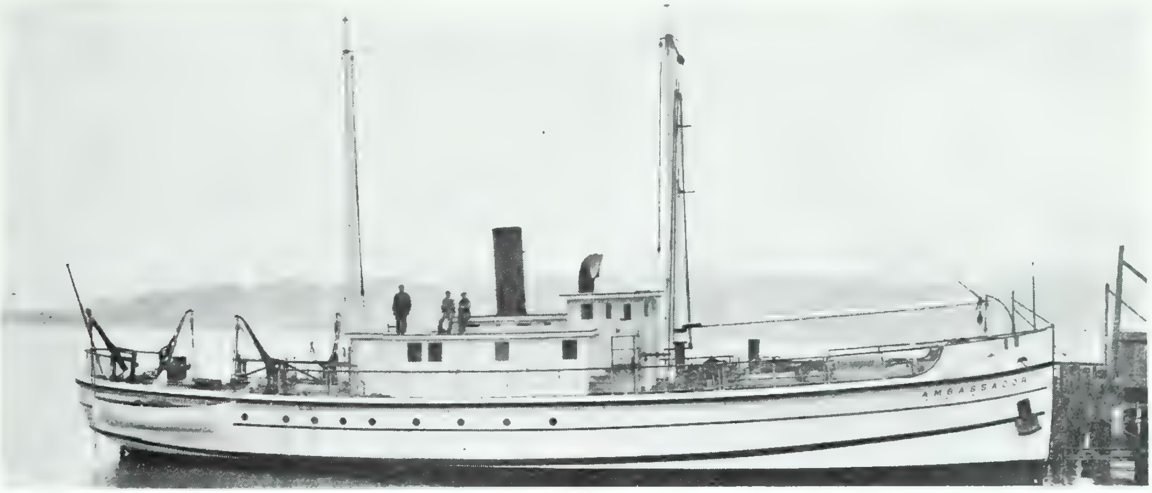
So much for the early history of Japanese government aid to ship-operators, as distinguished from the building subsidies. The subsidies now paid aggregate millions of yen a year. The budget appropriations fixed the following maximum amounts for the year April, 1919, to March, 1920, although it does not follow that all this will be expended:

European line, Nippon Yusen Kaisha	Yen	1,569,672
North American line, Nippon Yusen Kaisha, Osaka Shosen Kaisha and Toyo Kisen Kaisha	Yen	2,509,187
South American line, Toyo Kisen Kaisha	Yen	269,350
Australian line, Nippon Yusen Kaisha	Yen	188,497
Java line, Nanyo Kisen Kaisha	Yen	220,000

The present regulations would have lapsed in December, 1919, had not the government extended them for two years. Despite the fortunes reaped by shipowners, the official policy was that the abnormal prosperity was only temporary and that public aid still would be necessary. For 1920 the appropriations will be slightly smaller, increasing, however, in 1921, inasmuch as it is anticipated that some of the companies will build new vessels, which will command larger subsidies.

Only the European, North American, South American and Australian routes are considered as being "distant navigation," and the other assisted lines receive their subsidies under the form of mail contracts. That is true of the Java service, the amount of the aid for which is given above. Figures for the other so-called "mail contracts" are not available. It should be understood that Java is not a "subsidized line," strictly speaking.

Japan's Department of Communications possesses the functions of more than one American department. It was organized about thirty-five years ago. The mercantile marine bureau has most to do with merchant shipping. S. Wakamiya is its director. In charge of its four sections are: Affairs in general, K. Miyazaki; ship inspection, Dr. M. Tsutumi; seamen's affairs, M. Nomobo; shipbuilding material inspection, S. Ochi. There is, besides, a ship control bureau, organized for the war under the shipping control act, which probably will be abolished in 1920. U. Noda is minister of communications, and T. Hata is vice-minister, in the Hara cabinet.



View of the Motorship Ambassador at pier

The Motor Vessel Ambassador

THE motor vessel Ambassador, very shortly after her trial run, performed last November a notable towing feat in the difficult waters off the Alaskan coast. The Ambassador is owned by the Chichagoff Mining Company, Chichagof, Alaska. The Ambassador is a wooden vessel, 112 feet in length, 22 feet beam, 16 feet 3 inches molded depth, draft loaded 10 feet 7 inches. She has a gross registered tonnage of 204 and is equipped with 360-brake horsepower Nelseco direct reversible Diesel engine of six cylinders, having a 13-inch bore and 18-inch stroke. This engine, running 240 revolutions a minute, drives the hull light at a speed of 11½ knots an hour.

A 16-horsepower Atlas engine direct connected to a 12-kilowatt generator, furnishes power for driving through electric motors the Moran centrifugal bilge pump, the stand-by air compressor, the cargo winches and an anchor windlass.

The Ambassador was built for the freight and passenger service between Juneau and Chichagof, in connection with the business of her owners, and was designed for strength and power in view of an occasional towing trip from Tacoma to Chichagof, hauling scows with material and oil. On her first trip she took up two scows. The larger scow was 100 feet long, 10 feet deep, with 40-foot beam, drawing seven feet of water. The load being eight feet above the deck, presented a wind resistance surface of 11 feet by 40. The smaller scow was 27 feet long, 17-foot beam and carried no load. The Ambassador herself carried fifty tons of freight. The distance logged amounted to 961 miles, which was covered in 195 hours' towing time at an average speed of five miles an hour. The engine room log shows that the cost of fuel and lubricating oil per mile on this towing trip was $0.186 and that in running with freight only from Chichagof to Juneau, the cost of fuel and lubricating oil per mile is $0.0967.

The fact that the Ambassador was able to make this towing trip under rather difficult conditions of weather, immediately after her first trial, and then go into active service without overhauling, is very good evidence of—first, the sturdiness of the Nelseco Diesel engine; second, thorough workmanship in the installation; and third, the ability of the navigator.

Flying Boats for China

By Guy T. Slaughter

THE aircraft comprising the shipment, of which some illustrations accompany this article, are to be used by Mr. C. E. W. Ricou in a strictly commercial enterprise, carrying passengers and express along the coast of Asia.

H. S.-2L type Flying Boat in the air

Mr. Ricou is a mechanical engineer by education. He has lived in the Orient for many years and has acquired interests in electric power and light plants, refrigeration plants and the like. His idea of utilizing aircraft commercially dates back to and before the spring of 1914, at which time he went to France to learn to fly and to arrange for the necessary equipment to start an aircraft line along the China coast. The war broke out while he was in France, his native country, and he offered his services as an aviator. He served with distinction on the Saloniki front and in France. He was wounded some time before the armistice and was assigned to the command of the French aviation forces in French China. After the armistice he resumed work on his commercial aviation plans and in August, 1919, came to the United States and arranged with the writer for the equipment and men that are the subject of this article.

The shipment consists of five Curtiss type H-16 and two Curtiss type HS-2 flying boats, three Aeromarine type 39-B seaplanes and one Boeing seaplane.

The H-16 type is the largest type of flying boat available for commercial use. The wing spread is 96 feet 6 inches. The power plant consists of two 330-horsepower Liberty motors, each consuming thirty gallons of gasoline an hour. The speed range is from 57 to 95 miles an hour. With fuel enough aboard for a 300-mile flight, the passenger capacity is ten persons. The weight of machine and load as it takes the air is approximately 11,000 pounds. This type was used during the war by the United States Navy in patroling for submarines and in convoy work in European waters.

The HS-2 type has a wing spread of 74 feet and is powered with one Liberty motor, and the carrying capacity is six to eight persons. This type was used by the Navy during the war in patroling off New York and other harbors.

The Aeromarine and Boeing seaplanes are powered with Curtiss and Hall-Scott 100-horsepower motors. They carry but two passengers and are intended for comparatively short flights only.

The entire shipment measured very nearly 60,000 cubic feet, or 1500 tons measurement, but the weight was but little over 100 tons. The packing cases containing hulls and wings weighed over four times as much as their contents. The shipment consisted of 144 packages, many of them of unusual size.

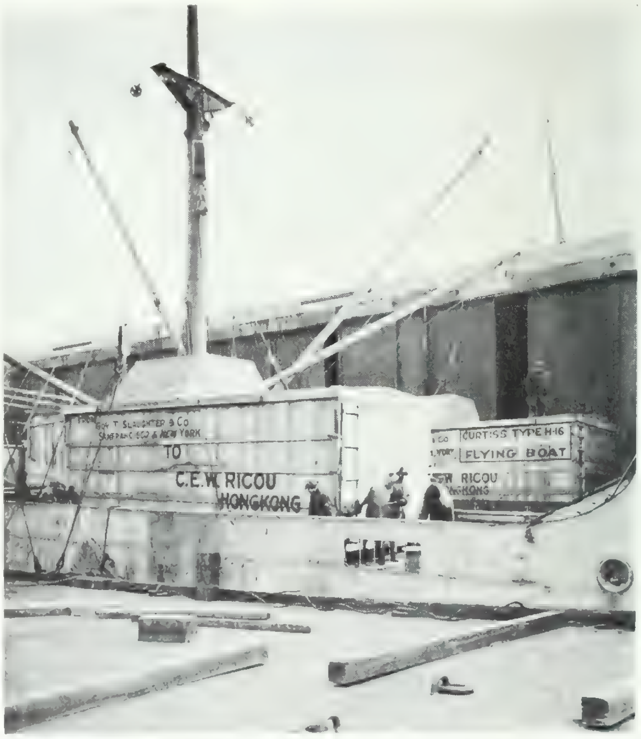
The largest boxes are those shown in the illustion, carrying the names of shipper and consignee. They contain the hulls for the H-16 type flying boats and each measures over-all 43 feet long, 10 feet 6 inches wide and 13 feet high, making a cubic measurement of over 146 ship's tons each. There are five of these boxes in the shipment. They were shipped on deck. Everything else was shipped under deck.

The spare parts shipped included enough aerofoils (wings and other fabric covered parts) to practically refit the entire lot of aircraft; about 100 extra propellers, 10 extra motors complete and a great variety of smaller spares, tools, etc. Cradle type handling trucks for all the flying boats were shipped, together with a tracklayer type gasoline tractor for pulling the aircraft, on trucks, out of the water and about the hangar yard.

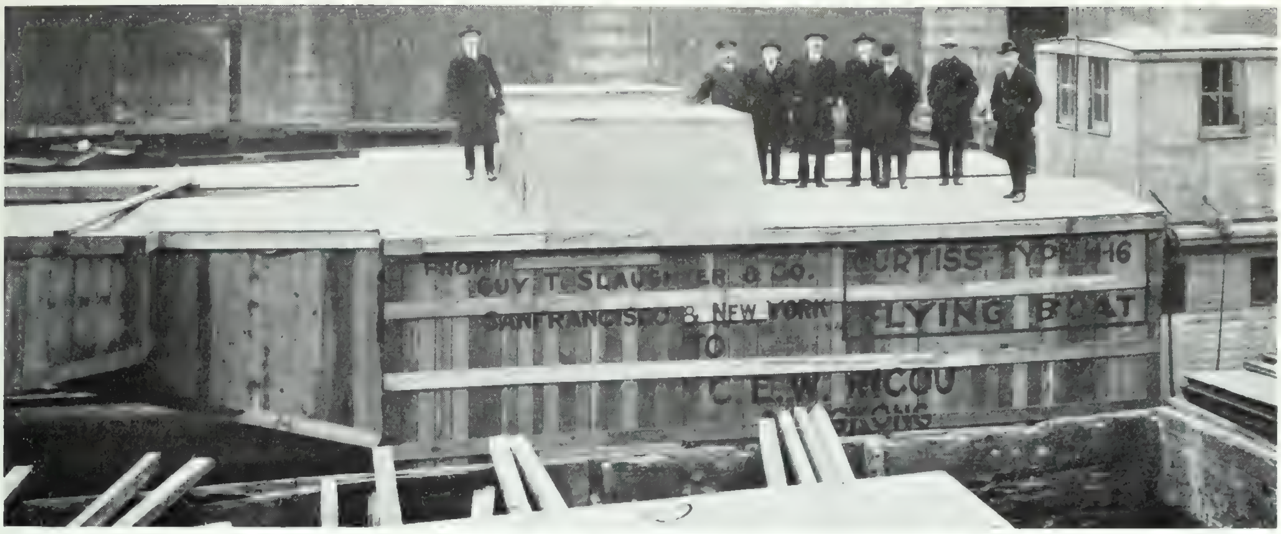
Four large barges were required to move the shipment to ship's side. To have moved it by rail would have required between thirty and thirty-five ordinary flat cars or twenty-five of the 50-foot type.

To successfully handle a shipment of this size and kind requires the cheerful and otherwise efficient co-operation of the steamship company. Such co-operation was accorded by the Barber Steamship Company, on whose steamship Dacre Castle the shipment complete left New York the middle of January.

In the selection of men to pilot the aircraft it was thought imperative to choose only men who were navigators and good seamen as well as good aircraft pilots and with long experience in operat-



Flying Boats loaded on deck of steamer Dacre Castle for shipment to the Orient



Large Packing Case Containing Flying Boat

ing the large type H-16 flying boats. These big craft must be operated almost entirely by instruments, their size and weight being so great that very few, if any, pilots can operate them by "feel"; i. e., by depending on the unaided senses to determine airspeed, the angle of ascent and descent, degree of bank and the proper speed at which to "take off." Practically the only men meeting these requirements were those who served during the war in the naval aviation branches of the United States, England and France.

From a considerable number of applicants, the writer selected Mr. Walter D. Bonner as general operating superintendent, and with his able assistance engaged five pilots and four assistant pilots, all of them men who served in navy aircraft operations during the war.

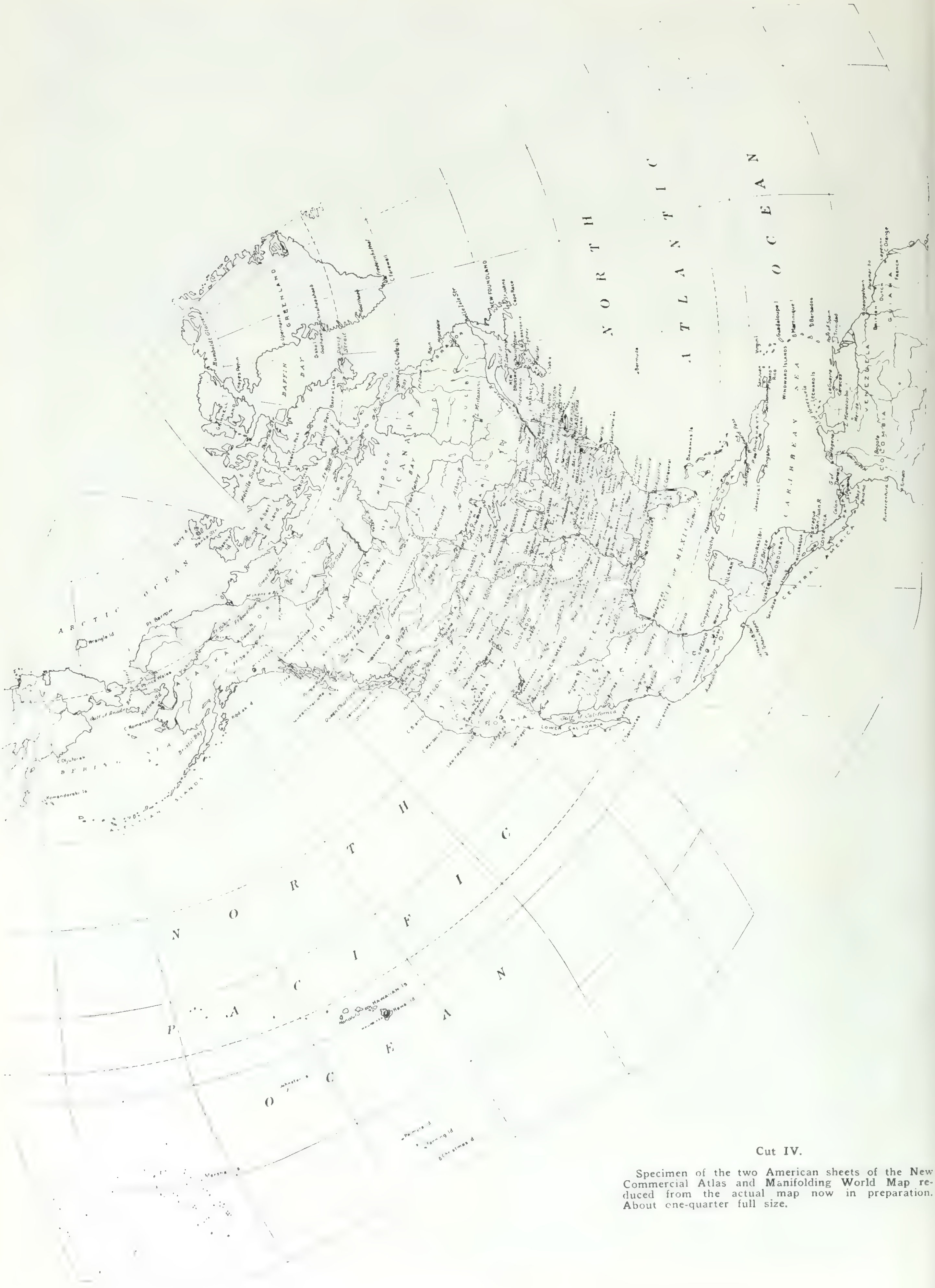
Mr. L. A. Scotchmer, who for many years superintended the construction of flying boats in the Curtiss factories, was engaged as mechanical superintendent and five expert mechanicians were hired to assist him. This makes a skeleton organization of sixteen men, to be supplemented by additional men as needed.

The wives of three of the men and a lady secretary made twenty in the party, and again the cooperation of a steamship company was necessary to get the men to Hongkong before the aircraft arrived. The China Mail Steamship Company at San Francisco accorded the same efficient co-operation in furnishing passenger accommodations as had the Barber Line in New York in handling the aircraft shipment, and the party of twenty set sail from San Francisco on the steamship Nile, January 30, 1920, and will arrive at Hongkong about two weeks ahead of the steamship Dacre Castle.

This is probably the largest shipment of aircraft ever exported from the United States for commercial purposes and the largest party of men ever sent out to a foreign country to operate aircraft in commercial use, but in all probability it will be but a matter of months until such shipments of aircraft will be very commonplace indeed.

Editor's Note:—Guy T. Slaughter has been intimately connected with the history of commercial flying on the Pacific Coast. In fact, aviation has been his hobby. Mr. Slaughter wrote the rules for the proposed aircraft race around the world that was to be staged at the time of the Panama-Pacific Exposition. It is therefore very natural that his friends in the Orient should turn to him as the best informed exporter to handle the purchase and forwarding of airplanes for the Orient.

Close up view of bow of Flying Boat floating at her moorings



Cut IV.

Specimen of the two American sheets of the New Commercial Atlas and Manifolding World Map reduced from the actual map now in preparation. About one-quarter full size.

A Unique Commercial Atlas and World Map

A Manifolding, Loose-leaf, Eight-part, Ever-new, Single-scale, Desk Atlas or Wall Map Combined, Showing the Whole Surface of the Earth Without Disruption of Land Masses or Noticeable Exaggeration, Distortion or Errors of Distance, Area or Direction

By B. J. S. Cahill, F. R. G. S.

"The ideal atlas would be of detachable sheets supplied to subscribers as soon as they are printed"—"The Map of the World."—Springfield Republican, October 10, 1912.

THERE is in preparation and about to be published in San Francisco an absolutely novel type of world map to meet the needs of international commerce and for all manner of uses incident and auxiliary to these needs, such as meteorology, radio-telegraphy, aerial communication and new routes by sea, land and air.

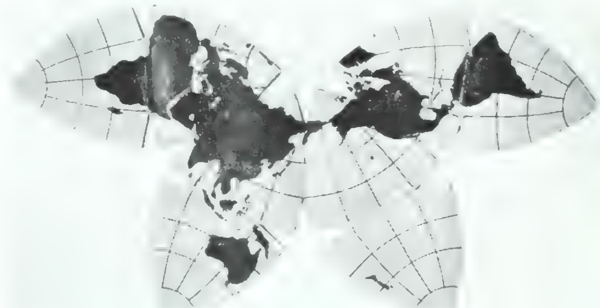
Readjustment after the war and the dawn of a new era of peace calls for wider vision and more accurate grasp of world trade and development problems than have hitherto been dreamed of. Alexander Hamilton's famous phrase in which he first envisaged a truly continental nation must now be superseded. The statesman and the business man alike must learn to think not only "continentally" but "planetarily." We must do business in the future, not merely in terms of a country, a continent, or an ocean, but in terms of the whole wide world.

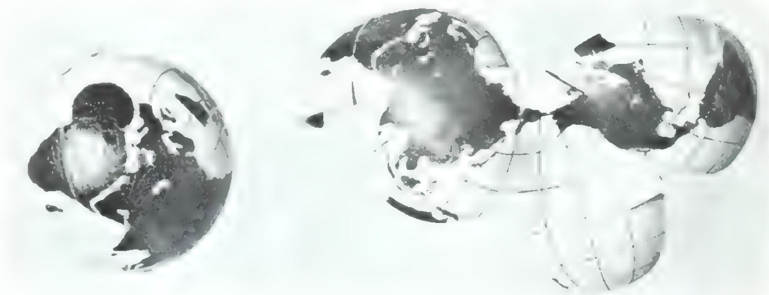
And the whole wide world is so much smaller than it used to be, as the London Times recently pointed out in a notable editorial entitled, "The Consolidation of the World." One hundred years ago a man required eight days to go from London to Edinburgh. Fifty years later Jules Verne's hero, in very plausible fiction, took eighty days to girdle the globe. But now, since the exploit of Messrs. Alcock and Brown in crossing the Atlantic in sixteen hours, it is theoretically possible to fly entirely around the world in as many days as a century ago it took to get from the Thames to the Firth of Forth!

No branch of the community has grasped this fact better than marine men and oceanic traders, because, in a sense, they are already cosmopolitan in thought. It is therefore the "ocean-minded" man, the overseas trader, who best appreciates the import of these new conditions.

No large problems can ever be approached without their elements being first tabulated, plotted, planned or mapped. An accurate plan of the earth is the first requisite for all world problems whatsoever, hence the new world map and atlas—new in its principles, new in its projection, and new in its purposes.

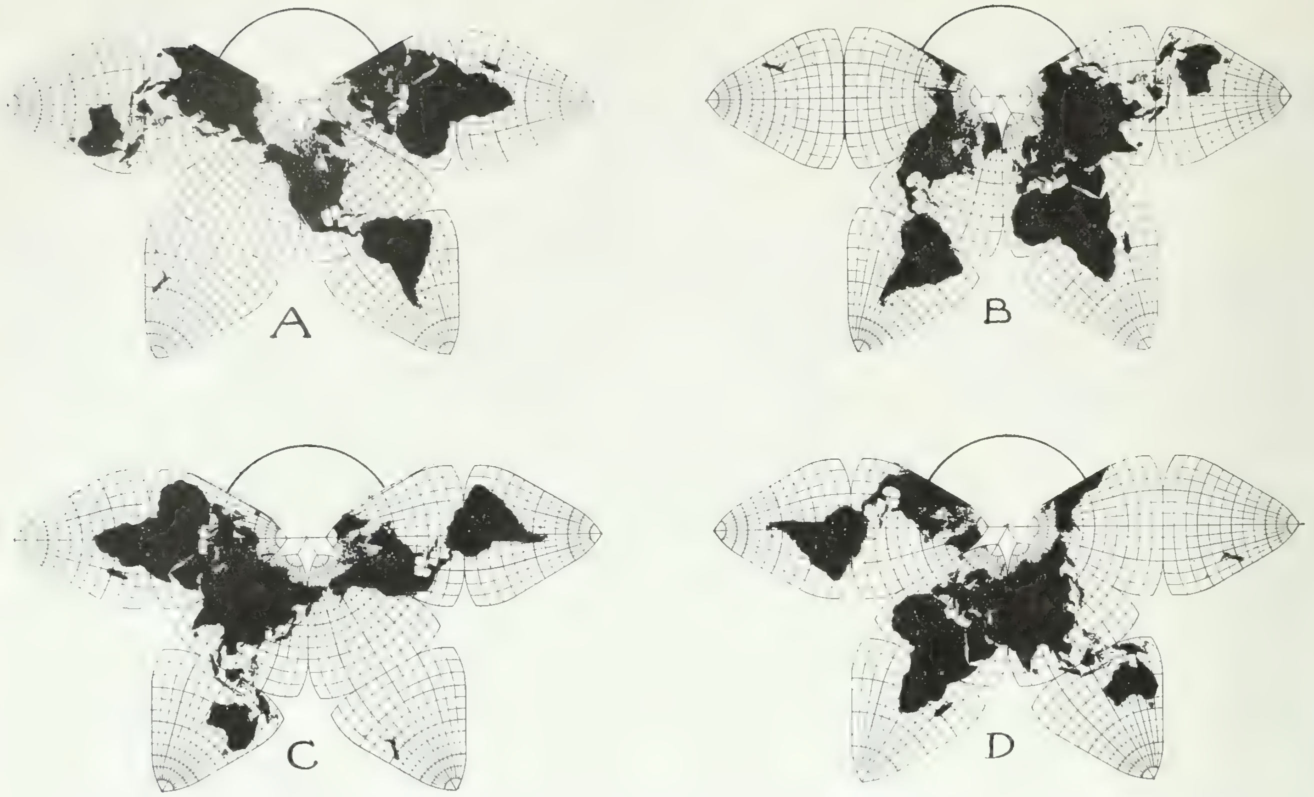
The new principle in world mapping, which simplifies many things, is based on the fact that a globe would be the ideal world map but for its drawbacks of solidity and a spherical surface. If we can literally peel off the skin of a globe and lay it flat in such a simple and symmetrical way that the land of the world remains intact, and the continents are made to cohere, we have a flat version of the globe, with the surface cut, it is true, but with the cuts always well out to sea. Our map, none the less is a picture or reproduction of the surface of a globe, and therefore is not considered to the scale of 1:10,000,000 or 1 to 500,000,000, the ratio of a map to the actual world. Such a conception has no practical meaning to anyone: the human mind cannot grasp such a ratio. A marine architect, engineer or machine designer works to a well-known unit, say one foot. He plans a ship, a factory or a machine with one-fourth of an inch to the foot, a foot being a unit easily grasped. We do not say a factory to the scale of 1:48. This absurd convention of geographers is understood by no one, not even themselves, and as maps are made to all conceivable and inconceivable (1:20,000,000) scales just to fit the pages of an atlas, no one can possibly get either an actual or even a relative sense of scale from an ordinary map album. Like the bed of Procrustes, all must get on or between the same sheet limits—Rhode Island and Texas both must fill the page, and so must Palestine and Russia, until one's sense of geographic proportion is utterly paralyzed. Fortunately, globes are expensive things to make and therefore they do not come in all the reckless and frivolous sizes of ordinary geographical maps. They are standardized to a few simple dimensions. For English-speaking people, globes have a diameter of 6, 8, 10, 12, 18, 30 and 36 inches. An eight-inch globe shows a scale of 1000 miles to





Cut I.

Mechanical proof of the great accuracy of the Butterfly Map. A rubber ball painted over like a globe and cut on three great circle lines is laid out flat under glass; upon removal of the glass the Butterfly Map closes up again and becomes a globe. It is therefore to all intents and purposes the covering of an actual globe peeled off and laid flat.



Four ways of arranging the octants of the Butterfly Map to suit various firms situated in different parts of the world. The plates of each sheet are triangular, and perfect register is assured because the boundaries fit a mesh of parallel lines crossing each other always at the same angle of 60° in place of the usual 90 of ordinary printing forms. Cut II.

the inch, a twelve-inch globe 676 miles to the inch, an eighteen-inch globe 442.5 miles to the inch, and a thirty-inch globe 265 miles to the inch. This last will, in all probability, be the scale of the world map in question. When assembled, the outspread map would be 9 feet 9 inches in width. The United States, from Cape Blanco to Cape Hatteras, would be a little under ten inches across and Great Britain, from "Lands End to John o' Groats," under 2¼ inches long. No practical end could ever be gained by publishing a larger map. Much smaller maps would indeed be far more in demand for scientific synthesis and for many other purposes, but for expressing the largest number of facts for commercial ends and yet to have no unit too bulky for desk use, the thirty-inch diameter globe map seems ideal. Moreover, the thirty-inch is more frequently found than the thirty-six-inch globe. It is the largest globe in general use.

Strange to say, while a globe is the most accurate picture of the world, it has always been the most backward and out of date as to the facts printed on its surface. New gores are seldom printed, though the old ones are often overprinted with a new fact; thus one sees the odd anachronism of Amundsen's arrival at the South Pole printed on the same globe which omits all mention of the Union of South Africa!

In the new map atlas the ideal condition of fresh, up-to-date sheets, to replace obsolete ones, as advocated by the Springfield Republican, is for the first time fully realized. The eight original sheets will be issued somewhat in the form of the two octants of North America here published, which is to the scale of an eight inch diameter globe—about a quarter the size of the actual map (see Cut I). All known facts as to railway lines, steamship routes and aerial travel will be fully indicated, and the map issued to subscribers with a folding frame into which the different octants are fitted. This will show the accuracy of the new projection and such facts of commercial importance as are already in print. Meantime, entirely new sheets will be commenced, beginning, say, with the North Pacific, in which much more minute information, corrections and additions will be incorporated, and, when ready, these will be distributed to subscribers as fast as they are completed, and so on in succession.

By commencing with a cadre, and continually improving each part, the financial side of the undertaking will be much facilitated. It is on exactly the same principle that a new railway operates. As quickly as possible, consistent with safety, the road bed is leveled and the track is laid so that freight and passengers can be moved over the line at the very earliest date. Then commences the real track ballasting, the fills, the cuts, the heavier rails—until, like the boy's penknife that first had a new blade and then a new handle, nothing of the original line remains; so with the new atlas world map—it will never be completed and yet will be always up to date.

It is obvious that the various users of such a world map and atlas would in the first place do business from various world centers, such as San Francisco, New York, London, Bombay, Yokohama and Sydney, for example. Being supplied with the frame and eight sheets, each trading house would mount its map in one of the four arrangements which brought its own position in the center (see Cut II). A San Francisco firm would use the arrangement of Figure A, but a London or New York York house might prefer Figure B, a Bombay house Figure D, and a Yokohama concern Figure C.

But aside from a central world position, each individual firm would have its own particular area of trading operations. For practical use one or two octants would serve. Now it is here that the peculiar property of the butterfly projection becomes apparent. An octant, being arranged in a mesh of equilateral triangles, the straight edge of each of its three sides can be fitted to its neighbor, but, more important still, it can also be folded to its neighbor, and that with geometrical precision.

A few critics of the Butterfly Map objected to the separation of the southern octants, but these critics were not then aware of the map's manifolding possibilities. In the main, of course, lines of human intercourse run east and west in the northern hemisphere and north and south below the equator, and these conditions are expressed in the new map.

Argentina, South Africa, Australia and New Zealand are all producers of raw material and their exchange of goods is normally with nations north of them rather than with each other. But let us suppose a Sydney firm doing its main business with Auckland. The octants most in use would be that quarter of the globe made by temporarily uniting the Australian and New Zealand lobes by folding them together just as the octants comprising North America are permanently united in the upper part of the map.

Cut III shows some of the possible combinations and folds of two or more octants so that any possible line of travel or communication in any direction can be shown uninterruptedly by merely folding the octants of the Butterfly Map without detaching them.

Thus "A" shows the normal map with California occupying a commanding position just about the middle of the world; "E" shows the result of folding the four upper octants back, in which Asia and Europe are united and the Old World is shown in one map, the reverse side of which shows the New World in one map—"F."

Restoring the map to position "A" and folding under the four outlying octants, we get "G," the northern hemisphere, and, by turning over the whole, "H," the southern hemisphere, which now is brought together exactly as the northern hemisphere is on the normal map. On this arrangement all steamship lines or aero tracks connecting up the four ends of the earth appear as uninterrupted, continuous lines.

By folding the upper octants of "H" once more, the South African and Australian sections become united, as on Figure J, which would show steamer routes from the Cape to Adelaide via Mauritius, with "I" on the reverse side.

Seeing that every octant would measure about twenty-three inches each way, not more than two or three could be consulted with convenience on a table at one time; but we know that in most cases this would easily cover the field interesting any one average firm or the average problem for which the map would be consulted at any one time.

To sum up, the new Atlas and World Map would have the following unique features possessed by no other world atlas ever published:

I. An eight-part atlas, showing exactly an eighth of the world on each sheet to the same scale, in the same form and to the same projection, each eighth containing 90 degrees of latitude and 90 degrees of longitude, and therefore necessarily equilateral and triangular. These divisions are neither new nor arbitrary, but based on cartographic precedent, Greek geometrical idealism and the historical conception of a universal prime meridian. Moreover, each octant, like a lens, focusses the world's centers of ethnical culture, past, present or to come:

1. Indo-China and Asiatic Russia.
2. Aryan races around the Mediterranean.
3. The eastern half of North America.
4. The western half of North America.
5. Australia.
6. New Zealand and Polynesia.
7. Argentina, Brazil, Chile, A. B. C. Driebund.
8. South Africa.

II. Each of the three sides of every sheet will fit exactly with the three sheets adjacent, so that the entire world can be assembled in a variety of positions to suit every conceivable problem of transportation in every direction.

III. Each sheet is standardized in scale, size and projection, so that successive new sheets can replace discarded ones; the map thus perpetually renews itself.

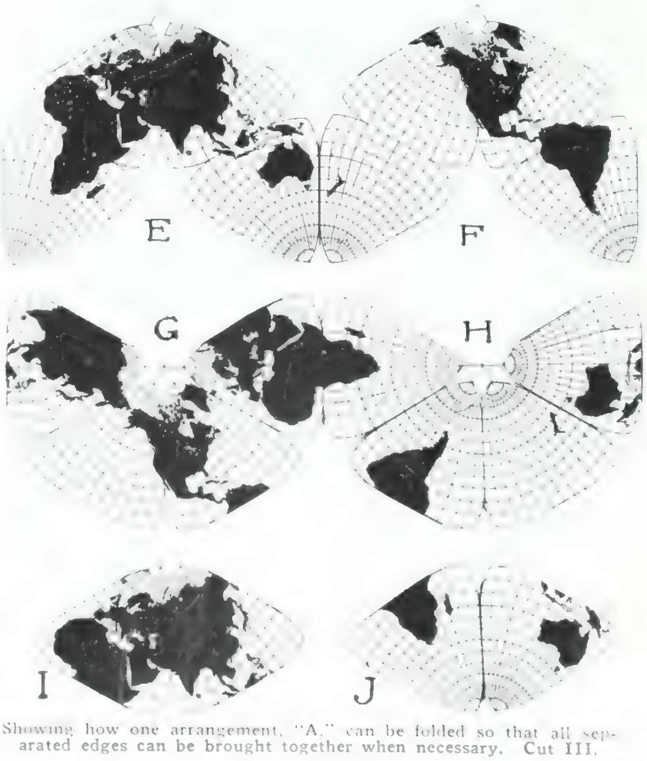
IV. When the sheets are united in the butterfly (eight positions) or other form, the unconnected edges of each octant can be folded to fit any other octant to which it belongs.

V. The eight sheets can unfold to a world map, or the world map can be folded to the size of one sheet.

VI. The projection shows more lines of latitude and longitude mathematically true to scale than any other world map projection, so that practically the scale is true and uniform throughout.

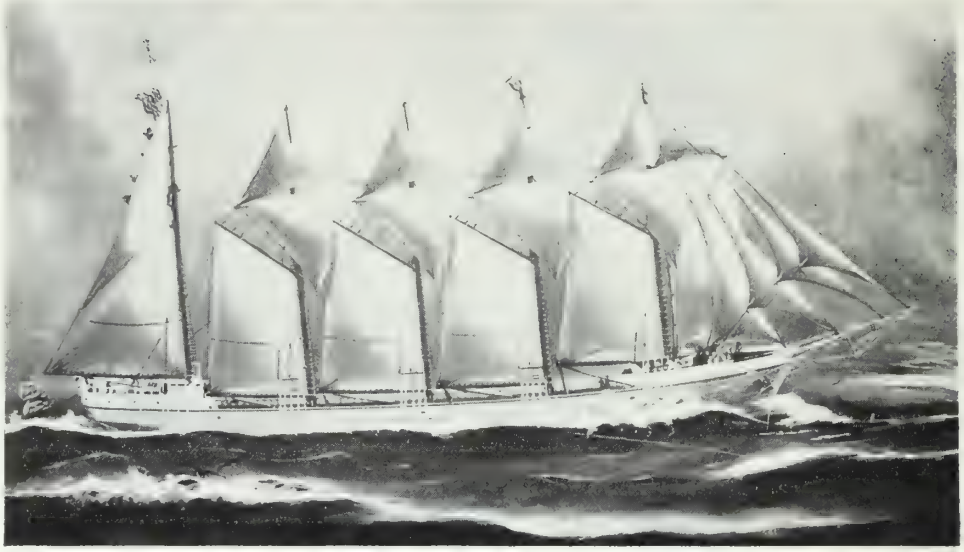
VII. Lines of latitude and longitude cross each other at right angles throughout the temperate zones and in the land parts of the tropics, so that the vast bulk of the land is literally orthomorphic—that is, in correct form—and lines drawn from one part of the map to another indicate the short route.

VIII. The area of each octant is the same as the area of one-eighth of the globe, so that a rubber ball cut on the lines of the map can be laid flat under glass (see Cut I), showing mechanically that map actually is, more nearly than by any other practicable method, the very globe itself laid flat.



Showing how one arrangement, "A," can be folded so that all separated edges can be brought together when necessary. Cut III.

New Schooner Rig


View of the Schooner Columbia River under full sail taken from a painting made at Sydney, Australia, on a recent voyage

IN the October issue of Pacific Marine Review there appeared a sail plan of a new rig for schooners, purported to be the creation of a naval architect of Seattle. Undoubtedly this is at variance with the facts—at any rate, the schooner Columbia River was the first vessel to be so rigged on this coast; in fact, it is believed that she is the only vessel afloat rigged in this manner.

The Columbia River was built in 1916 at Aberdeen, Washington. She was intended for an auxiliary, and was, therefore, rigged as a five-masted baldheaded schooner. It was subsequently decided that engines would not be installed, pending result of the experiences of those auxiliary vessels already afloat and on voyages.

Upon completion, the Columbia River loaded at Aberdeen, Washington, a cargo of 1,428,000 feet of lumber and sailed for Port Pirie, South Australia, under command of Captain Neil Murchison, who had also superintended her construction. The vessel proved a fair sailer, arriving at Port Pirie in seventy-six days. From there she sailed around to Newcastle, New South Wales, and at the latter place loaded a cargo of 1800 tons of coal for Iquique, Chile.

It is generally known that these fore and aft vessels are not as suitable for underdeck deadweight cargoes as they are for light freight, such as copra, and particularly the carriage of lumber, for which they are primarily built. They have great beam in comparison to depth and can conveniently carry half their cargo on deck. It is this equalization of weight that affords the necessary stability in these "fore and afters" to sail along more or less serenely, without undue strain on the gear aloft.

But not so with an underdeck deadweight cargo like coal. Perhaps it is only the masters and crews of these vessels who appreciate how uncomfortable they are with this class of cargo. Under these circumstances, in almost any kind of a sea, there is a severe strain upon the gear aloft (even the masts), for when, as in the case of the Columbia River, four fifty-six-foot gaffs start swinging from side to side, due to the abnormal rolling and pitching of the vessel, it becomes mighty irksome. Ironwork and other gear are frequently carried away and it gives everybody on board a good deal of concern.

During the voyage from Newcastle to Iquique with coal, Captain Murchison, who is a "square rigged" ship master of many years' standing, had his first experience with a deadweight cargo in a "fore and after." To cap the climax, he carried nitrate from South America to Honolulu.

About this time it had been decided that the vessel [illegible] as a sailer and to that end the master was consulted with a view to installing topmasts. From the outset of his voyage to Iquique and thence to Honolulu, Captain Murchison had been scheming to overcome the difficulties of navigating a schooner-rigged vessel with heavy underdeck cargo. The creation of this new rig was the result of this scheming. It was found to be less expensive than the installation of topmasts would be; furthermore, it would give the vessel a much greater spread of canvas and at the same time overcome, to a very great extent, the serious annoyance when carrying underdeck deadweight cargoes. Of course, she still has fore and aft sails, but they have been reduced in size to allow for the greater spread aloft, and when they give trouble can be lowered without entirely impeding the progress of the vessel. Heretofore, if you expected to reach your destination in any reasonable time, it was necessary to "carry on" and that always meant trouble. Moreover, the vessel is much more satisfactory to handle, for now when tacking, jibbing or wearing ship, there is no necessity to clew up topsails just when sail is most needed.

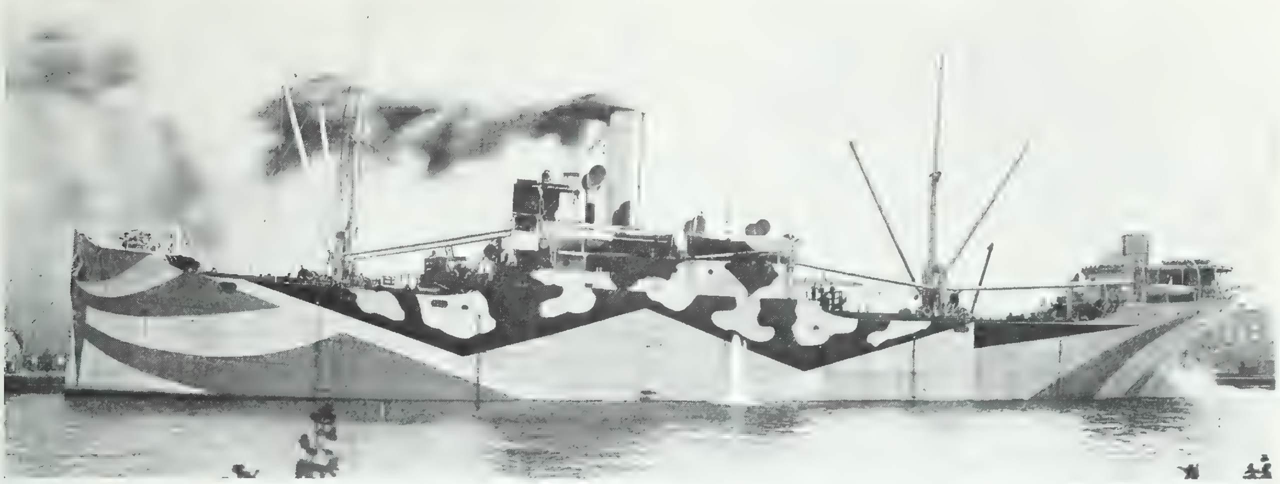
The Columbia River has just completed a voyage from Sydney to Callao in four days with a full cargo of wheat.

W. H. STEWART

THE many friends of W. H. Stewart, consulting engineer and marine surveyor, will be glad to congratulate him upon his return to private business. Mr. Stewart's long experience as a surveyor for Lloyd's Registry, from 1901 to 1916, has brought him into intimate contact with marine engineering and naval architectural problems peculiar to the Pacific Coast.

In 1916 he opened an office in San Francisco as consulting engineer and marine surveyor, but the next year he gave up this private business to engage in work for the United States Shipping Board, acting as resident inspector at the Schaw-Batcher Shipworks, South San Francisco, until August 31, 1918. From September 1, 1918, until January 31, 1920, he served as resident inspector at the yard of the Moore Shipbuilding Company, Oakland.

The war emergency now being over, Mr. Stewart is resuming his consulting business and has opened an office in the Dollar Building, 311 California street, San Francisco.



A 4200 deadweight ton ocean cargo steamer of the sturdy, deep type built by the American Shipbuilding Company for the United States Shipping Board Emergency Fleet Corporation

Construction Record of the American Shipbuilding Company for 1919

By J. S. Dickie, Chief Estimator

DURING the past year (1919) the American Shipbuilding Company has continued the activity in ship construction which was renewed when the war in Europe brought to shipbuilding in America an opportunity to supply the tonnage depleted by losses and demanded by the unusual increase in transportation by sea. No ships were built for private interest during the year. One large lake steamer had her tank top renewed and two had side ballast tanks built; ordinary repairs and heavy bottom damages, docking and overhauling were taken care of as usual. The total output of new ships for the year 1919 was as follows:

Cleveland Plant	14	Steamers
Lorain "	27	"
Chicago "	8	"
Detroit "	29	"
Superior "	10	"
Buffalo "	4	"
Total	92	"

Aggregating 380,000 tons capacity.

These steamers were all seagoing vessels built to the order of the United States Shipping Board Emergency Fleet Corporation, and were of the following dimensions:

Length over all	261′ 0″
Length between perpendiculars	251′ 0″
Breadth moulded	43′ 6″
Depth moulded	28′ 2″

In general they were plain cargo steamers built to class 100 A-1 at Lloyds under special survey, and had a deadweight carrying capacity of about 4200 long tons loaded to summer draft.

They were all of the same type—deep, short, sturdy vessels with poop, bridge and forecastle; all had beams, stringers, and hatches framed for a second deck, but the deck was not planked or plated. Forty-seven of them had machinery which developed 1500 indicated horse power; of these, forty-six were equipped with oil fuel burning apparatus. The remaining forty-five vessels were equipped with machinery which developed normally 1200 indicated horse power and burned coal. All were equipped with the Howden type of forced draft.

Cargo was handled by eight winches and eight booms serving four large hatches so that there were two winches and two booms to each hatch; the winches were arranged so that one man could handle two winches and see down the hatch.

These vessels were fitted out complete, ready for sea and left the yards when they were completed except such as were finished subsequent to the close of navigation on the lakes; these latter will be delivered formally at the opening of navigation in the spring.

During the last four years the entire resources of the company have been devoted to constructing the particular type of vessel most suitable for use under war conditions. This work, with repairs to the great fleet of vessels, has kept the organization fully occupied.

The product of the company during the many years of its existence has, however, been very varied. The number of vessels built during the past twenty years is as follows:

In 1900, 30 vessels aggregating 163, 224 d. w. tons
In 1901, 38 vessels aggregating 185,848 d. w. tons
In 1902, 37 vessels aggregating 201,384 d. w. tons
In 1903, 41 vessels aggregating 210,892 d. w. tons
In 1904, 12 vessels aggregating 68,236 d. w. tons
In 1905, 24 vessels aggregating 189,655 d. w. tons
In 1906, 34 vessels aggregating 302,268 d. w. tons
In 1907, 34 vessels aggregating 290,966 d. w. tons
In 1908, 21 vessels aggregating 156,954 d. w. tons
In 1909, 16 vessels aggregating 90,018 d. w. tons
In 1910, 28 vessels aggregating 151,182 d. w. tons
In 1911, 19 vessels aggregating 64,690 d. w. tons
In 1912, 10 vessels aggregating 38,782 d. w. tons
In 1913, 16 vessels aggregating 82,677 d. w. tons
In 1914, 5 vessels aggregating 32,997 d. w. tons
In 1915, 1 vessel aggregating 10,519 d. w. tons
In 1916, 20 vessels aggregating 109,248 d. w. tons
In 1917, 35 vessels aggregating 148,743 d. w. tons
In 1918, 91 vessels aggregating 322,265 d. w. tons
In 1919, 92 vessels aggregating 380,000 d. w. tons

These figures include all kinds of vessels both for salt water service and for service on the lakes. The limitations on dimensions imposed by the size of the canal locks through which vessels must pass to get to the sea have prevented the company from competing in the construction of large cargo steamers for ocean service, but its organization and resources have been maintained on a scale which has enabled it to build not only the mammoth ore carriers of the lakes efficiently and economically, but also passenger steamers, car ferries, ocean tow boats, lake tow boats, package freighters, fish tugs, barges, machinery and boilers, and to carry on a general ship repairing and engineering business, including the extensive manufacture of auxiliary machinery, such as winches, windlasses and steering gears. These building facilities and engineering experience are at the disposal of ship owners on the sea coasts and abroad, whose businesses require vessels of small size such as tugs, trawlers, lumber steamers, wreckers, cargo steamers not over two hundred and sixty-one feet long over all, and forty-three feet six inches beam, or small passenger steamers.

The impression is generally held that the only vessels built on the lakes are the great bulk freighters. No impression could be more incorrect. The physical and geographical conditions of the Great Lakes regions are such as to make them naturally adapted to shipbuilding because that vocation calls for the co-operation of all others and this district is the home of manufacturing of all kinds, besides being very close to the source of the principal raw materials used in modern shipbuilding. Consequently, shipyards on the lakes are conveniently situated to secure a ready supply of labor, and to procure the manufactured products entering into ship construction. The varied nature of the industries which are native to the locality gives the general labor body a skill in all the different mechanical arts which is of great value in carrying on the work of making a varied product. It is to this fortunate situation that the American Shipbuilding Company owes credit for its successful versatility. Exclusive of about two hundred vessels built for or requisitioned by the government, the company has built for ocean service two large freight steamers which had to be taken to tide water in two parts, three large tugs, five oil tankers, eleven oil barges, and thirty-three cargo steamers, all of which vessels were successfully operated in the trades for which they were designed.

In addition to completing the government's program, the company is now building for private interests ten ocean going general cargo and lumber steamers, and four large bulk freighters for the Great Lakes ore and coal trade, and it is expected that many more orders will be booked for oil tankers and lumber steamers because of the early deliveries that can be guaranteed.

The foregoing paragraphs give an excellent idea of the construction record of the American Shipbuilding Company for the calendar year of 1919. The twentieth annual report of this company to its stockholders covers the operations for the fiscal year ending June 30, 1919, and this report contains some very interesting and instructive figures, which, in view of the long experience and conservative management of the American Shipbuilding Company, should be carefully studied by shipbuilders and all those financially interested in shipyards.

During the fiscal year the yards of the company delivered to the United States Shipping Board Emergency Fleet Corporation, 109 ocean-going cargo ships of [illegible] deadweight tonnage. President M. E. Farr, in his letter to the stockholders, points out the fact that while this is the greatest production of tonnage and volume of business of any year in the history of the company, and while also the amount of dockages, repair and replacement work has been very large, the earnings are less than those of the fiscal year ending June 30, 1918. This is apparently due to the high cost of construction and labor inefficiency, in addition to government taxes and the large sums used in enlarging the plant and in housing operations, which do not become an asset on the books of the company.

It is rather refreshing in the face of charges of profiteering against shipbuilding firms to find a statement like this in a report to stockholders. "The earnings," says President Farr, "while satisfactory, are less than last year, notwithstanding the fact that the total cargo tonnage completed and delivered during 1919 amounted to more than two and one-half times that of 1918."

The future policy of the company is outlined in the following paragraphs:

"The various construction plants will be reduced to as near normal capacity as possible, as soon as practicable. Some of the plants, owing to high construction costs, will be abandoned as construction plants, leaving only such equipment as is necessary to take care of repair work.

"The property of the company generally, is in good condition, although a part of the operating equipment, worn out through hard usage under pressure of war production, must be replaced, and other tools and equipment overhauled and repaired.

"The company has during the year, participated in loans to the government as follows:

"Fourth Liberty Loan, 4¼%, $4,000,000.
"Fifth Victory Loan, 3¾%, $2,150,000.

"The workmen at the various plants also subscribed for $2,393,500 par value of these bonds.

"During the month of May, 1919, the company opened an office in London, England, for the purpose of keeping in close touch with the shipbuilding and shipping situation of the world. The prices now quoted by British shipbuilders for ocean cargo steamers are considerably lower than American offerings.

"The ability of this company to compete with foreign builders depends largely upon labor costs, which at the present time are excessive, not so much on account of the prevailing high wages, as the lack of individual efficiency and application. The cost of steel, coal, and other commodities used in shipbuilding is much lower in the United States than in countries where shipbuilding is an important industry. Notwithstanding the advantage of lower material costs, this company cannot now meet the prices quoted by British builders for ocean cargo ships, but has some advantage in being able to make early deliveries. In order to secure orders for ocean cargo and other ships, construction costs must be materially reduced, and this can only be brought about through increased individual production and greater economies in operation."

The Seamen's Church Institute of San Francisco

By Magda Leigh

Editor of The Seafarer for the S. C. I.

IN most sea-ports of the United States there are various missions or societies for seamen. San Francisco is unique in that her entire work among men of the world's merchant fleet is centered in one organization—the Seamen's Church Institute.

Incorporated on October 10, 1917, the Seamen's Church Institute combined all former local missions to seamen, including what was once known as the San Francisco Port Society.

During the years since this reorganization, the Institute has been endorsed by the Chamber of Commerce. It has been recognized by the United States Government, through the Public Health Service, as the headquarters for social and religious work at the United States Marine Hospital. Further, the United States Shipping Board has recognized the superintendent of the S. C. I. as social service agent at the training station in this port.

Today the Seamen's Institute takes its place beside the Y. M. C. A., the Red Cross, the Associated Charities and other organizations of this class, and is called upon by these other organizations in all cases pertaining to seamen.

Twenty-five years ago, when the Institute was founded, the need for such a society was unquestionable. Seamen ashore and at sea, both, were victims of terrible conditions. Wretched quarters, food and pay were only part of their trouble afloat. In port they were particularly helpless in the hands of boarding-house masters, crimps, runners and the like.

Seafaring conditions today are better. And undoubtedly the advent of so many of our own young American boys into seafaring will improve these conditions still more. Ashore, too, things are somewhat better for the sailorman, since prohibition has closed up the saloons.

But there still remain the gambling houses, the peddlers of dope, money lenders and agents of houses of ill repute.

The seaman is neither an angel nor a devil. He is simply a human being, with a human being's desire to enjoy life during his hours of recreation. At sea his life is not his own. He is under constant command of someone else. It is only natural that this should cause him to throw off all restraint when ashore. Alone among strangers, he welcomes whatever invitation is most cordially extended. He has money and he wishes to do something with it.

Reading room of the Seamen's Church Institute

The Seamen's Church Institute answers every need above-mentioned. Here, the seaman finds a welcome. He finds recreation. He finds himself, not under restraint, but under the friendly influence of a staff of men and women who are interested in him and his welfare, and in whom he can trust, absolutely.

The Institute is his social headquarters ashore. Here he can check his baggage, receive his mail, and deposit his money.

If he is in trouble he can appeal to the Institute, and he knows he will receive assistance if his case is a worthy one. If he is ill, the Institute will see that he receives medical attention.

And more, here he has the opportunity for divine worship if he wishes it. There is a large and mistaken idea among many that the Seamen's Institute is nothing but a "rescue mission." This is not the case. Spiritual guidance is given the men, but is never forced upon them.

In its temporary quarters at 58 Clay street, the S. C. I. has a chapel, a recreation room and a canteen. Here the seaman ashore can read the latest magazines, play a player-piano or a phonograph, indulge in billiards or other games, write letters home (the stationery is his for the asking), and he can dance, on Wednesday nights, with girls his own mother would be glad to see him with; or he can listen, on other nights, to entertainments ranging from first-class concerts to honest-to-goodness minstrel shows. He can see the best in motion pictures. At holiday time he can join in the wonderful festivities arranged for him, and, on Sundays, he can join in the services held by the chaplain.

At the canteen he can eat well-cooked food for a small sum of money. Up in the executive offices he can consult those who are really interested in his welfare, no matter what his problem.

Last September a hut was built in connection with the Marine Hospital. This hut, called "The Fo'c'sle," is the S. C. I. unit, erected for the recreational inspiration of the men at the hospital. "The Fo'c'sle" was fittingly dedicated to those who "have been faithful to the end in their noble calling as merchant seamen."

At the hut the convalescent may find music, books, great easy chairs to loaf in, and always a charming "hostess" to talk to.

The S. C. I. of America, with which the local organization is affiliated, has been instrumental in inaugurating an annual observance of Sailors' Day on the first Sunday in November. It is the memorial day for seamen, living and dead. It is the one day on which the entire country is reminded of the splendid services of the men who go to sea in its behalf.

The work of the Institute is increasing in company with the growth of shipping. It is no longer a matter of coaxing the men into the Institute: it is a question of finding places for them after they come! The statistics for 1919 tell a tale in themselves:

Attendance

At Headquarters, 58 Clay street		41,613
Recreation room	32,949	
Entertainments (80)	7,540	
Services (69)	2,115	
At The Fo'c'sle (opened September 15, 1919)		4,720
Recreation room	3,160	
Entertainments (26)	1,560	
(There have been thirteen programs in addition rendered in hospital wards.)		
Total attendance		46,333

Services Rendered

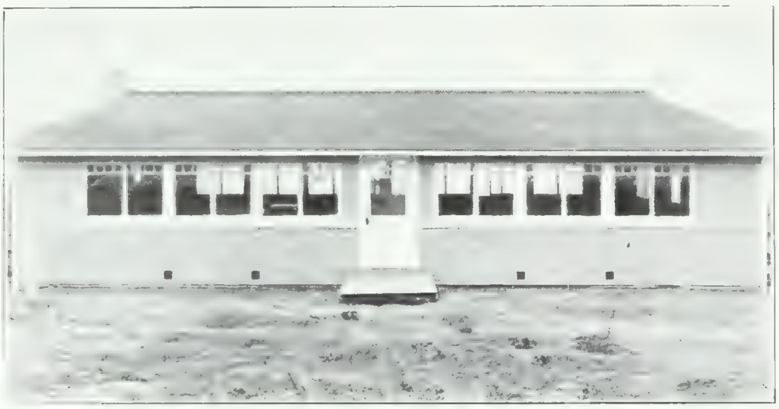
Orders served in canteen	36,022
Ship visits	463
Pieces of baggage checked	581
Packages of reading matter given	517
Letters received for seamen	4,353
Financially assisted	239
Received for safe keeping	$10,109

(In 1918 this figure was $3,418.45.)

San Francisco needs and must have a larger Institute—an Institute with a hotel department, so that the men can "come home" to San Francisco, no matter from what port they hail. Shipping interests in this city cannot each have a welfare department to look out for the men ashore. The S. C. I. must grow to such proportions that it can act as a central home and club, wherein not only the seamen but the shipping men can place full trust. San Francisco shipping interests should work shoulder to shoulder with the S. C. I. That this is beginning to be a recognized fact is testified to by the following quotations, one from a telegram from Mr. H. F. Alexander, the other from a letter from Mr. Henry Avila:

Mr. Alexander says: "I consider the objects and work of this Institute to be second to none in importance insofar as shipping interests of the coast are concerned. Seafaring men live a particularly lonely life and any work of this kind that lends a hand to these men when in port and helps them to maintain a decent and respectable standard of living is a distinct advantage to the shipping world and should receive the earnest support of shipping interests. (Signed) H. F. Alexander."

Mr. Avila says: "I would like to testify that our experience since this bureau was organized, nearly two years ago, has been that there are inevitable pitfalls in the way of the sailormen and that in order to keep up their standard in a clean and wholesome way, such an institution as the Seamen's Church Institute has been and can be of great benefit and essential value to the apprentices in the American merchant marine. (Signed) Henry Avila, Supervisor, Sea Training Bureau."



Upper left: The Fo'c'sle, United States Marine Hospital, San Francisco.

Lower left: Seamen's Sunday at Grace Cathedral, San Francisco.

Upper right: "Coffee and"—at the S. C. I.

Lower right: Seamen's Church Institute Seal.

Marine Insurance

Recent Developments in Marine Insurance

By Chas. F. Howell

By far the most important development in marine insurance in this country for years is that which arises from the proposals made by the sub-committee of the Committee on the Merchant Marine and Fisheries of the House of Representatives and duly handed over by that sub-committee to a meeting of fire and marine underwriters, exclusively American, held at the Union Club in New York City on the evening of January 30. Ever since last October this sub-committee has been patiently receiving and considering propositions made to it by various leading marine underwriters that purported to reflect the best thought of the business with respect to the needs of American marine insurance companies for the handling of American business, two-thirds of which is known to be controlled by non-admitted foreign companies. These suggestions have revealed so much difference of opinion on vital points that the sub-committee at last grew disgusted and thinly veiled a threat of government entrance into the business unless the underwriters could manage to find common ground among themselves. On the evening of January 30, the sub-committee came to New York and presented the underwriters with what is regarded as its last word. This was in the form of definite proposals for the insuring of both hulls and cargo, and was tendered as a basis for the devising by the underwriters of a working platform. The committee thinks that American business should be taken care of by American insurance companies. The plans it submitted consist of, first, a hull scheme to take care of all vessels operating under the American flag, and, second, a cargo plan of reinsurance to take care of excess lines of American companies. The great fund now in the hands of the Shipping Board, about $30,000,000, will be available for reinsurance purposes. Eighteen of the strongest American fire and marine insurance companies were represented at the meeting by their most responsible officers, and they unanimously pledged their companies to the proposition. A committee of seven companies was appointed to work out the plan based on the submitted proposals, and this committee met a few evenings later and produced the arrangement that is now being perfected by it. The first step has thus been taken to relieve this country of its traditional dependence on foreign insurance interests.

The Adjuster-Broker

There is good news from Washington to the effect that a bill has been drafted by the House Committee on the Merchant Marine and Fisheries for prompt submission to Congress, the purpose of which is to elevate the work of the marine average adjuster and dignify his position in our business life by giving him the standing of a quasi-governmental official. The best feature of the proposed measure, in the opinion of many, is that it would forever divorce the brokerage and adjusting ends of marine insurance, and by so doing would vitally safeguard both the assured and the underwriter through having the services of unbiased and impartial referees. In no other advanced nation does such a condition exist, in this particular, as in these United States. In England, France and Italy, not to mention Scandinavia and Germany, the adjuster is a man of education and training whose findings have almost the binding force of law. The chaotic state of Spanish law enables the securing of almost any kind of an adjustment in that country; a Barcelona finding, for instance, being often quite another matter from what a Seville adjuster would hand out. The venerable Phoenician rule—the oldest principle of average adjustment—was to the effect that "Anything sacrificed for the good of all must be made good by all." This has served through the centuries to supply a foundation for a top-heavy legal superstructure, but where has it reached a more preposterous application than right here in this country, where the broker, the vaunted agent of the assured, becomes, in frequent instances, the judge of his client's case? In England, where marine insurance practices have been perfected by centuries of world-wide experience, what is the route to an adjustership? In the first place, the young man must have had a college education, or its equivalent; then he has to serve a five-year apprenticeship with an average adjuster, for which he pays a "premium" of some £500; this over, he is put through a difficult oral and written examination before a special examining board appointed by the Association of Average Adjusters; and if he passes he becomes an associate member, and when he starts in business "on his own" he may have his full membership by simply applying for it. Naturally, the adjustments of so thoroughly equipped an expert are seldom seriously questioned. A broker-adjuster is next to unheard of in England. We Americans should not rest content with adjusters of an inferiority of training to those of any other nation. It is sometimes said that a broker here will rebate his commission if, by so doing, he can be assured of the adjustment; the inference being, of course, that this latter end of the business is decidedly profitable. It would be fairer to have the general average deposits placed in trust in the names of the ship-owners and the insurance carriers until the adjustment has been completed; after which, such sums as remained unclaimed should go to the underwriters. In fairness to those who oppose this

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divorcing of the adjuster and the broker, we would say that the following argument is regularly advanced: No serious evil exists here as an outgrowth of the present system, and none could possibly arise with any prospect of permanency, for the reason that an incompetent or tricky adjuster would find his game checkmated by the immediate opposition of all the underwriters on the risk. It would only take one serious reversal, they say, to destroy such a party's standing with ship-owners, with the consequence of his never again receiving an important adjustment. It is argued that if the adjuster's work were to be separated by law from the brokerage end, we should at once be in a bad way for competent adjusters, as most of the latter are in the brokerage business and would not be disposed to sacrifice the remunerations of their brokerage work for the decidedly lesser returns of adjusting. These are the two sides of the case; but the man in the street will welcome the bill that would tend to an unbiased and impartial adjustment.

Cancellation Practices

The appellate term of the New York Supreme Court, First Department, has unanimously affirmed the judgment of the city court in an action brought by the Jefferson Insurance Company against the Stewart-Morehead Company to collect the premium on a war risk policy. The policy contained this clause: "Warranted no cancellation nor short interest." The Stewart-Morehead Company defended the action on the grounds that its broker was only instructed to take out the usual form of war risk policy, and that the usual form of such policies with which it was familiar did not contain such a clause. It also contended that, notwithstanding this clause in the policy, it had the right to show that there was a custom well known to shippers and marine insurance companies that any war risk policy could be cancelled by the shipper at any time before the ship sailed, and there was a further custom equally well known in the marine world that, if a shipper took out insurance in this country and subsequently learned that his goods had already been covered before the insurance was taken out here, the shipper had the absolute right to cancel the policy, and was not liable for the premium. The insurance company contended that testimony could not be given to establish such customs, as they would be in direct conflict with this provision of the policy. It also denied the existence of any such customs. The trial judge overruled the contention of the Stewart-Morehead Company and directed judgment for the Jefferson Insurance Company for the full amount of the premium and interest; and the appellate term has unanimously upheld the decision of the trial court.

Improved Concreters

Underwriters are beginning to look witn more favor upon concrete vessels, now that an experimental classification has been given them by the recognized societies, and structural improvements of importance have been introduced. Decided advances in concrete construction have been made since the launching of the famous Faith from a California shipyard a year or two ago. The reinforcement remains much as before, but the concrete itself is now of a greatly improved quality, being 20 per cent lighter and twice as strong as the old mixture. Oil is employed for fuel, and, with an equipment of triple expansion engines, there it little trouble in securing a speed of a respectable character for loaded vessels. Actual experience is demonstrating the seaworthiness of these boats, and underwriting losses on them to date have been little more than normal. It is generally felt that the concreter is here to stay, and that her underwriting problems press for solution.

Want Freedom of Action

There is no opposition to be heard among marine underwriters to the proposals of the Congressional Committee on the Merchant Marine and Fisheries and the Shipping Board, as transmitted to the governors and insurance commissioners of the several states, looking to action from the legislatures for the securing of uniformity in state laws as regards this branch of insurance. It would, as a matter of fact, he hard to understand opposition, so necessary is this relief from state restrictions, if America is to cut any considerable figure in its new policy of foreign trade expansion. All that is wanted is that our companies be placed upon the same basis as other companies are in their countries. We must have freedom of action. At present, there is no credit allowed for the moneys companies own, apart from the two or three set items in any one state. How can we establish loss deposits in a foreign department, for example, if such sums are to be treated as though they did not exist? Two changes are essential: First, in state requirements for making up accounts; and, second, in our method of taxing gross incomes instead of net profits. Few people are aware that of all the industries of this country insurance, and only insurance, is so treated. In other countries the tax is on net profits; here, it is on gross premiums.

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
230 BYRNE BUILDING
LOS ANGELES

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

This is, of course, rank provincialism. The proposition of the Washington authorities is likely to bring about the desired change. Indeed, from the replies that have already come in to the House committee, it is evident that most of the governors and commissioners feel the force of the argument and stand prepared to move for a decided relaxing of the obnoxious and crippling states' restrictions.

Tug Owners' Liability

Mr. Justice Holmes has delivered, in the United States Court, an interesting opinion with respect to the limit of responsibility of a tug owner in event of collision. The revised statutes provide that the responsibility of the owner of a vessel for an injury by collision shall in no case exceed the value of the interest of the owner in such vessel. Construing this statute, in the libel suit in Admiralty brought by the Liverpool, Brazil & River Plate Steam Navigation Company against the Brooklyn Eastern District Terminal, 40 Supreme Court 66, it is held that the responsibility of the tug owner is in no wise increased by the fact that a loaded car float and a disabled boat, both belonging to the tug's owner, were lashed to it and one of them came in contact with the injured vessel. The steamship Vauban, of the petitioner, while moored at a Brooklyn pier, was injured by collision with the car float that was lashed to the respondent's tug Intrepid en route up the East River. The case was brought on the question whether the value of the whole flotilla of the respondent should not have been included in the decree of the lower court that limited responsibility to the value of the tug. The fact that the same party owned all the libeled vessels in the case was held not to have changed the rule. Citations were given in support of the contention that for the purposes of liability the passive instrument of the harm does not become one with the actively responsible vessel by being attached to it. The words of the statute are: "The liability of the owner of any vessel for any injury by collision shall in no case exceed the value of the interest of such owner in such vessel." Says the Justice: "The literal meaning of the sentence is reinforced by the words 'in no case.' For clearly the liability would be made to exceed the interest of the owner 'in such vessel' if you said frankly, In some cases we propose to count other vessels in, although they are not 'such vessels'; and it comes to the same thing when you profess a formal compliance with the words, but reach the result by artificially construing 'such vessel' to include other vessels if only they are tied to it. Earlier cases in the Second Circuit had disposed of the question there, and those in other circuits for the most part, if not wholly, are reconcilable with them."

Hull Troubles in Britain

Rumors of serious disagreements among members of the British Hull Agreement are reaching this country with increasing persistency. It is reliably stated that unless these difficulties can be promptly reconciled there is every likelihood of the dissolution of that body in the near future. Many of the same problems appear to have arisen there that led to the wrecking of the American Hull Underwriters' Association six months ago. Should the British Hull Agreement, popularly known in this country as the British Hull Committee, go by the board, it would be a real disaster for hull insurance the world over. The chaotic condition now prevailing in America as a result of the disruption of our Hull Underwriters' Association would doubtless be duplicated not alone in England but very generally. The criticism most frequently heard in America of the British Hull Underwriters' Agreement is that their rates discriminated against the American market, and there is some suspicion here lest the impending dissolution of the former might be a covert move designed to increase the British hold on their American business through an agreement among marine insurance leaders to handle the American situation according to their unrestricted best judgment.

Little Marine Litigation

The amount of litigation arising out of the transaction of marine insurance is trifling compared with that encountered in other branches of underwriting. Insurance lawyers frequently have occasion to comment upon this fact. Court calendars record few marine suits. The reason for this, according to students of marine insurance, lies in the fact that clearly established precedents are accepted as defining liability, and the great majority of marine underwriters have no desire to dodge that liability or to quibble over their proper losses. Practically the only points that ever arise to form the basis of a dispute are those concerned with the causes of damages or constructions of bills of lading. A surveyor says, "The attitude of the marine adjuster is 'What do we owe you?' not 'How little can we pay?' "

New McMyler-Interstate Agency

AFTER being associated with the electrical industry in Canada and the United States for twenty-one years, L. A. Somers has recently severed his connection with the Westinghouse Electric & Manufacturing Company and accepted a proposition to open an office in San Francisco for the McMyler-Interstate Company of Cleveland, Ohio.

Mr. L. A. Somers

The McMyler - Interstate Company is a merger of the McMyler Manufacturing Company and the Interstate Engineering Company. Each of these two companies has an uninterrupted history of about thirty-five years in the manufacture of coal and ore handling machinery, locomotive cranes, shipbuilding cranes, car dumpers, pile drivers, railroad equipment, clam shell, scraper and orange peel buckets.

Mr. Somers has specialized in the application of electric apparatus and steam turbines to shipyard practice.

The building of the famous electrically operated battleship California, which was recently launched at the Mare Island Navy Yard, was facilitated by the use of two shipbuilding cranes of the Hammerhead type, built by the McMyler-Interstate Company.

Bulletins describing these cranes and other types of cranes that this company manufactures will gladly be furnished on written request, addressed to the company's offices, 407-9 Merchants' Exchange Building, San Francisco, California.

The work of the McMyler-Interstate Engineering organization has contributed to the mechanical engineering arts some very notable achievements, chief of which, perhaps, may be mentioned the recently installed outfitting crane, League Island. This crane, which is of the stationary type, of pintle cantilever design, has a working capacity of 350 gross tons at a radius of 115 feet, and a clear lift of 170 feet. On test, 392 net tons were easily handled. These figures put the League Island in the forefront as the largest outfitting crane in the world. A more detailed description of the mechanism and the electric drive used on the crane will be found on page 86 of Pacific Marine for January, 1920.

New Crandall Docks

THE Globe Shipbuilding & Dry Dock Company, Fairfield, Baltimore, Maryland, is to have, at its new repair plant, a 9000-ton floating dry dock of the latest design. This dock is of the longitudinally-trussed sectional type, designed and developed by the Crandall Engineering Company, dry dock engineers, Boston, Massachusetts. It measures 440 feet over the keel-blocks and 83 feet between the wing walls. The pumping is accomplished by twenty-four electrically operated centrifugal pumps, the control of which is so centralized with indicators that the dockmaster may readily govern the pumping in all the compartments of the dock.

The third pontoon of the floating dock being built for the Bruce Dry Dock Company, Pensacola, Florida, was successfully launched on February 7. Indicators on the pontoon showed no measurable deflection during the launching. It is believed that the construction of this pontoon establishes a world's record, it being built and launched thirty-nine days and six hours from the time of laying the first lumber. This floating dock is of the Crandall longitudinally - trussed sectional type. The dock is being constructed by the Aberthaw Construction Company under the supervision of Paul H. MacNeil, resident engineer for the Crandall Engineering Company.

The new railway dry dock of the Winnisimmet Shipyard, Inc., Chelsea, Boston, Massachusetts, was put in operation on February 9. It measures 320 feet over the keel blocks, 64 feet between the uprights, and is capable of handling vessels up to 3500 tons displacement. This dock is operated by four 2⅝-inch special chains and a steam hoisting machine which will lift the vessel clear of the water for repairs in thirty minutes. The usual bilge block system of supports is used, the dock being equipped throughout with the patent releasing bilge block of the designers. This railway dry dock was designed and constructed by the Crandall Engineering Company.

The Coast Equipment Company

THIS energetic firm, with offices in the Merchants Exchange Building, San Francisco, and San Fernando Building, Los Angeles, has recently been appointed exclusive sales agent in California and Nevada for the following companies: Ridgway Dynamo & Engine Company, Ridgway, Pennsylvania, manufacturing turbo-generator sets, alternating and direct-current generators, motor-generator sets, steam-engines and synchronous motors; Pittsburgh Transformer Company, Pittsburgh, Pennsylvania, transformers; Atlas Car & Manufacturing Company, Cleveland, Ohio, electric storage battery and trolley locomotives, storage - battery flat-cars and industrial cars; Norwalk Iron Works Company, South Norwalk, Connecticut, air, oxygen, hydrogen and carbonic-acid gas compressors, and automatic ammonia compressors; Duncan Electric Manufacturing Company, Lafayette, Indiana, watt-hour meters.

A. W. V. Johnson is one of the managing directors of the Coast Equipment Company, with offices at San Francisco, and Ralph B. Clapp is in charge of the Los Angeles office. Mr. Clapp is well known in the electrical world and is now president of the Co-operative Electric League of Southern California.

With the EXPORTERS & IMPORTERS

FREIGHT REPORT

February 19, 1920.

SINCE our last circular, dated January 21, no transactions have been made for grain from this coast to the United Kingdom or Continent. Barley can be shipped via New Orleans or Galveston to the United Kingdom on the basis of $19 to $20 a short ton. Shippers, therefore, are indicating for steamers from this coast to the United Kingdom via Panama not over $20 to $22.50 a long ton for immediate loading. The United States Shipping Board, we understand, has made a rate of 60 cents per cental from the Gulf to the United Kingdom for July/August loading; in other words, new crop loading from this state, which, added to the freight by rail and 4 cents per cental to more than cover charges of trans-shipment, etc., makes $1.20 per cental or $24 a short ton. For the last two or three weeks indications have come here from England and New York for steamers, July/August loading, for barley from San Francisco, and indications for sailers as high as £10 to £10 10s., which struck the street as strange in the face of the rates at which the Shipping Board will allow them to ship, and particularly so as we, at the present moment, cannot say whether there will be much of a barley crop at all on account of the continued drought.

We, personally, offered London a steel vessel, for new crop loading, at $35, and after a week a reply came that with a firm offer from us $25 might be paid for new crop loading on this coast, not San Francisco alone.

We have to report, the following charters:

Dunsyre, nitrate from Chile to a Gulf port at $17.50 a ton, with a free tow from Callao to loading port. The charterers are W. R. Grace & Company.

The Bank Line Transport & Trading Company chartered barkentines Forest Pride and Forest Dream at $10 for coal from Newcastle, Australia, to Honolulu, also Olympic at $9.50, same voyage.

The Fearless was taken at $10, coal to Honolulu, by J. J. Moore & Company.

Steamer Valdez chartered for a round voyage on time, delivery and re-delivery Puget Sound by Thorndyke-Trenholme & Company, and re-let on a sub-charter of $35 a thousand to the West Coast, and nitrate back to San Francisco or Puget Sound at $17.50. Steamer Cordova was also chartered at $17.50, same business, both by Balfour, Guthrie & Company.

The United States Shipping Board sailer Chillicothe is reported chartered from here to Sydney by the Vacuum Oil Company on a basis of $13.50 for oil and $15 for merchandise.

The barkentine Hawaii chartered by Grace & Company at $18.50, nitrate to Honolulu.

Motorboat La Merced chartered by the Petroleum Products Company at $1 a case to two ports New Zealand is also reported chartered for a lump sum from New Zealand to this port by the same firm on private terms.

Burns-Philp & Company have chartered Esther Buhne, lumber, $30 a thousand to Fiji, and return cargo of copra at $30 a ton.

J. J. Moore & Company chartered new schooner Ella A at $37.50 Sydney, $42.50 Melbourne, Adelaide or Port Pirie.

A. F. Thane & Company have chartered the schooner William Bowden at $37.50, lumber to Sydney. They are also reported to have taken another vessel, still unnamed, at the same rate.

For the West Coast, Hind, Rolph & Company have chartered Lake Gebhart at $35 for a direct Chilean port, also steamer Paraiso at $36, redwood ties from Eureka to Peru.

Grace & Company chartered the steamer Lake Fitch at $25 from the North to Balboa, also the steamers Lake Frenchton and Lake Flynus, also $25 for lumber to Cuba.

J. J. Moore & Company chartered the schooner C. S. Holmes at $1 a case to a New Zealand port from San Francisco.

Steamer Bundarra is reported chartered on private terms by J. J. Moore & Company to Melbourne, from the North.

Hind, Rolph & Company chartered the schooners Fearless, Fred J. Wood and Albert, all at $37.50 Sydney, $42.50 Melbourne Wharf or Adelaide.

No charters have been made for Africa or the United Kingdom or the Orient, but a good deal of lumber has gone forward from Vancouver and Puget Sound to United Kingdom ports on a basis of $60 freight.

The drought in California still continues, and we begin to see that it is affecting different business enterprises.

Japanese tonnage is evidently weaker, presumably because a great deal of their tonnage, which was under charter for one year, will soon be running out, so that time charter rates are purely nominal at about $8 for world-wide trading.

For sales, we have the following to report:

Burns-Philp & Company have bought Gardner Mill Company's schooner Lily for their South Sea Island trade, at a reported price of $15,000.

The Western Fuel Company sold their iron barge Acapulco at a reported price of $60,000, a very good price indeed, the reported buyer being L. O. Devlin.

PAGE BROTHERS, Brokers.

Panama Canal Notes

TRAFFIC through the Canal during the calendar year 1919 exceeded that in any previous year. The total number of ocean-going vessels making the transit in 1919 was 2394, as compared with 2233 in 1918; 2081 in 1917; 1278 in 1916; 1171 in 1915; and 357 for the four and a half months from August 15, 1914, the date of the opening of the Canal, to the end of the year 1914. The grand total to January 1, 1920, was 9514 vessels.

The foregoing figures include ships in commercial service and vessels of the United States government, exclusive of those in the service of the Panama Canal. The government ships were practically all vessels of the Navy and Army, with a few belonging to other departments of the government, such as the Coast Survey and the Bureau of Fisheries. Shipping Board ships pay tolls and are otherwise handled as commercial ships. "Commercial" ships, in the sense of this classification, include merchantmen in commercial service and the transports or naval vessels of other nations, as well as yachts—everything, in short, contributing to the traffic of the Canal other than United States government ships. The proportions of commercial and noncommercial traffic are shown in annexed table:

More ships passed through the Canal during the month of December, 1919, than in any preceding month and new records were established for net tonnage, tolls and cargo. A total of 281 ocean-going ships made the transit, with an aggregate net tonnage of 957,109 plus 12,875 displacement tons, and a total cargo of 953,901 tons. The commercial ships numbered 261, of 916,956 net tons, with 931,203 tons of cargo, and the United States government ships numbered 20, of 40,153 net and 12,875 displacement tons, carrying 22,698 tons of coal and supplies. The total tolls collected amounted to $891,375.70, of which $448,541.58 was on traffic bound from Atlantic to Pacific and $442,834.12 on that from Pacific to Atlantic.

The month of greatest commercial traffic previous to this was May, 1918, with 200 ships of 664,827 net tons, carrying 775,357 tons of cargo, and the month of the greatest number of ships, commercial and government combined, prior to December, was July, 1919, with 234 ships. Further comparisons are afforded by the tabulated statements in this issue.

The first ocean-going German vessels to pass through the Canal under the German flag were the tugs Einigkeit and Schelde, which made the transit from Atlantic to Pacific on January 2, on their way from Hamburg to Valparaiso. They were manned by German crews but traveling under orders of the British Admiralty, and are to tow disabled ex-German vessels from Valparaiso to Liverpool for overhauling.

Prior to the passage of these tugs, the only vessel to have passed through the Canal under the German flag was the launch Germania, of five tons net, which made the transit from Cristobal, where four ships of the Hamburg-American Line were interned, to Balboa, on February 19, 1915.

The steamship Gorredijk, of the Holland-American Line, arrived at Balboa in the evening of December 26, bringing the master and twenty-seven members of the crew of the wooden steamship Firwood, which was burned at sea on December 18. This occurred in latitude 16° 18′ S., and longitude 73° 39′ W., off the coast of lower Peru. Fire broke out at 8 o'clock in the morning, due to the bursting of an oil pipe under pressure of 120 pounds to the square inch, close to the boilers. Within fifteen minutes, while the flames were shooting fifty feet in the air, the crew had left the ship in two lifeboats, being unable to get the others overboard on account of the fire. The men were picked up at sea twenty-six hours after leaving the vessel, and in latitude 16° 55′ S. and longitude 73° 21′ W.

Plans have been prepared for the construction on the mole at Cristobal, between the ends of Piers 8 and 9, of a building 250 feet long and 75 feet wide, to serve as a shop for light repairs on vessels docked at Cristobal, and as a storehouse for ship's chandlery.

The section devoted to the shop will occupy 100 feet of the length of the building and will be one story in height. A traveling crane, which has a span of 36 feet, will traverse the length of the building and extend beyond one end sufficiently far to command a roadway on which trucks may bring materials for repairs. The shop will be equipped with lathes, steam hammer, forges, and other adjuncts for light repair work. This feature is an extension of the small shop now operated at the end of Pier 9.

The remainder of the building will be two stories in height. The ground floor will be used for storage of various items of supplies for ships and the second floor will be available for offices and storerooms for steamship lines which wish to rent spaces for storing their own supplies.

The building will be constructed of reinforced concrete with poured walls. The walls will be constructed in slabs 5½ inches thick, on the ground, and raised into place. Columns will be poured afterwards between adjacent slabs, completing the walls and affording sufficient strength to carry the roof structure. The estimated cost of the building is about $70,000.

	COMMERCIAL VESSELS			GOVERNMENT VESSELS				TOTAL			
Year	Vessels	P. C. Net Tonnage	Tons Cargo	Vessels	P. C. Net Tonnage	Displacement	Tons Cargo	Vessels	P. C. Net Tonage	Displacement	Tons Cargo
1914*	351	1,281,119	1,745,334	6	21,139	..	8,600	357	1,302,258	..	1,753,934
1915	1,149	3,873,512	4,894,134	22	74,968	73,104	72,426	1,171	3,948,480	73,104	4,966,560
1916	1,222	3,834,112	4,838,496	56	94,902	54,770	93,415	1,278	3,929,014	54,770	4,931,911
1917	1,960	6,223,833	7,427,680	121	138,554	240,930	130,032	2,081	6,362,387	240,930	7,557,712
1918	2,072	6,415,522	7,294,502	161	69,082	131,256	40,008	2,233	6,484,604	131,256	7,334,510
1919	2,134	6,919,149	7,468,167	260	209,348	826,938	234,581	2,394	7,128,497	826,938	7,702,748
Total	8,888	28,547,247	33,668,313	626	607,993	1,326,998	579,062	9,514	29,155,240	1,326,998	34,247,375

* Four and one-half months.

Pacific Port Notes

SHIPPING men up and down the Pacific Coast are indulging in many chuckles over the situation developed recently by the Shipping Board's action in connection with the deliveries of vessels built in Japan for the Emergency Fleet Corporation. When taking the contracts, the Japanese builders refused to consider delivering the the vessels to Shipping Board representatives in Japan, and in the final settlement were allowed the freight which could be made in bringing these vessels to the United States for delivery. After being allowed this concession, the Japanese builders began to look for freight cargoes at various Oriental points and began to cut rates much to the dismay of American shipping men on the Pacific. This action having been called to the attention of the Shipping Board, a ruling was made to the effect that cargoes for these ships must only be obtained at Japanese ports and as loose cargoes in Japan are very scarce it looks as though many of the ships would have to come across in ballast. The Japanese builders in this instance had made for themselves a nice soft bed and are now compelled to lie on it even though they find it full of burrs.

Perhaps the most outstanding development during the last month has been the tremendous increase in western bound, purely tourist passenger traffic. All of the steamship company offices report a wonderful increase of passage booking to the Orient by those seeking pleasure. On the recent trip of the Pacific Mail liner Ecuador more than two-thirds of her passengers were tourists and more than half of her passengers were from the one state of Ohio. The China Mail liner China and the Matson liner Matsonia also took out many tourists. The steamship companies are laying plans now for passenger traffic campaigns, and with the arrival from the Atlantic in the early summer of the new Shipping Board passenger liners there promises to be keen competition among the various lines.

Victoria, B. C.

CAPTAIN H. W. R. MOORE, acting on instructions from the Federal Minister of Justice, has taken possession of the new Esquimalt dry dock site where work is soon to be begun on the construction of the new dock.

The Canadian Electric Steel Producers, Ltd., have put up a proposition to the provincial government of Victoria that they will establish a five-million-dollar steel plant and rolling mills adjacent to Victoria on condition that the government guarantee the interest on a bond issue.

Interest in wooden shipbuilding has been revived locally by the investigation of the two Foundation Company's ship yards with a view to purchase in the interest of a syndicate represented by Captain E. V. Argou, a French army officer.

The Dominion government has refused to assist the Victory Shipowners, Ltd., a corporation formed for the purpose of constructing four wooden barkentines on a co-operative shipbuilding and shipowning basis. The government takes the ground that it cannot sanction what is virtually compulsory sale of stock, as employment in the new concern would be contingent upon stock purchase by the employe. Some of the directors, however, seem willing to proceed in this enterprise without government aid and the promotion of the scheme is being pushed energetically.

The lighthouse tender Newington, which, with Captain Harry Biltman and crew, was for some time a familiar sight in Victoria harbor, has been transferred to the new marine depot at Digby Point just at the entrance to the port of Prince Rupert.

As a result of grounding on Masset Bar, the Grand Trunk Pacific steamer Prince Albert was laid up at Esquimalt Dock for several days, where repairs to her shell plating were made by Yarrows, Ltd., of Victoria. The Prince Albert is now on her regular run to the Queen Charlotte Islands.

Vancouver, B. C.

PASSENGER steamers are running with all their accommodations crowded to capacity with both first-class and steerage passengers and Chinese coolies. The Empress of Asia cleared on February 19 with 800 cabin and steerage passengers and 2300 coolies. The Monteagle took out 1700 coolies and 299 other passengers.

Customs figures show that during 1919 the increase of shipping through Vancouver was 192 per cent in excess of the highest pre-war figures, which were those of the year 1912.

The local fishing fleet is feeling very keenly the discontinuance of the sale of distillate. Several boats with distillate-burning engines have been sold and others are being laid up.

Contracts were let early in February for excavation and granite work for the new Canadian Pacific pier. The Pacific Construction Company is doing this preliminary work, which will cost more than a million dollars. The entire pier is to be finished before the end of 1920.

After a thorough overhauling, during which new boilers were installed, the steamship Princess Patricia, fastest turbiner on the Pacific Coast, is back on the ferry run from Vancouver to Nanaimo.

The dispute between the port pilots and the Dominion government has been settled by the government accepting the pilots' terms. The pilots will now get a fixed salary of $325 a month and three launches and other equipment which the pilots now have will be taken over by the government at the pilots' price.

The Canadian Pacific freighter Methven brought a typical Oriental cargo from Singapore, Hongkong and Yokohama. Among other items there were 22,000 packages of rubber, 6000 bundles of rattan, 3300 cases tapioca, 21,000 packages of rice, 9000 cases of tea, 900 tons of silk, 3500 cases of fresh eggs, and 600 bales of hides.

Seattle

A TOTAL of 230 deep-sea vessels with an aggregate net tonnage of 331,698 arrived at the port of Seattle during the month of December, 1919. These ships handled 7932 passengers inbound and 6405 passengers outbound, 63,987 tons of foreign export freight with a value of $12,783,162, and foreign import freight valued at $41,379,181.

Much speculation has been going on among Seattle shipping men on the orders from the Standard

Oil Company of California to its local sales manager that no future contracts shall be made for the sale of fuel oil until approved by the main office at San Francisco.

The Patterson-MacDonald Shipbuilding Company's plant is still turning out big wooden motorships. The ninth of these ships, the Boobyala, a 4400-tonner, was completed and delivered during February. This vessel is one of the motorships purchased by J. E. Chilberg of Seattle from the Australian government and will make the eighth ocean-going carrier in Chilberg's new fleet.

On February 17 Frank Waterhouse & Company announced that they had booked 30,000 tons of cargo to be dispatched from Seattle to the Orient and to the Atlantic Coast during the five weeks following that date.

On the same date the Shipping Board made the announcement that a Seattle-Singapore service would be inaugurated by them with a sailing every twenty-eight days.

About the middle of February, Captain O. D. Trieber arrived in Seattle from San Francisco and opened offices as special representative of the Bethlehem Shipbuilding Corporation.

A number of the Shipping Board's Japanese-built steamers have arrived in Seattle during the month, among others the Eastern Pilot of 5000 deadweight tons, with a cargo of 4000 tons of Oriental vegetable oils, and the Eastern Craig of 6300 deadweight tons, also with a full cargo of Oriental products. In all six of these Japanese-built ships were in the harbor at one time during the month, being converted from coal to oil burners and receiving finishing touches in the way of American fittings for crew and officers' quarters.

On the whole the shipyards and the repair and dry dock plants of Seattle have been very busy.

Skinner & Eddy have finished and delivered the last of the four 10,400-deadweight-ton vessels built on their own account. This ship, the Robin Goodfellow, was a success in every way, developing a speed of 12½ knots on her official trial. The Robin Goodfellow was delivered to the Pacific Steamship Company and is now en route to the Orient with 9000 tons of lumber, steel, cotton, wood pulp, copper ingots and general merchandise, all consigned to Japanese ports. This finishes the shipbuilding program of the Skinner & Eddy Shipbuilding Corporation and their yards are now silent except for repair work.

J. F. Duthie & Company have delivered the West Ivan and launched two 8800-tonners, the West Camp Gaw and the West Makwah, while the Ames Shipbuilding & Dry Dock Company launched their twenty-fourth 8800-ton ocean carrier, the West Jester.

Indicative of the activity in repair work is the fact that nearly a hundred men are now steadily employed at the Anderson plant on Lake Washington which was recently leased for five years by the J. H. Price Construction Company. This plant is now rebuilding the King County ferry boat Leschi and have six other vessels at the docks for repairs or overhauling. In new construction they are building two 3300-ton wooden motorships for John L. McLean.

The Industrial Bureau of the Seattle Chamber of Commerce has started an energetic campaign for bringing new industries to Seattle. Under its direction a special survey is being made of industrial activities by the students of the University of Washington. Fourteen special lines of new industries are to be investigated, including coke, silk, rubber, vegetable oil, furniture, canning and dehydrating, copper and brass, pulp and paper, glass, fertilizers, tanning, textiles, furs and chocolate. The Industrial Bureau hopes that by means of accurate information along the various industrial lines it will be able to attract manufacturers to the Puget Sound region.

Tacoma

FIGURES recently compiled by Harbor Master W. G. Rowland show great changes brought about by the war in shipments of wheat and flour from Tacoma. In 1914 the shipments of flour from Tacoma amounted to 136,333 tons, valued at $5,880,251, while wheat was exported to the amount of 153,631 tons, valued at $4,947,265. For 1919 the flour shipments were 254,519 tons, valued at $27,464,703, and 1020 tons of wheat, valued at $85,449. In other words, the war has brought about a condition such that practically all wheat for export was ground into flour here before shipment.

Several of the Japanese-built United States Shipping Board vessels have been loading flour at Tacoma during the month.

A skeleton hull of the Ferris type 3500-ton wooden vessel, completely framed but sealed and planked only to a point two feet above the water line, was towed to Tacoma from Olympia and sold to George Rogers, the consideration named being $1. Rogers in turn sold the hull to Robert McCully and Fred Marvin of the Tacoma Tug & Barge Company for the nominal consideration of $10. This hull is said to have cost in the neighborhood of $150,000 to construct.

Tacoma has started a fight through the Traffic and Transportation Bureau of the Commercial Club to secure the allocation of Shipping Board ships for regular trans-Pacific service from this port.

A considerable amount of salt fish is being received here for trans-shipment to Oriental points. In one day five small freighters arrived from British Columbia with fish for trans-shipment on the Arabia Maru to Japan.

Late in January the Robin Grey took out of Tacoma one of the largest copper shipments in many years, totaling almost four thousand tons and consigned to Japanese ports.

C. A. Pratt and associates have arranged to take possession of the Stevens Dock property at Tacoma and, with some additional space, go into an active dock and warehouse business. They will probably handle the business of the Matson Steamship Company from Tacoma to the Hawaiian Islands. C. A. Pratt is one of the greatest box shook manufacturers in the Puget Sound section and ships yearly a tremendous amount of shook to the Islands. The dock will hereafter be known as the Pratt Dock Company.

The Port District of Tacoma, which has been organized a little over a year, is planning and has under construction the first unit of a development which will make at Tacoma harbor one of the best equipped terminals in the United States. There are to be two water ways, one on the east side, 800 feet wide, and one on the west side, 600 feet wide. The eastern water way is being finished first and will be dredged to a depth of thirty-five feet. The first unit, which will be completed in about a year, is an open pier and transit shed, the pier to be 1200 feet long and 226 feet wide and equipped with machinery of the most modern type for handling lumber, bulk oil and general heavy cargoes. The transit shed will be 1000 feet long and 180 feet wide, equipped with machinery so arranged that the cargo in slings will be taken from the ship's hold and conveyed without dropping the sling load to its place for stacking in the shed. Announcement of this device, which is to have its first trial in this Tacoma installation, has been received with great interest by terminal engineers on the Atlantic seaboard, as its success will mean a saving of at least 50 per cent in the time needed to unload general cargoes.

For industrial sites the Port Commissioners have secured 280 acres of tide land, extending from a paved street 100 feet wide with double track railway out to deep water.

Grays Harbor

THIRTY-ONE vessels with lumber cargoes totaling 25,143,000 feet cleared from Grays Harbor to coast, foreign and eastern ports during January. Twenty-six vessels bearing 20,625,000 feet of lumber cleared for coast ports, three schooners and barkentines cleared for foreign points with cargoes of 2,556,000 feet, and two vessels cleared for eastern ports. The foreign shipments were carried by the schooner Muriel to Callao, Peru; schooner Defender to Suva, Fiji Islands; and the barkentine Forest Pride, a vessel built at the Grays Harbor Motorship yard in Aberdeen, which cleared for Sydney, Australia. A total of five vessels carrying 4,025,000 feet of lumber cleared from Willapa Harbor to coast ports during the month.

The wooden barge Academia, built at the Aberdeen yard of the Grant Smith-Porter Company, is the first of the government carriers laid up in Lake Union, Seattle, to be sold. The vessel was purchased from the Shipping Board by a Puget Sound syndicate of business men and lumber men. It will be converted into a steam schooner at an expenditure of approximately $100,000. When ready for service, equipped with oil-burning boilers, the Academia will be used in the coastwise lumber trade and in general cargo movements. Northwest shipping circles are reported to be much interested in the announcement, as it is believed that the plan gives one of the solutions for the utilization of wooden carriers laid up by the government in various coast ports. The Coast Shipbuilding Company of Portland, which is buying the Ferris type wood barge Egeria, built in Astoria, also will convert that vessel into a steam schooner. In the deal, the Coast Company represents a community proposition, business men and others taking interest in the vessel.

A large American flag used during the war by the Grant Smith-Porter Shipyard at Aberdeen, engaged in building wooden vessels for the government, has been presented to the Aberdeen post of the American Legion. The flag is of pure wool and measures 12 by 20 feet in size, and will be used by the ex-service men as a dress flag for ceremonial occasions. It was presented at a recent meeting of the post by Manager Charles Albertson of the shipyard company.

With the Olympia Chamber of Commerce taking the initiative in promoting the movement, a determined effort is to be made to interest the states of Washington and Oregon in a system of inland waterways that will be the equal of Atlantic Coast systems, and Congress will be asked to authorize an investigation with this end in view. Decision to work upon a Northwest plan of this character came about as a result of recent inquiries as to the feasibility of the proposed Olympia-Grays Harbor ship canal. J. A. Woodruff, lieutenant- colonel, corps of engineers, U. S. A., reported unfavorably to the war department relative to the smaller project. This report did not come as a great surprise to the committee in charge of the canal movement, as it became almost certainly unfavorable when the engineer pinned arguments upon the project to a question of tonnage that would pass through the canal if it were in operation at the present time. There is considerable evidence to refute the contention that it would be necessary to build a feeder canal to obtain water to operate the locks, and this is one of the questions that could only be ascertained after an actual survey had been made. When United States Senator Wesley L. Jones had passed the bill providing for the "construction of a waterway connecting the waters of Puget Sound with Grays Harbor with a view of providing a channel suitable for navigation," he was following out lines worked upon for years, but with the demise of sailing traffic the scheme changed in the minds of those closest in touch with the situation, and the fight before the engineer at the public hearing in Olympia some time ago was made to have a recommendation placed in the report of a project that comprised not only connecting the waters of Grays Harbor and the Sound, but Grays Harbor, Willapa Harbor and the Columbia River, above the bar, as well.

Astoria

ONE day late in January was shown by the reports of the Merchants Exchange to have been the busiest in many years at the mouth of the Columbia River. Nine ocean ships entered and twelve left the Columbia River within the twenty-four hour period. The Ageria wooden hull, built at Astoria yards for the Emergency Fleet Corporation, was sent up the river to Portland with a cargo of surplus material from the unfinished wooden ships. This hull has been contracted for by a group of Portlanders and will be finished as a lumber carrier, capable of loading 1,700,000 feet board measure.

The new steamer service between Astoria and Portland is to be inaugurated about the first of March with the steamer Astorian, which arrived from Port Angeles, Puget Sound, on February 17. The Astorian was formerly the Nisqually, operating between Seattle and Tacoma. She has recently been completely overhauled and is now being refitted at the Callender wharf.

Large quantities of freight are being assembled at the port terminal for shipment to foreign points and movement will begin as soon as the necessary tonnage is available. There are in the elevator and warehouse 481,300 bushels of wheat ready to go forward, 7000 tons of flour for Europe, 4000 tons of flour for the Orient, and 2000 tons of box shooks for Honolulu. An additional shipment of 8000 tons of flour has been offered as soon as there is available craft to take it.

The port dredge Natoma has been busy all month digging basins, straightening channels and in general deepening work. The turning basin on the Skipanon River has been finished and the straightening of the channel from the mill dock to the Columbia River is well under way. Much better progress is now being made on the construction work of the bulkheads at the import and export pier unit of the port terminal and the indications are that by the first of March or very soon thereafter the work will be sufficiently advanced so that the dredge can commence making the fill.

The coal bunkers of Astoria have been kept busy as usual bunkering the many steamers which have cleared from Portland and from the local terminal.

Portland

IT is stated on the authority of a prominent exporter that Japan and other Oriental lumber buyers have recently placed orders in Portland and the Northwest for ten million feet of lumber for early shipment to the Orient.

Two more Shipping Board vessels, the Eastern Merchant and the Mehanno, both of which are now in San Francisco, have been assigned to Portland as flour carriers. They will be operated from here by the Columbia Pacific Shipping Company.

Five flour cargoes for the Food Administration were moved from the Columbia River district during the month. These cargoes had an aggregate value of approximately 4,470,000.

On the evening of February 16, the newly organized Foreign Commerce Club of Portland gave a dinner in the dining room of the Chamber of Commerce which was attended by seventy-five representatives of importing and exporting firms, foreign departments of banks, shipping firms and others interested in foreign commerce. The Foreign Commerce Club hopes to be instrumental in furthering the interests of the Port of Portland as an importing and exporting center.

On Saturday, January 31, the Bearport, the last steel steamer of the government shipbuilding program in the Portland district, was launched. Like her predecessors from the Standifer Construction Corporation, she was practically completed when she slid into the water. The Bearport has since been completed and has been assigned to the Columbia Pacific Shipping Company for carriage of flour to Europe. She is of 9600 deadweight tonnage. The Standifer yard is now concentrating its energies on the five 9500-deadweight-ton freighters for the Nafra Company of New York and the three 12,000-deadweight-ton tankers for the Standard Oil Company.

Heavier oil shipments were received in Portland during the month of January than have been received for many months. Crude and fuel oil to the amount of 559,928 barrels, and gasoline and refined oil amounting to 108,495 barrels were discharged at the docks of local oil companies during the first thirty-one days of 1920. Notable among the arrivals in this line was the Shell Oil Company's tanker Silver Shell, which is the first of the Shell tankers to enter the Columbia River.

C. O. Yokum, general manager of the Western division of the Supplies and Sales Department of the United States Shipping Board, has recently returned from Philadelphia, where he was in conference with Shipping Board officials. At these conferences the decision was made to place the Supplies and Sales Department under a separate division and to give greater authority and larger field of duties to district managers. Yokum states that sales are progressing nicely on materials and already property valued at more than twenty-five million dollars has been disposed of.

A number of wooden ships and wooden hulls have been purchased by Portland corporations and will be fitted out as lumber and general cargo ships.

Late in January the tanker Imlay arrived at St. Helens from Amsterdam via Seattle, bringing the first foreign cargo of creosote to the Northwest since the war started in 1914. The vessel had about a million gallons or one-third of its total cargo consigned to the St. Helens Creosote Company, the balance having already been unloaded at Seattle.

San Francisco

THE United States transport America, formerly the German trans-Atlantic liner Amerika, came into San Francisco harbor February 17 from New York en route to Vladivostok with Captain William Rind, a San Francisco skipper, on the bridge. The America is a twin-screw steamer with a gross tonnage of 26,622. She was built in 1905 by Harland & Wolff of Belfast and is 668.8 feet long, 74.3 feet beam, and 47.8 feet depth. These figures are taken from Lloyd's Register and show the America to be larger than the Mount Vernon, which is credited by Lloyds with a gross tonnage of 18,372, a length of 685.4 feet, a breadth of 72.2 feet and a depth of 40.5 feet. Therefore the America may claim to be the largest ship in point of length and depth which has yet entered the harbor. Visitors on board this huge vessel were not a little surprised to note that many of the auxiliary pumps, engines, electric generators and other fixtures and equipment belonging to the original installation on the ship were of American make and notable to local people there was observed a Dow pump.

The Chamber of Commerce reports foreign imports received in San Francisco by water during the month of January as follows: 52,058 bags coffee, 78 bags cocoa, 7602 bales kapok, 1161 hides, 10,718 bales hemp, 8100 tons nitre, 33,403 bags, 6179 tons copra, 90,840 barrels various oils, 48,442 cases oils, 2104 packages matting, 1000 tons steel, 443 bales jute, 9577 cases rubber, 14,914 slabs tin, 107,399 bags rice, 4745 bags sugar, 13,794 packages tea, 1296 cases cigars, 125,000 cocoanuts, 149,671 packages Oriental merchandise, 7217 packages assorted silks, 19,474 bags beans, 979 bales gunnies, 1005 packages various spices, 369 bales wool, 785 bales flax, 2510 packages shoyu, 25 boxes limes, etc.

The steel shipyards around the bay are all busy on Emergency Fleet Corporation work or private construction. At the Moore yard the keels for many new tankers and freighters are being laid, chief interest centering on that of the motor tanker F. H. Hellman for the Standard Oil Company, which is the largest steel motorship yet laid down on the Pacific Coast. The Bethlehem Shipbuilding Corporation is also laying many new keels, among them the W. S. Miller and the K. R. Kingsbury, tankers for the Standard Oil Company, which will be about the same size as the D. G. Schofield.

On February 19 the Shipping Board steamship Eastern Bell, built by the Asano yards in Japan, arrived from Yokohama with 8800 tons of general merchandise for Suzuki & Company.

The report of the China Mail Steamship Company for 1919 shows that concern to be in a very prosperous condition. The net profits of the company, after deducing a reserve for Federal income taxes and proper allowances for depreciation, amount to 12½ per cent on the book value of the stock.

The figures compiled by the Marine Department of the Chamber of Commerce show that in January of this year the total inbound tonnage amounted to 504,430, as compared with a total for the corresponding month of 1919 of 434,691. The departures for January, 1920, aggregated 580,881 tons as against 454,830 tons for January, 1919.

The terminal vegetable oil plant of the Board of State Harbor Commissioners on Islais Creek is now in commission. The operation of the terminal has been taken over by the Associated Terminal Company and the barge Mohican, purchased from the Matson Navigation Company and converted into a vegetable oil carrier, was used to transfer 500 tons of bulk wood oil from the China Mail Company's liner Nanking to the Terminal Company on Islais Creek. Half of the net profits, if any, in the operation of this terminal and barge are to be turned into the treasury of the State Board of Harbor Commissioners, who expect by this means to make a fair profit on the capital invested in the terminal.

Space for export shipments from Pacific Coast points continues to be short and many of the forwarding companies are being seriously embarrassed by this fact and the Shipping Board is besieged with requests for more allotments of tonnage.

Late in February the Mount Vernon proceeded from Mare Island to Hunters Point, where she will be docked for repairs. The Mount Vernon will be the longest vessel that has ever been berthed in this dock.

John Wilder, of the Crowley Launch & Tugboat Company, is planning to fit up a barkentine for a Southern California motion picture company. This ship will be used for the filming of two sea stories. She will be equipped with a special lighting plant for scenic work and with dressing rooms for the actors.

The big army transport President Grant was docked at Pier 39 on February 23, immediately following the departure of the America for the Orient. The President Grant took on 4000 tons of coal and proceeded to Vladivostok.

On February 17 the Alicia Haviside, one of the five Ferris type wooden hulls converted by the Shipping Board into five-masted barkentines, sailed from San Francisco for Hastings Mills, where she will load lumber for Durban, South Africa. She was convoyed out to the light ship by H. T. Haviside and other interested shipping men in a launch. Under a smart breeze from the northwest, the Alicia stood out in the port tack with every stitch of canvas drawing well and behaved as prettily as any clipper ship.

With the threatened advance in lumber rates on steamships, these sailing ships will certainly prove a profitable investment and should be carefully considered by shippers, especially on the Pacific Coast.

Los Angeles

THE shipbuilding operations at the Port of Los Angeles have been considerably hampered during the past few months by the distribution of natural gas for heating and cutting work in the shops. This situation has been partially cleared up by the action of the State Railway Commission in making a more even distribution compulsory. The commission ordered the Midway Gas Company to supply fifteen million cubic feet daily to the Los Angeles Gas & Electric Corporation, all of their product in excess of the fifteen million cubic feet to be delivered to the Southern California Gas Company at the rate of twenty cents a thousand cubic feet, it having been shown at the hearing that the latter company was in a better position to serve the Torrance and San Pedro districts direct from the Midway fields than was the Southern California Gas Company to serve these same districts from the Orange county fields through Long Beach. This distribution will enable the shipyards to get about double the amount of gas they have been receiving for some months past, but they will still be working with only twelve thousand cubic feet an hour at each yard; and while this covers their indispensable needs, it is only about one-third of their normal consumption.

During the month the Los Angeles Shipbuilding & Dry Dock Company launched the Las Vegas, its twenty-third steamer, and delivered the West Himrod, its twentieth ship, which has departed for San Francisco to be operated on the Manila run by Struthers & Dixon. The Las Vegas will probably be allocated to the Los Angeles Pacific Navigation Company.

The steamer Falcon, thirty years ago a passenger vessel between here and Avalon, which sank some years ago in thirty feet of water, has been raised and repaired and is now engaged in towing work at San Francisco.

The Los Angeles Shipbuilding & Dry Dock Company has been co-operating with the Harbor Commission in having the West Basin dredged so that large steamers may enter there for repairs.

The steamer West Niger is now completed. She underwent her final trials and sailed for San Francisco on January 31, 1920, for delivery to the United States Shipping Board. The West Niger was built at the Southwestern Shipbuilding Company's yards.

The Los Angeles Pacific Navigation Company on January 28 dispatched the steamer West Montop for Japan and the Orient laden with Southern California products. This company has procured a permanent permit for municipal dock space and shed in the inner harbor and reports that its business is growing very rapidly.

The recently organized California & Mexico Steamship Company dispatched its motorship Mazatlan from the Wilmington pier on February 17 with cargo and passengers for Mexican ports. This company has under construction two more motorships of the same type as the Mazatlan.

On February 6 five lumber carriers arrived from the Northwest with cargoes aggregating three and one-half million feet of pine lumber. On the same day two oil tankers and an oil barge departed with full cargoes for outside ports.

There has been a record run of sardines in the local fisheries, but early in February the canneries began to feel a shortage of cans and were unable to work full time. Notwithstanding this handicap, the pack this season will be the largest in the history of the industry. Local fishermen have been very much interested in the experiments being carried out for locating schools of fish by aeroplane.

The World Traders of Los Angeles held a regular meeting with dinner at the Mission Cafe on February 19, 1920. The slogan of this organization is "Los Angeles a World Market." Their meetings are held fortnightly and great interest has been displayed by the shipping fraternity; in fact, at nearly every meeting seats have been at a premium.

Honolulu

HONOLULU'S commerce is growing by leaps and bounds. Already the new year has brought here the steamers of one new freight route, while the Toyo Kisen Kaisha has announced the coming of four big combination freight and passenger vessels this year, and the early construction of six others in 1921. The Pacific Mail is making provision for the reception of at least half a dozen Shipping Board combination freighters promised for the Oriental run of that company.

The new freight route is that of the Los Angeles-Pacific Navigation Company's Far East service and the first vessel to arrive here under the company's schedule is the West Montop. The West Montop brought a cargo of coal for the Inter-Island Steam Navigation Company and also has 6100 tons of general merchandise for Yokohama, Nagasaki, Hongkong, Manila and Singapore. At the various ports of discharge raw material will be loaded for the Southern California port.

For the first time since the construction of the dock, seven years ago, the Kuhio wharf at Hilo was used by the passenger steamers of the Matson Navigation Company on Friday of last week, when the Matsonia, carrying tourists from San Francisco and Honolulu, called at the port on the Island of Hawaii. There had been much discussion during the past few years as to whether or not a big vessel such as the Matsonia or the Maui could dock safely at Kuhio wharf, but the company refused to make the attempt until the breakwater was constructed out to a sufficient length. This has now been done and it is probable that all the Matson steamers will use the dock hereafter. Heretofore lighters have been used for landing and loading passengers and freight.

Disquieting reports have been received here from Vancouver recently that the Canadian-Australasian Line, operating the steamers Niagara and Makura between that city and Auckland and Sydney, may discontinue the service until the labor situation in New Zealand and Australia is more settled. The rumor, however, is denied by the Honolulu office of the company. The Niagara and Makura have been held for several weeks in the South Seas because of strikes at Auckland and Sydney and for the past six months their schedules have been shattered by the labor agitations there. New Zealand and Australian passengers on the two vessels have almost a day to spend in Honolulu when the steamers dock here and there is much anxiety among the merchants in regard to the reports of a temporary discontinuance of the service.

Two vessels from Japan have been quarantined while in port here since the return of the influenza epidemic. The Shinyo Maru, arriving during the week of February 1, was placed under quarantine when she arrived because of the presence of a dozen cases of influenza on board and three deaths. No one was allowed to leave or board the vessel while in port. Similar action was taken with the Kiyo Maru, which arrived Sunday, February 8, and departed for San Francisco Monday morning. There were nine deaths from influenza on the Kiyo.

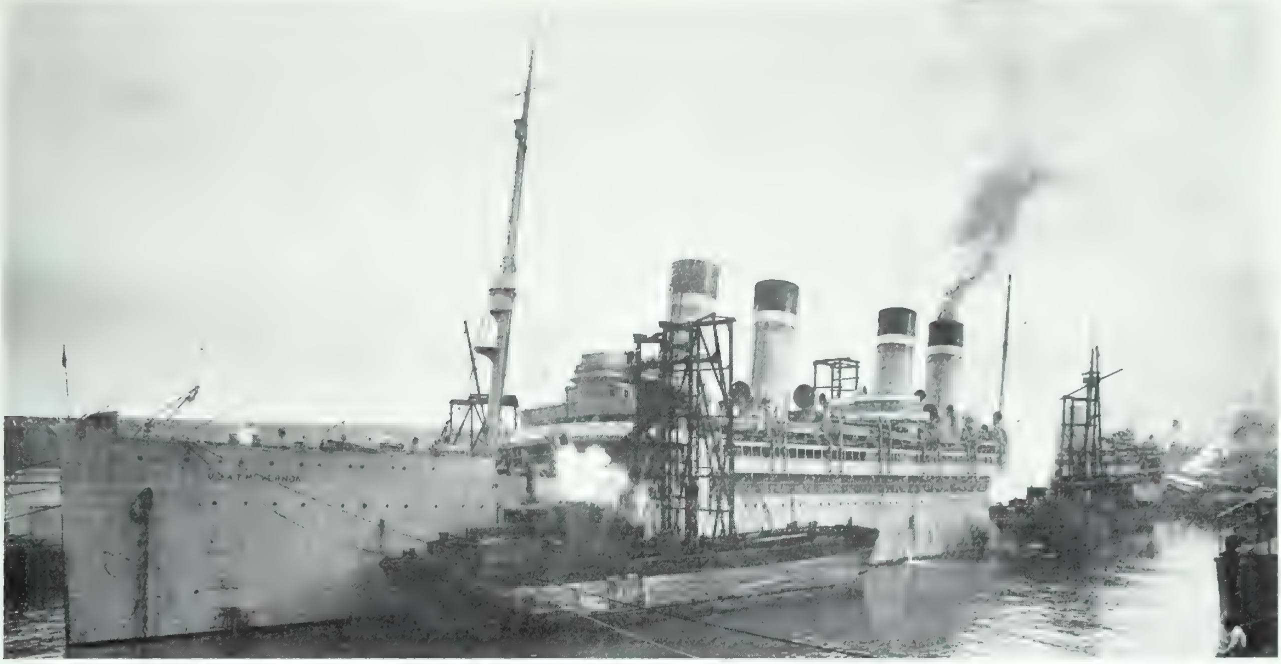
Vigorous steps have been taken by the Territory to prevent violation of the harbor law which makes it a misdemeanor to run oil or other bilges into the water at the docks. Captain Libby, of the freighter Ben Salem, was arrested and fined $500 in court for allowing oil to flow from his vessel into the harbor on January 29, and Captain Hoistrum, of the steamer Askawake, was fined $100 for a similar offense on February 3.

The Pacific Mail steamer Colusa, on her last visit here from the Orient, brought 1400 tons of "gunnies" for the sugar mills. The bags were loaded at Calcutta.

A new inter-island freight line is planned by John Bohnenberg, who has purchased the big sampan Tenjin Maru, and will start a regular schedule between Kauai, Maui, Hawaii and Oahu ports during February. The Tenjin Maru is of twenty-nine gross tons. Bohnenberg says he believes he can inaugurate a regular service between small ports on the four islands and be of considerable assistance to the agriculturists by carrying cargoes of produce.

Honolulu harbor proved during 1919 to be the magnet for twenty-two vessels which essayed to make the trip between San Francisco and the Orient by way of the Great Circle route, 400 miles north of the Hawaiian Islands, and found that they could not "make the grade." Since January 1, 1920, three vessels have put in here for the same reason, and according to this ratio the new year will break the record of the old. The majority of these vessels have come in disabled and needing repairs. Besides those from the Great Circle there put in here for bunkers and repairs during 1919, 187 freight steamers en route between San Francisco and the Orient. During February and March the Inter-Island Navigation Company will bunker more than twenty vessels, the majority of which are en route to the Orient from New York by way of the Panama Canal.

Coaling the Mount Vernon



The United States Army transport Mount Vernon with four 1000-ton coal barges of the King Coal Company discharging coal into her bunkers

THE record made by the King Coal Company of San Francisco in filling the bunkers of the United States Army transport Mount Vernon is said to constitute the best bit of work of its kind yet done in America. Seven thousand tons of coal were bunkered and properly trimmed in 5½ days. The Army authorities were very anxious to put this work through in good time, and by their co-operation in the preparation of the ship for the coal and their service of refreshments to the men at work, they contributed very largely to the success of the undertaking.

Especial credit is due to President McCallum of the State Board of Harbor Commissioners, who gave this work the right of way on the waterfront, and to Major-General DeVaux, chief of the Western Division of the United States Army, who made special preparation, with the aid of the crew of the Mount Vernon, so that no time was lost in shifting from one bunker to another, and who also arranged for the serving of coffee and other refreshments to the barge crews.

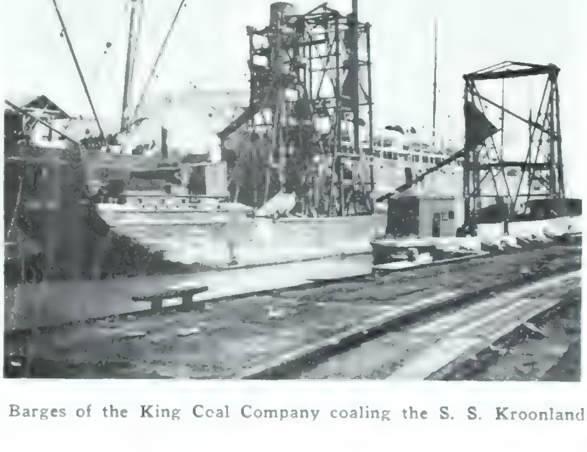
The Mount Vernon was warped out from the pier a sufficient distance so that barges could work on both sides of the ship and four of the King Coal Company's 1000-ton coal barges were put to work simultaneously. With the co-operation between the crew of the ship and the working shifts on the barges, the task was completed in 5½ days, and, as stated above, this is held to be a record achievement for this class of work on a big passenger liner.

The barges used are the design of Leland S. Rosener. They are fitted with steam hoisting apparatus which handles a grab bucket. The coal holds of the barges are of the blunt V section, the flat width on the bottom being the width of the open grab bucket. Each time this bucket closes, it lifts 2½ tons of coal from the hold of the barge. The bucket is then hoisted to the top of the elevator frame, where it is opened and the coal dumped through a hopper into a skip of the ordinary mine type. This skip rests on a recording scale and dumps automatically at a given weight into the chute leading to the coal bunkers of the vessel being coaled. The coal is thus automatically weighed in transit to the bunker.

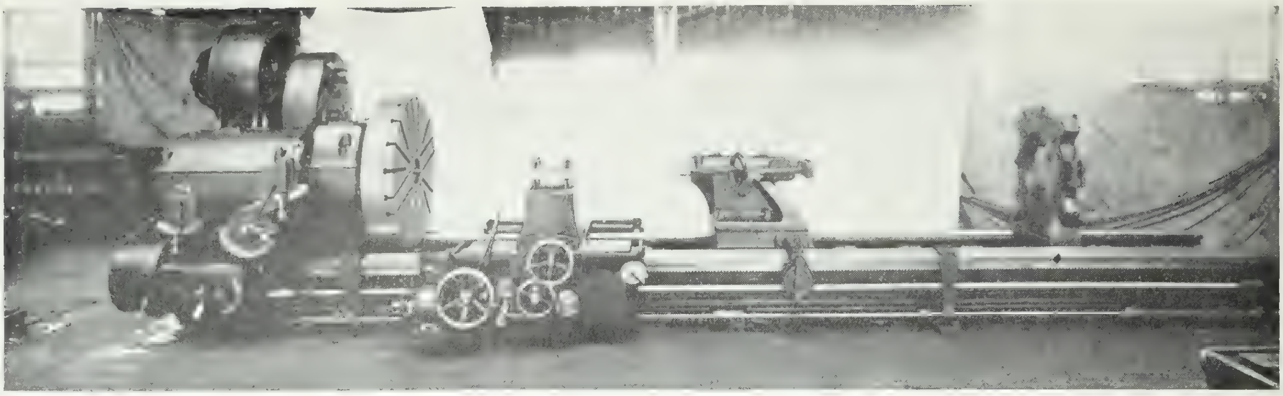
The capacity of this apparatus with steam coal is normally about 140 tons an hour for each barge, and it has been demonstrated that with the aid of such machinery two men can do in one hour four times the work that fourteen men could do without such aid.

Utah coal, which can be secured in San Francisco in practically unlimited quantities on very short notice, was used in filling the bunkers of the Mount Vernon.

The King Coal Company deserves great credit for this piece of work, which in a way gives San Francisco's harbor facilities a great deal of favorable publicity, and which advertises to the shipping world the fact that San Francisco is able to take care of the needs of the largest ships afloat.



Barges of the King Coal Company coaling the S. S. Kroonland



A Houston, Stanwood & Gamble 54-inch plain turning lathe

A Pair of Sturdy Machine Tools

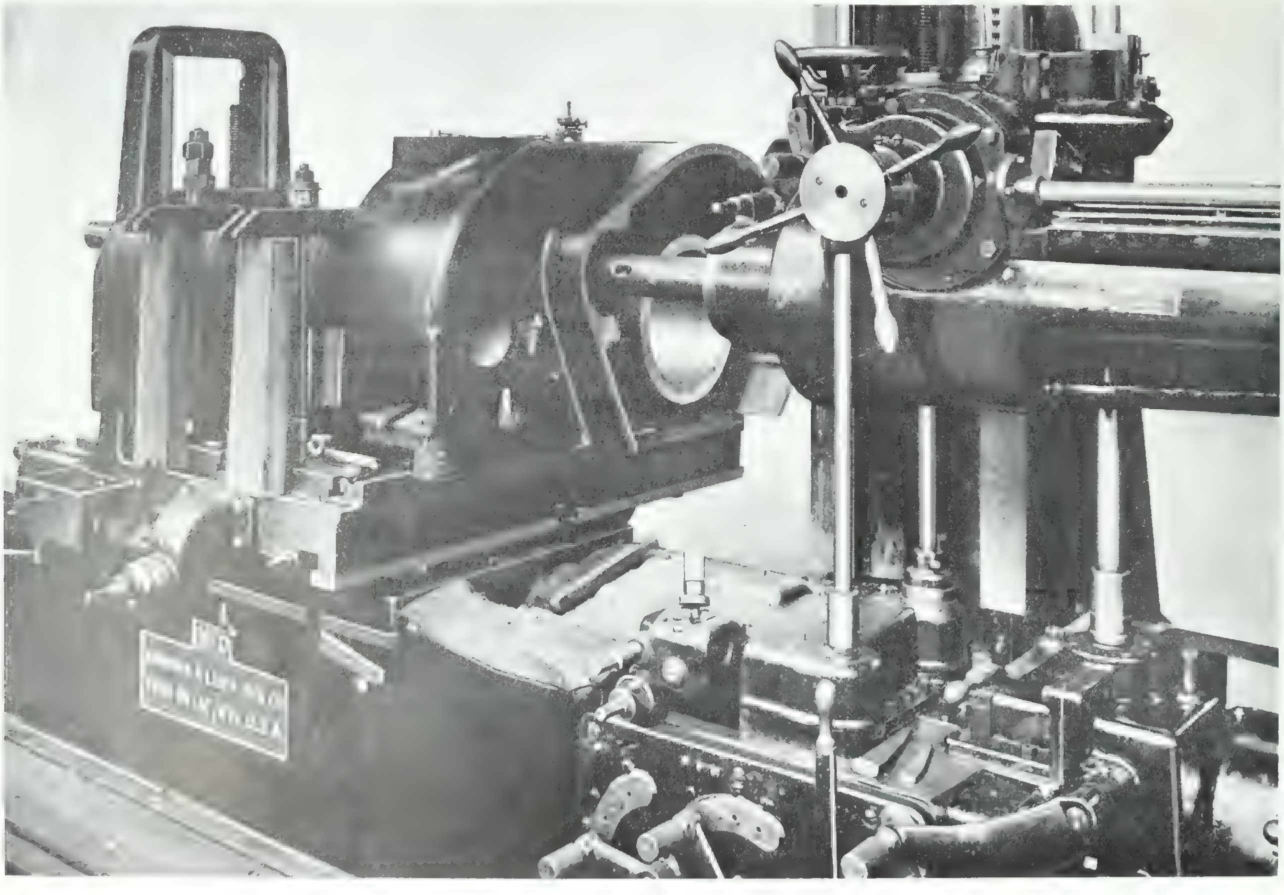
THE upper picture on this page shows a 54-inch plain turning lathe of the type built by Houston, Stanwood & Gamble, which had such a large share in contributing to the war records of American machine shops. Note the sturdy, straight line design and the simplicity of the control. Houston, Stanwood & Gamble have always made a practice of incorporating individual electric drive in the design of all of these large lathes. They also provide a small motor on the tool carriage which gives independent drive and speedy traverse when necessary and which has proved to be a very valuable feature in speeding up production with these machines, especially in such work as the turning of line shafting and tail shafting for steamers.

Below is shown a No. 0 horizontal boring mill, especially designed for precision work, built by the Gidding & Lewis Manufacturing Company. This tool has been found particularly useful in jig work, such as boring small cylinders.

The spindle bar in this machine is 3⅛ inches in diameter with a longitudinal travel of 26 inches. The head has a vertical adjustment on the column of 25½ inches. The table is 24 inches by 50 inches with a traverse of 30 inches and a longitudinal travel of 32 inches. This machine is of heavy construction for its size; rigidity and accuracy being the main considerations. The approximate net weight is 9500 pounds.

ANNOUNCEMENT

The Chicago Pneumatic Tool Company announces the appointment of Mr. E. A. Woodworth and Mr. C. E. Laverenz as special railroad representatives attached to the staff of Manager of Western Railroad Sales, with headquarters at Fisher Building, Chicago, Illinois.



Horizontal boring mill built by the Giddings & Lewis Manufacturing Company

PACIFIC MACHINERY

Johansson Gage Blocks

THIS article is a summary of the lecture by Ernst Mentor, delivered before the meeting of the American Society of Mechanical Inspectors in the auditorium of the Engineers' building, New York City, May, 1919.

Johansson gage blocks, now the finest inspection measuring device manufactured, are, like many other implements used in modern manufacture, the product of war needs. C. E. Johansson, a Swedish engineer, was employed in the Swedish government arsenal, and had charge of making all kinds of jigs, special tools and machinery necessary to put the arsenal on the interchangeable parts system of production. He quickly realized that the cost of making master gages for all parts would be prohibitive on account of the change in size limits and in designs from time to time, and he evolved the idea of making the least number of gages to obtain accurate measurement for the greatest possible number of sizes.

After working out a combination of key sizes whereby any multiple of .0001 part of an inch could be obtained through the addition or subtraction of the various units of the key, Johansson started out to solve the problem of making accurate block gages to the exact dimensions necessary for this key system. His solution of this problem has made him famous, and has been one of the most remarkable developments in the improvement of the manufacturing industries of the world.

The first part of the problem was to make an absolutely flat surface upon a block of steel. The second step consisted of making two flat surfaces parallel, and the third in making two flat surfaces parallel and a certain distance apart. Written down in this simple fashion, it seems quite easy, but let anyone who thinks thus try to file ten pieces of steel to exact one-inch cubes and get them so accurate that while each dimension measures precisely one inch, the ten blocks piled one on the other will practically cohere and make one piece of steel ten inches long.

Johansson started to solve this problem in 1889. His first combination set of gages was not ready until 1897, and even then one of the greatest difficulties remained to be solved, viz.: The treating of the steel so as to minimize expansion and contraction regardless of time. Johansson experimented for nine years with this part of the problem and it was not until 1906 that he succeeded in making the first combination set which could be guaranteed in accuracy to within .00001 part of an inch.

When he started to make his combination set, his intentions were to make working gages for the tool maker and inspector, but when the blocks were completed they were so accurate that they became standards, and five years later, viz.: in 1911, facilities were completed for manufacturing the blocks and a company was organized with Johansson as leader for putting them on the market on a production basis.

At first these gages met with prejudice and many mechanics considered them merely a curiosity. Scientists pronounced them impossibilities, and when they were first demonstrated at the International Bureau in Paris, Professor Benoit said, "This is pure magic and nonsense—you gentlemen don't know what you are talking about." But in spite of prejudice and ridicule, these gages have slowly found their way into the mechanical industries of the world, and are today practically the standards in settling all disputes about sizes and in accurately checking tools and gages; in fact, they are the toolmakers' delight and inspectors' authority.

A story is told of a tool contractor in Dayton, who had made a very elaborate fixture for a Detroit automobile plant. A few days after delivery he received word that it had been rejected. The contractor knew that he was right because the fixture in question was made in accordance with Johansson gages. Putting the gages under his arm he took the next train for Detroit. At the plant of his customer he was told that the fixture had been checked with micrometers and found not to be up to specifications. The tool contractor checked the fixture with his set of Johansson gages and it was shown to be perfectly correct. The chief inspector was very much embarrassed and immediately insisted that the manager equip him with a set of Johansson gages so that he would be protected against any future mistakes of that nature.

Johansson gages are made both for the English and metric systems. The surfaces are so perfect that when placed together they practically cohere as one piece of metal. In an experiment two one-inch blocks, on which the area of the end surfaces is .516 of a square inch, the lower block supported 220 pounds without separating from the upper block.

The blocks are finished in what is known as the "Johansson Lapped Surface." This surface is so perfect that its reflecting properties are equal to those of the best French plate glass. Under the microscope the surface edge, after being finished by Johansson lapped process, appears almost like a straight line, whereas the edge of ordinary lapped steel under the same microscope makes a very ragged line. The Johansson blocks are self-checking and the exactness of measurement is carried to such a pitch that English measurement can be checked against blocks manufactured for the metric system. The one-inch block checks perfectly against 25.4 millimeters built up with three or any number of blocks.

In numerous manufacturing establishments where interchangeability of parts is a very important consideration, all gages and jigs used in manufacturing processes are checked by the use of Johansson blocks. In the setting of sine bar fixtures, and in arranging the heights of pads for milling processes, in the setting of minimeters and in the gaging and checking of all straight surfaces, these Johansson blocks are practically indispensable.

NEW TOOL ENGINEERING FIRM

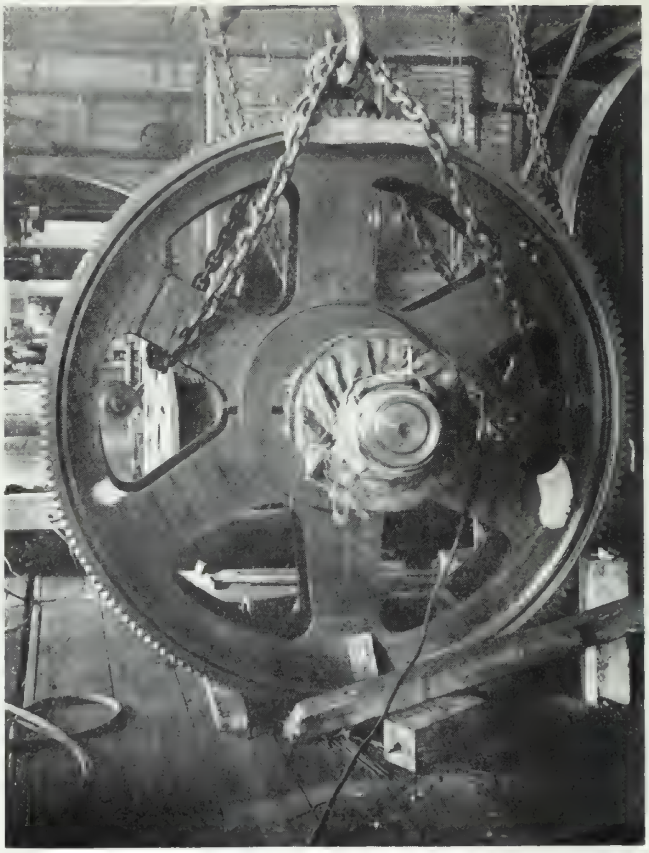
Very recently a newly organized firm, the Pacific Coast Machinery & Engineering Company, succeeded to the shop and business of the T. H. Griffitts Machine Works located at 20 Clementina street, San Francisco. This firm is composed of competent engineers and skilled mechanics and proposes to carry on an expert machinery and engineering business, specializing in the reorganizing and re-equipping of manufacturing plants for increased efficiency and economical production. Mr. Chauncey T. Keefer is president of the firm.

WELDCRAFT REPAIR

THE accompanying photograph shows how the Weldcraft process saved a valuable herring bone turbine gear. This gear, which is part of the equipment of the steamship Belfort, is 8½ feet in diameter and has a 24-inch face; it weighs approximately eight tons. The wheel is of double-flange, double-spoke construction and is made of cast steel.

It was welded by the ordinary arc welding process, but broke in the weld. In making the repair the Electric Welding Company of America had first to cut out all the welding material that had previously been deposited and reweld it; that is why the welds are so wide.

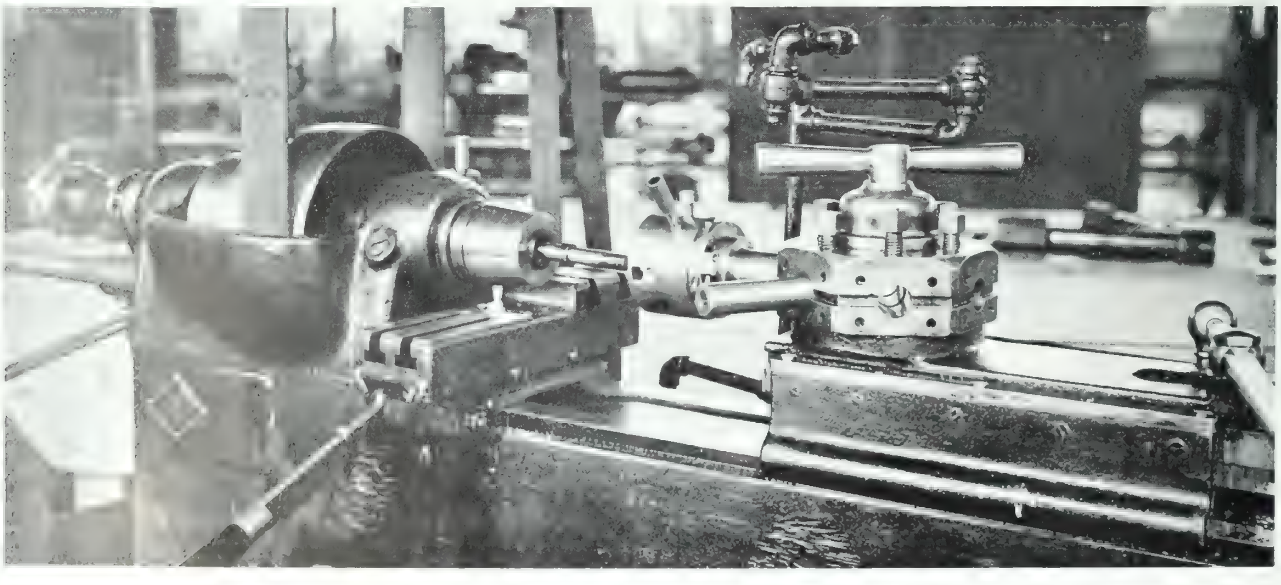
This work was done without preheating and saved from the scrap heap a gear that was worth between $7000 and $8000.



Large herring-bone gear saved by welding

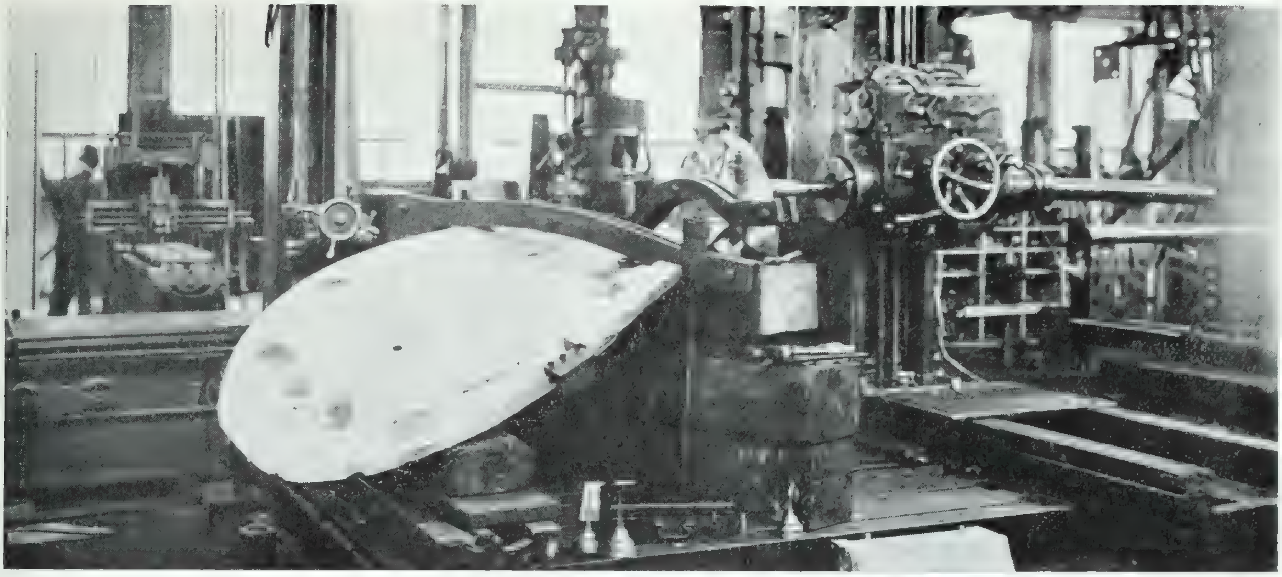
GEORGE DIAMOND'S NEW SHOP

George A. Diamond & Company have opened a machine shop at 215-217 Spear street, San Francisco, and are properly equipped to take care of all ordinary machining work. George Diamond, the president of this new concern, has had a very long and successful experience in shop work and shop management on the Pacific Coast. For a number of years he had charge of work in a machine shop in Seattle and more recently was shop foreman at the Skandia Pacific Oil Engine Company, and under his guidance the George A. Diamond Company will undoubtedly prove a complete success.



Garvin screw machine working on studs held in the spring collet designed by W. H. McKenzie of the Moore shipyards. This collet holds the threaded stud without injuring the threads and has been found very valuable for rapid production work

Ingenious Boring Mill Jig

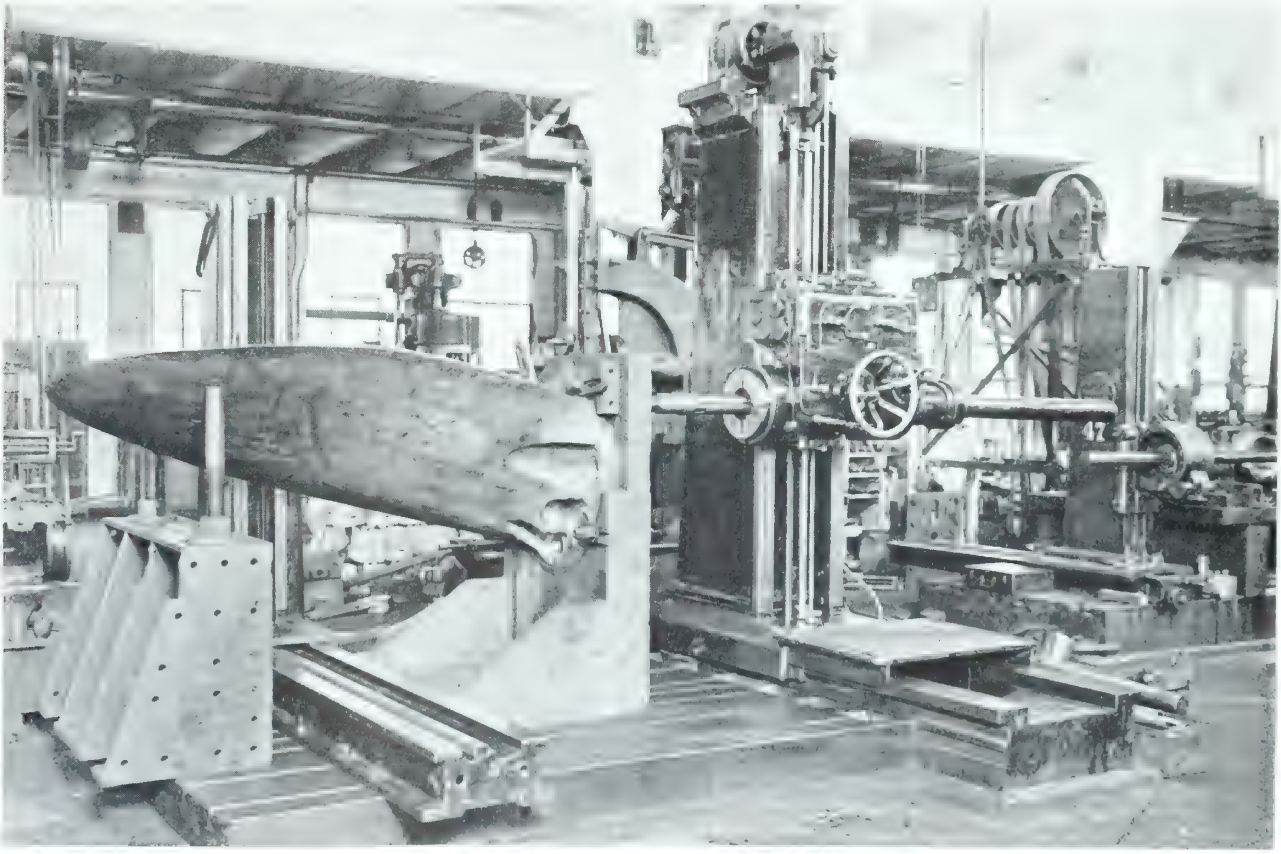


The Landis boring mill at the Moore shipyards, showing former method of setting up propeller blades for machining

PROPELLER blades are now machined in the machine shop of the Moore Shipbuilding Company in one-third the time formerly employed. A cast-iron angle plate is used which squares and centers the blade for machining; permits marking both the center and pitch line at the same time, and eliminates the necessity of checking the pitch of blades after machining.

By the old method the blade was clamped on blocks on the table of the horizontal boring mill and squared up to spindle of machine, thus causing considerable vibration when taking a heavy cut. The angle plate above mentioned is provided with a cast-on lug which makes it self-centering when placed on the boring mill and holds the blade firmly with any cut. This method also saves time when assembling the blades on the propeller hub of the ship as all the blades are uniform and interchangeable.

The angle plate and the general arrangement of this fixture are the work of W. H. McKenzie, general foreman of the machine shop at the Moore Shipbuilding Company. One of the accompanying illustrations shows the blocks and clamps and layout of the work under the old method, and another shows the angle plate fixture set up with a propeller blade ready for boring.



Landis boring mill, showing new method of setting up propeller blades with an angle plate

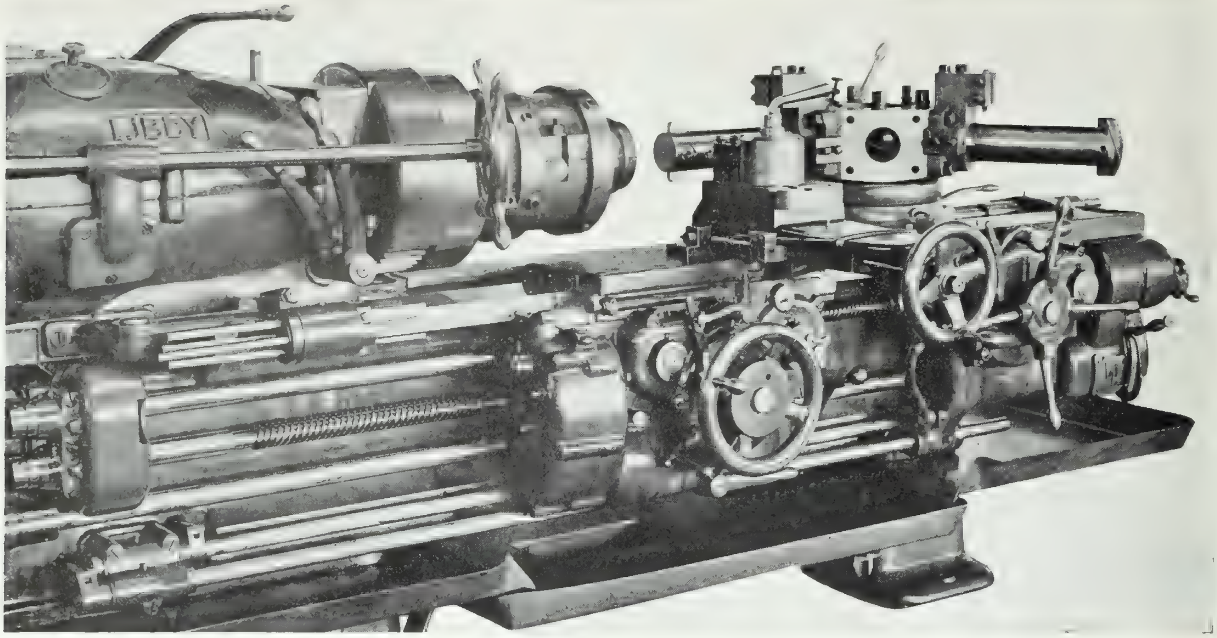


Figure 1. Libby lathe set up with special pot chuck for airplane engine cylinders

A Rapid Production Side Carriage Turret Lathe

By E. N. Moor, Jr.

RAPID strides have been made in the last few years in perfecting high-speed metal cutting, and to keep pace with that advance have come the modern high-power, rapid-production machine tools. The Libby rapid production side carriage turret lathe is an excellent example of this class.

In designing this machine it was necessary to produce a tool that would be capable of holding up under the most severe conditions that might be imposed on it. An all-geared head machine with the headstock cast integral with the bed was produced. Work speed changes are made through suitable gearing in the head with shift levers which are within convenient reach of the operator.

In a tool of this class abundant power for pulling heavy extensive cuts is essential. Extreme rigidity and stiffness to easily carry the heavy strains and produce accurate work continuously are also necessary. In producing these qualities the ease and speed of operation cannot be lost sight of. The machine must be convenient to handle and easy on the operator in order that he may keep the tool cutting a maximum percentage of the time and thus give a maximum production. These qualities are found in the Libby lathe combined with capabilities and possibilities that will inspire the tool engineer to his best efforts in designing ingenious and rapid production tools, jigs, fixtures, etc. The limit of production with this machine is the limit of the ability of the cutting tool to stand up.

Equipped with standard outfit of bar and chucking tools, the machine can be tooled up to produce a wide variety of work. Due to ease of operation and speed in changing tool set-ups comparatively small runs can be made and tools changed for different jobs economically. This feature is of great

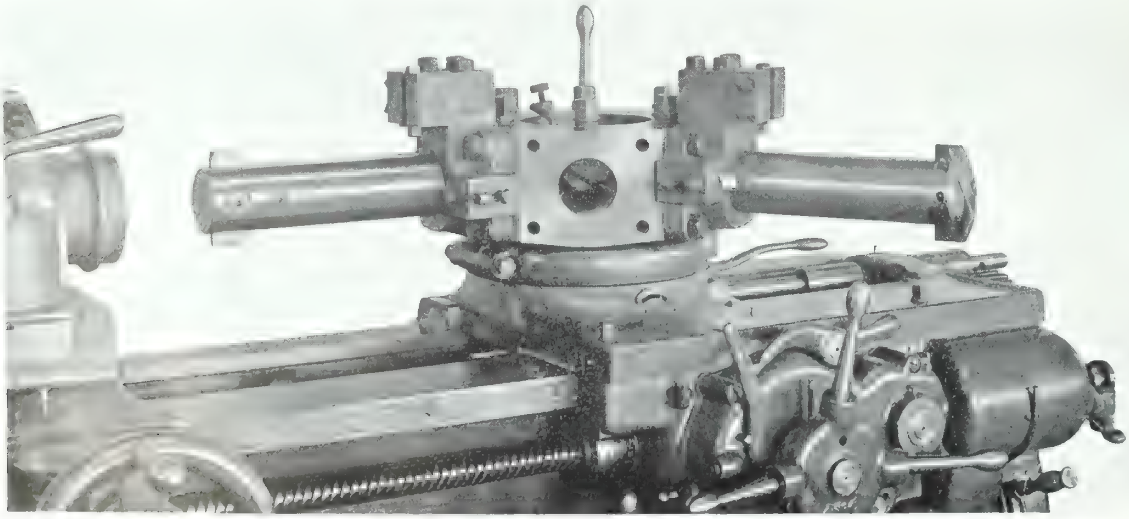


Figure 2. Turret head on Libby lathe, showing boring bars for airplane engine cylinders

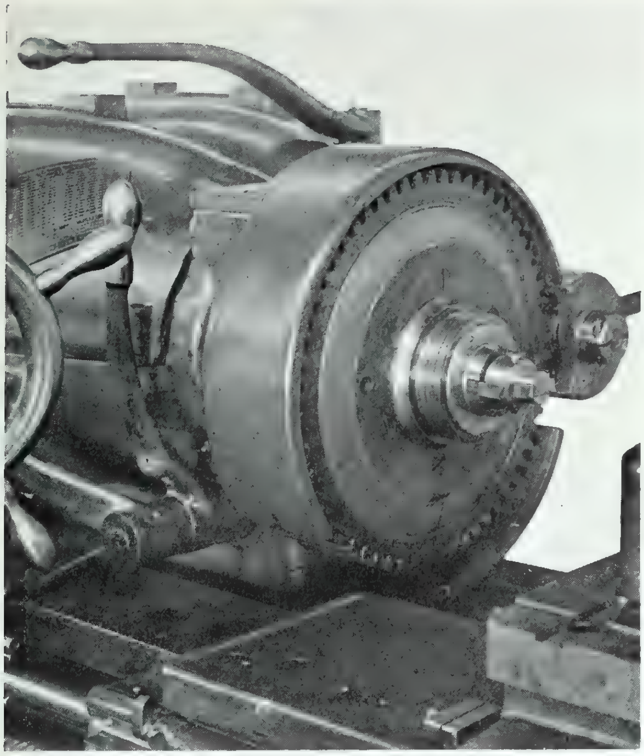


Figure 3. Showing boring bar worked through hollow spindle for facing and boring hole in the head of airplane engine cylinders

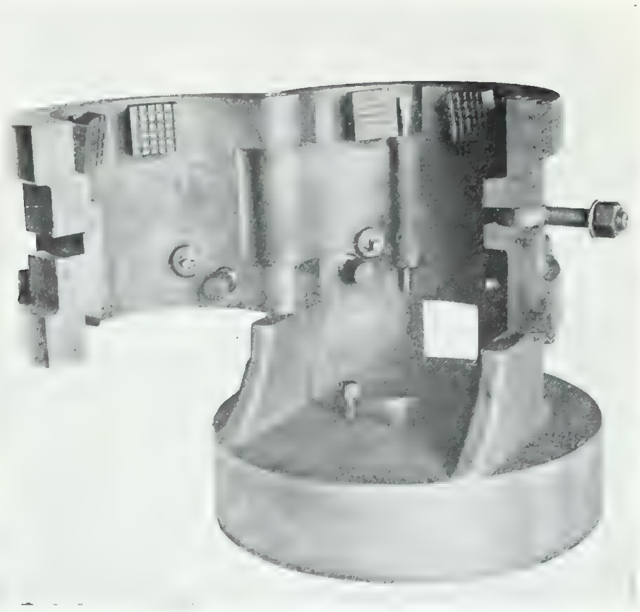


Figure 4. Detail of pot chuck for airplane engine cylinders

advantage in the shop that has work of the proper kind for a high-duty turret lathe, the quantity of same being limited.

An excellent example of rapid production work with this machine, giving an idea of its capabilities when tooled for special jobs, can be found in the gas engine cylinder. Figure 1 is a complete view of the turret lathe, showing the special boring tool equipment, with rough turning tools and chamfering tool held in suitable heads which are bolted to turret face. The finish cut of the cylinder base which fits the crank case seat is accomplished with a tool on the side carriage. This operation is completed while the sizing boring cut is running in. The combustion chamber is machined to a given shape and length in relation to the base flange with the broad curved formed cutter in the end of the boring bar.

Figure 2 shows a close-up view of this tool set up, giving an idea of the cutters in detail. All cutters used in this set-up were made up of stellite, which is capable of standing a much higher cutting speed than high-speed steel.

An interesting device is shown in Figure 3 for boring and facing a hole through the head of the cylinder. This device eliminated a second chucking operation and accomplished the job at one setting. The cutter shown projecting from the bushing in the spindle nose is fed into the work by the pilot wheel shown in Figure 1 at the side of the headstock. Movement of the cutter bar through the spindle is obtained by a spiral gear on the end of the pilot wheel shaft meshing with a rack on the cutter bar, the rear end of the bar being supported by a bracket fastened to the rear of the headstock. The cutter bar is provided with a stop to insure the cut reaching the same depth in each piece.

Figure 4 gives a detailed view of the fixture used for chucking the cylinder casting. It is made with a hinged leaf to enable the casting to be easily and quickly changed and the eight supporting points provide a rigid and secure means of holding the casting under the most severe cutting strains. The casting is located for length in relation to the tools by the screw stops and is centered by a screw movement in the supporting pads. The circular hole through the base allows the tool shown in Figure 3 passage for the rear facing operation.

This is one of many pieces of work that the Libby lathe is suited for and is an excellent example of the capabilities of this machine when tooled properly for a given job. The purchase of a turret lathe offers the shop management a wide field for the designing and making of suitable tools and fixtures to accomplish various purposes, and if proper thought is given to their design, bearing in mind the quantity and quality of work that is wanted, excellent results are sure to follow.

LARGE STEEL CONTRACT

The Barde Steel Products Company has been incorporated this month under the laws of the State of Delaware. The names of the directors will be given out in a few days. It has been stated that most of them are bankers from New York and the West. It has also been understood that this enterprise has been organized by M. Barde & Sons, steel, iron and machinery merchants of Portland, Oregon. They have been in this line of business for the past twenty-five years and are considered to be the largest iron merchants on the west coast. Undoubtedly, of course, their names will also appear in the board of directors.

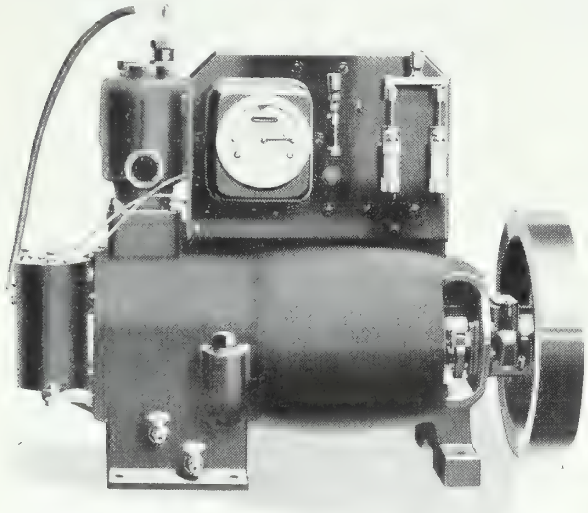
At the present time the Barde Steel Products Corporation owns between 350,000 and 500,000 tons of steel, consisting of plates, shapes and bars of all descriptions, etc., which were recently purchased from the United States Shipping Board. The value of this contract runs up to about $30,000,000. It has also been stated that the same concern is negotiating for an additional large quantity of steel.

Mr. L. Baron, formerly manager of the engineering and chemical department of J. Aron & Company, Inc., was appointed general export manager of this new corporation. Mr. Baron has been recognized in the export business for the past fifteen years, and has traveled extensively over Europe, including Russia, and the Orient, and has made very good connections in the foreign countries.

Full Automatic Lighting and Power Systems on Shipboard

IT will be interesting to the Pacific ship and boat owners to know that the Herzog Electric & Engineering Company, of 172 Steuart street, San Francisco, has closed a deal with the Consolidated Utilities Corporation of Chicago to represent it as Pacific Coast distributors of the world-famous Matthews Full Automatic electric light and power plant.

The Matthews Full Automatic was the standardized outfit adopted by the United States Government as auxiliary lighting units on transports, coast patrol boats, sub-chasers, light ships, light houses, wireless and field equipment, Red Cross, Y. M. C. A., and in the front lines during the great war. The government purchased and used many hundreds of Matthews outfits ranging in size from one-third k. w. up to twenty-five k. w. To say that they proved satisfactory in emergency and general use would seem superfluous, since at the present time a large portion of the Matthews Engineering Company's business is devoted to government work in the isolated lighting plant field.



"Little Husky"
350-watt Matthews Full Automatic Lighting Unit with normal capacity of fifteen 20-watt lamps of 32 volts

The Matthews Engineering Company are the exclusive builders of a full automatic electric light and power plant for marine purposes in America; they have been engaged in that field for over twelve years and built up their business from a small beginning to a concern today worth several millions. The name "Matthews" bespeaks the highest quality obtainable in manufacture and dependability in operation.

During the war, when the government wanted the best and most efficient auxiliary electric outfits they could get to safeguard the lives of many thousands of doughboys on their journey over-seas, it called upon the Matthews Engineering Company of Sandusky, Ohio, to assist in the design and development of an electric lighting unit that would start up automatically and furnish light for the ship and signals as well as power for the wireless and search-lights in case the ship was torpedoed and the main steam plant rendered inoperative.

The Matthews engineers immediately went to work on the development of large full automatic 110-volt outfits, and in record time the factory had under production these massive machines. They served their purposes well and today there are many hundreds of them giving dependable light and power on the seven seas.

The Consolidated Utilities Corporation of Chicago now announces its new style 1-kilowatt Matthews lighting and power plant as the last word in this type of electrical equipment. This compact plant, weighing only 395 pounds, net, shows a rated generator capacity of 1000 watts with 20 per cent overload capacity. Its engine is the same that has been standard in Matthews equipment for seven years.

A radical change has been made in the cooling system, the old-style tank having been replaced by an automobile-type of radiator. The switchboard also has been condensed into a very small compass and mounted above the generator so that the whole unit boxes into a package of only 45 by 34 by 22 inches.

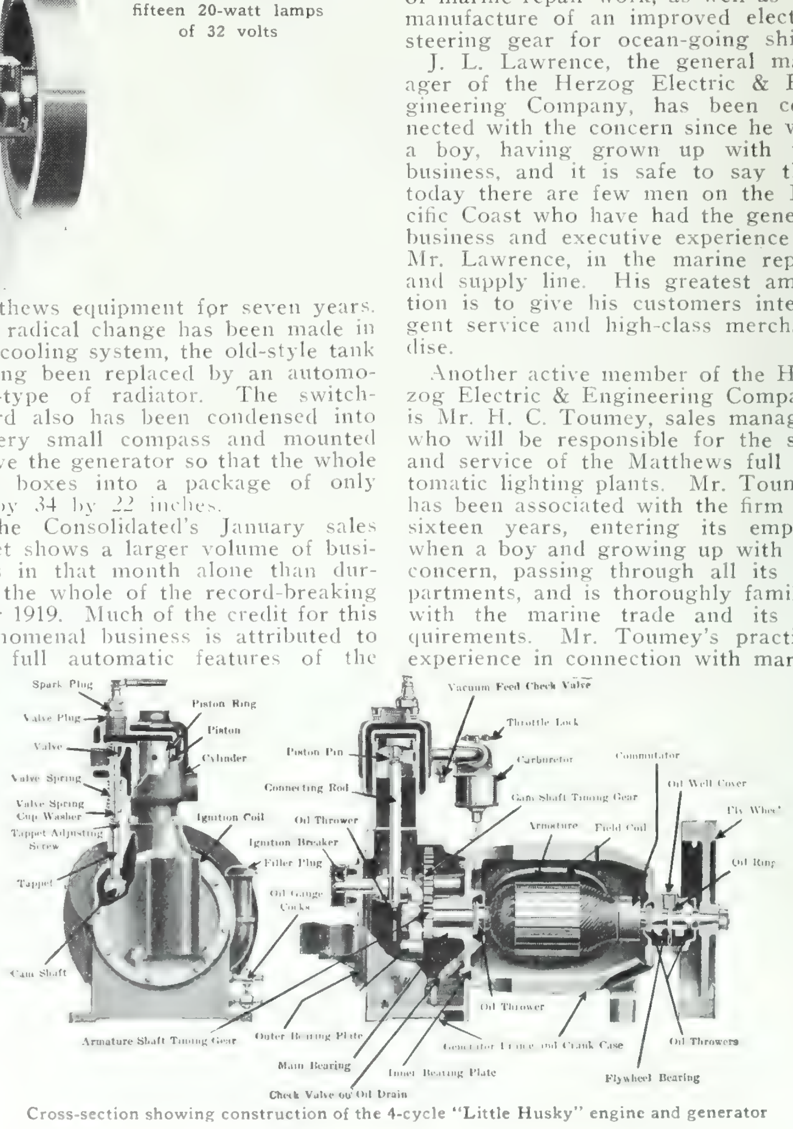
The Consolidated's January sales sheet shows a larger volume of business in that month alone than during the whole of the record-breaking year 1919. Much of the credit for this phenomenal business is attributed to the full automatic features of the Matthews plants, which automatically start the batteries to recharging and automatically stop recharging when the batteries are full. These features also automatically handle an overload in such a way that ample power without danger of injury to the batteries is assured and they do all this without attention from the owner aside from keeping the plant supplied with fuel and oil.

Because of a tremendous expansion which was made necessary to take care of government war requirements the Matthews manufacturing facilities are now extraordinarily well equipped to take care of this great flood of commercial business.

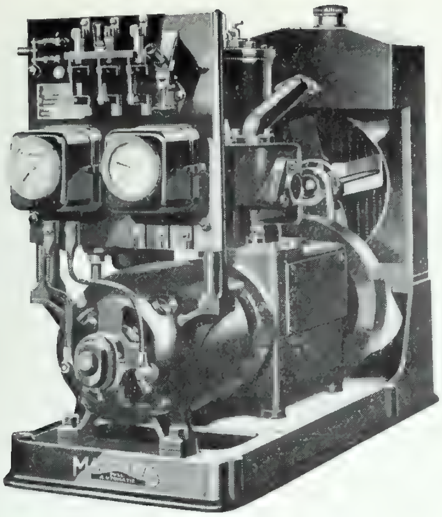
The Herzog Electric & Engineering Company has a full and complete line of Matthews Full Automatic lighting plants at its San Francisco store and shops. It is perhaps the best known concern of its kind on the Pacific Coast, having been located in San Francisco for many years. There is an efficient and modern machine shop in conjunction with the marine supply business, in which is carried on a general line of marine repair work, as well as the manufacture of an improved electric steering gear for ocean-going ships.

J. L. Lawrence, the general manager of the Herzog Electric & Engineering Company, has been connected with the concern since he was a boy, having grown up with the business, and it is safe to say that today there are few men on the Pacific Coast who have had the general business and executive experience of Mr. Lawrence, in the marine repair and supply line. His greatest ambition is to give his customers intelligent service and high-class merchandise.

Another active member of the Herzog Electric & Engineering Company is Mr. H. C. Toumey, sales manager, who will be responsible for the sale and service of the Matthews full automatic lighting plants. Mr. Toumey has been associated with the firm for sixteen years, entering its employ when a boy and growing up with the concern, passing through all its departments, and is thoroughly familiar with the marine trade and its requirements. Mr. Toumey's practical experience in connection with marine

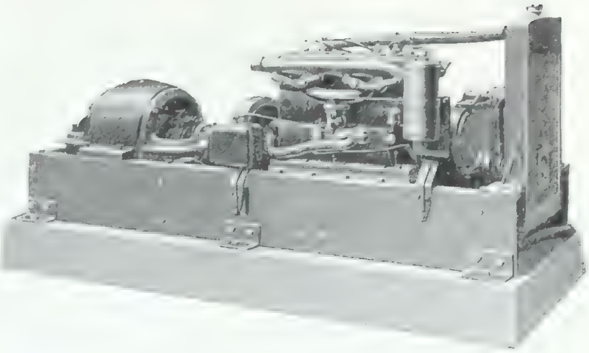


Cross-section showing construction of the 4-cycle "Little Husky" engine and generator



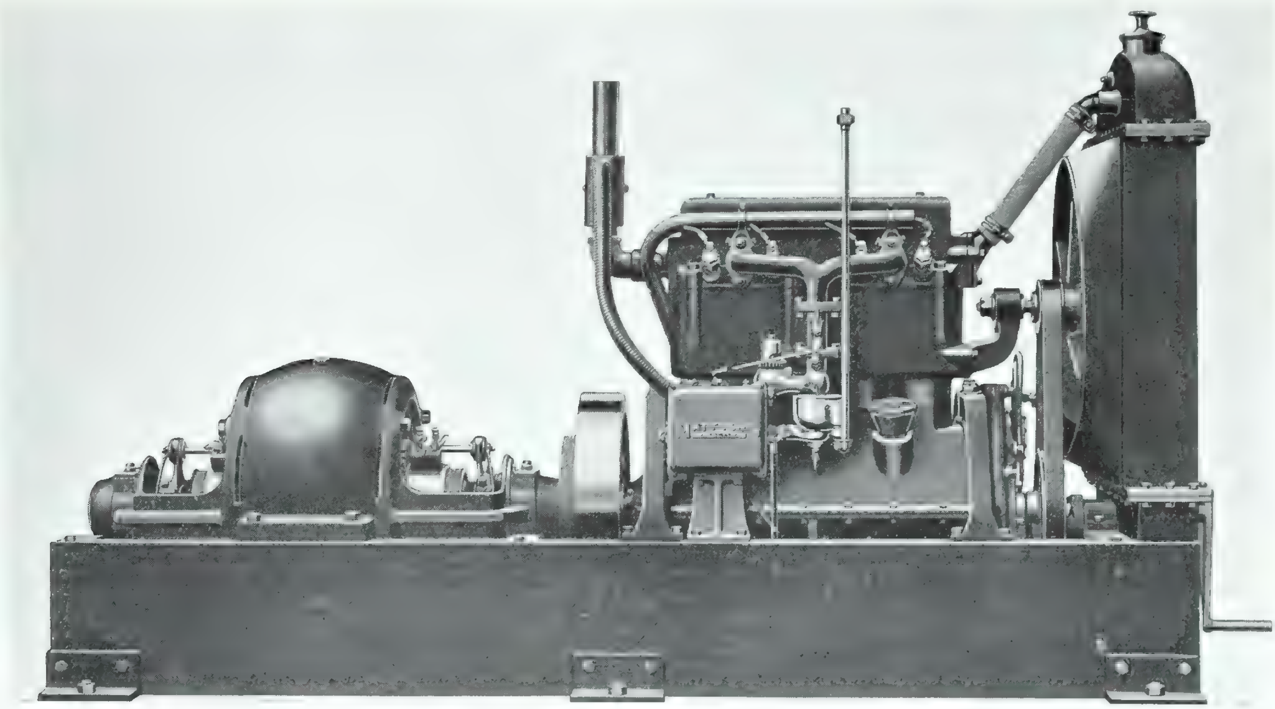
On Left:
New model "J. R." Matthews Full Automatic Lighting and Power Plant with a capacity of fifty 20-watt lamps and power capacity of ¾ horsepower

On Right:
The 5-kilowatt Matthews Full Automatic Lighting and Power Plant with power capacity of 6 horsepower capable of lighting 200 50-watt lamps



electrical equipment will be very valuable in studying the requirements in regard to installing the Matthews full automatic power plants.

The Herzog Electric & Engineering Company is to be complimented on its connection with the Consolidated Utilities Corporation and Matthews Engineering Company, and it goes without saying that the Matthews Full Automatic will have good representation on the Pacific Coast.



The 15-kilowatt Matthews Full Automatic Lighting and Power Plant with power capacity of 20 horsepower and capable of lighting seven hundred and fifty 20-watt lamps. These units may be applied in parallel to any power capacity required. The full automatic feature permits automatic starting and stopping of one or more units as power is used or shut off.

A New System of Paint Manufacture

THE high price of linseed oil and the frequently unsatisfactory quality of that material as supplied during the last few years have induced many paint manufacturers to consider satisfactory substitutes.

The William Cail Bitmo Company, an offshoot of the International Composition Company (late Holzapfels) of New York, has succeeded in finding such a substitute, which, with many eminent qualities, combines a low cost. A little over two years ago experiments were started with an organic wax, dissolved in hydrocarbons, and it was found that this solution of varnish, which contains no oil whatever, possessed remarkable powers of adhesion, elasticity, resistance against acids and electrolysis, also against seawater, dampness, etc. Another quality possessed by the varnish was that it served as an insulating coat for surfaces covered with asphalt and other bituminous substances.

Mr. Holzapfel, president of the company, was not long in recognizing the good qualities of this varnish, and after testing it in form of a paint on steel plates exposed to the weather for about a year, decided to bring it out under the name of Otello paint. This paint has now been on the market for a little over a year and is made in seven different shades, the principal ones being black, brown, red and green.

So far, it has been found impossible to produce paints in lighter shades, but as the base of the paint appears susceptible to the bleaching effects of actinic rays, it is hoped in due time to also produce paint in lighter colors.

The chief purposes for which this paint has heretofore been used with great success are:

Black: For ships' top sides, for structural steel, as a protection against all acids, also against electrolysis.

Red: As a hold paint for ships, as a paint to cover asphalt or other bituminous roofs, as a substitute for red lead on new steel.

Green: For steel and wooden roofs.

Brown: For steel and wooden roofs.

These paints have the following qualities:

1. They are applied like any ordinary paint, flow well and dry in about one hour with an enamel surface.
2. They adhere reliably to steel, iron, wood, canvas, asphalt roofs and galvanized structures.
3. They possess a high degree of permanent elasticity.
4. They are proof against acids and electrolysis.
5. They are an excellent waterproofing material.
6. They are half the cost of oil paints.

Although with the present high cost of labor a saving in the cost of paint may not be considered very important, the many special qualities possessed by this paint appear to recommend it to the particular attention of users. Time, of course, will prove whether this paint has come for good. The manufacturers say yes, and they show samples of floor cloth manufactured with the base of this paint which appear to possess all the elasticity and other qualities of a highly oxidized linseed oil. Messrs. Clinch & Company, of 144 Davis street, San Francisco, are distributors of Otello paints in Northern California.

TRADE LITERATURE

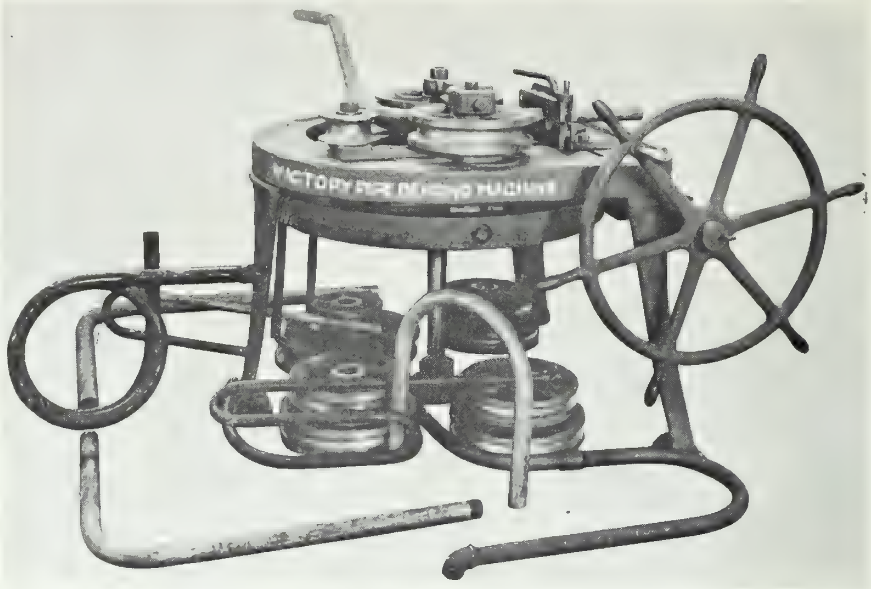
Catalog and Price List No. 10. The Nelson Valve Company, Chestnut Hill, Philadelphia.

A very neat book of 156 pages, describing and illustrating the extensive line of angle valves, check valves, combination disc valves, gate valves, globe valves and special forms of these types, all of which are manufactured in bronze, iron and steel.

The Nelson Valve Company is represented in San Francisco by Robert B. Graham with offices and warehouse at 75 Fremont street.

General Catalog of the American Manufacturing Company.

This profusely illustrated 100-page booklet describes the American cordage line, including Manila rope, sisal rope, marine cordage, transmission rope, drilling cordage, jute and hemp twines, marlines, reinforced cotton rope, clothes lines, packing and oakum. American products have a splendid reputation and the American Cordage Company claims to be the largest manufacturer of Manila and sisal rope, jute and hemp twines in the world.



The De Beers Victory pipe bending machine and some of its work. This machine is manufactured by the American Marine Iron Works, Portland, Oregon

The shop and office of the Pacific Block & Forging Company, 224 Spear street, San Francisco

Tackle Blocks

THE Pacific Block & Forging Company has been incorporated for $75,000, with offices and plant at 224-232 Spear street, San Francisco, California. Up-to-date equipment is being installed for the manufacture of steel and wooden tackle blocks, wire rope blocks, logging and oil well blocks, marine hardware and drop forgings.

Mr. Herbert F. Cook, president and manager of the company, has had many years' experience in this line through his association with the Boston & Lockport Block Company, for which company he was at one time factory superintendent and latterly sales representative on the Pacific Coast. He assures the trade that a product first-class in every respect will be turned out.

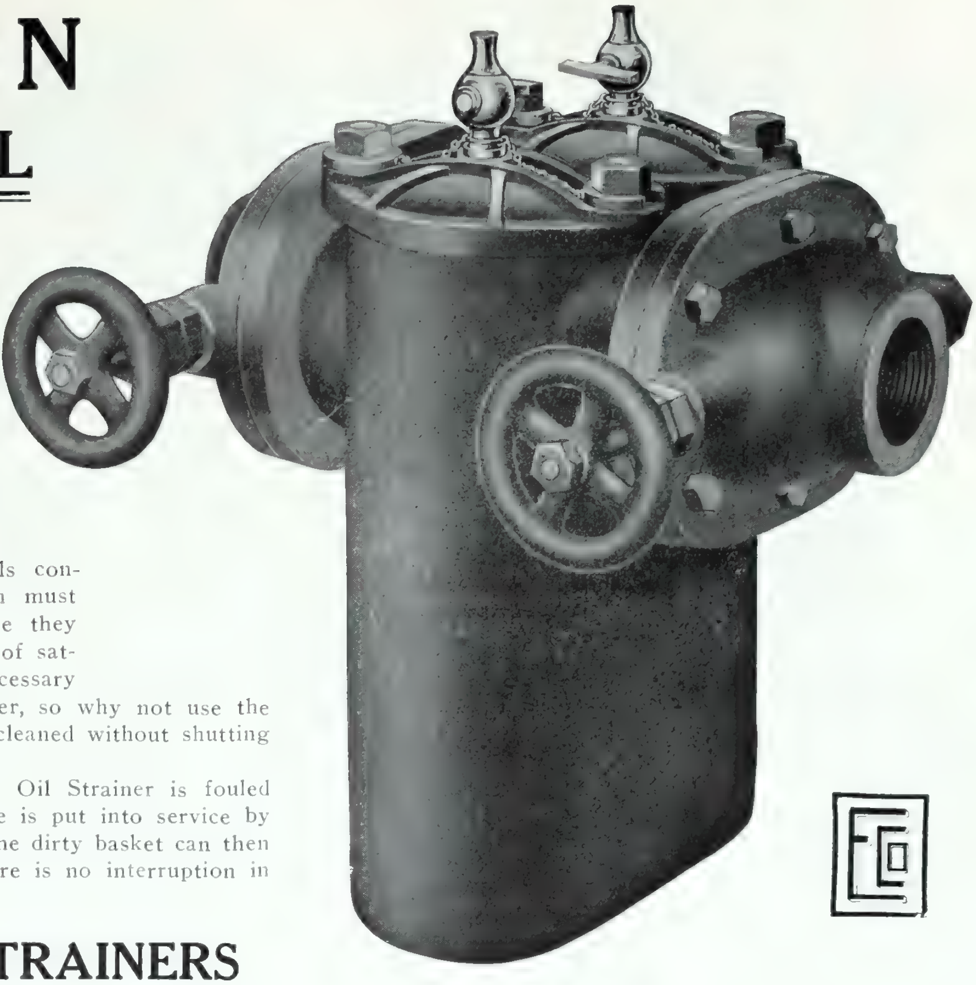
Mr. C. H. Barstow, vice-president, formerly with the Foard, Barstow Ship Chandlery Company, will have charge of the accounting department.

Mr. Cook, with his wide experience as to the requirements of steel and wooden tackle blocks for the Pacific Coast trade, will be able to fill the particular needs of any modern plant that may require this product.

All styles of blocks will be manufactured, and particular attention will be given to self-lubricating bronze bushed blocks, etc. The hot-dipped galvanizing has always been an important subject with Messrs. Cook and Barstow, and the Pacific Block & Forging Company will be equipped with every facility for turning out the highest grade of galvanized surface. This department will be in the hands of experts so that the marine trade may depend upon the blocks.

(Section continued on page 142)

STRAIN
YOUR OIL



Both fuel and lubricating oils contain some solid matter which must be removed from them before they can be used with any degree of satisfaction. To do this it is necessary to use some kind of a strainer, so why not use the Twin—a Strainer that can be cleaned without shutting off the supply.

When one basket of a Twin Oil Strainer is fouled with solid matter, a clean one is put into service by simply shifting two valves. The dirty basket can then be cleaned at leisure, and there is no interruption in the supply of clean oil.

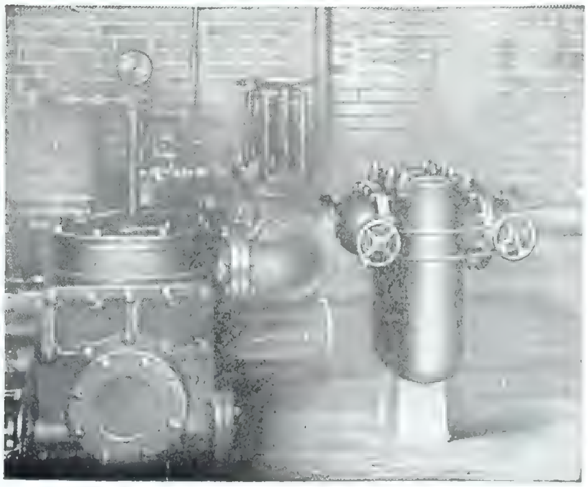
TWIN OIL STRAINERS

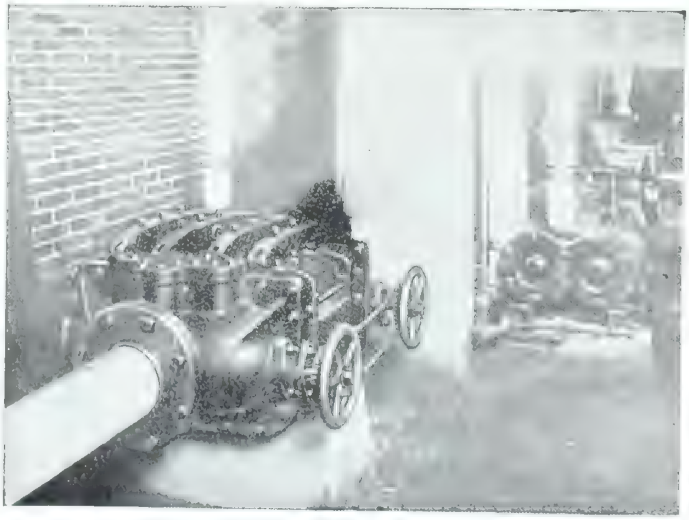
give the same service as two single Strainers, but are more convenient to operate, require less space for installation and do away with all extra valves and piping necessary to connect up. These are features that led to their being used in submarines and destroyers for the Navy and in cargo boats for the Merchant Marine.

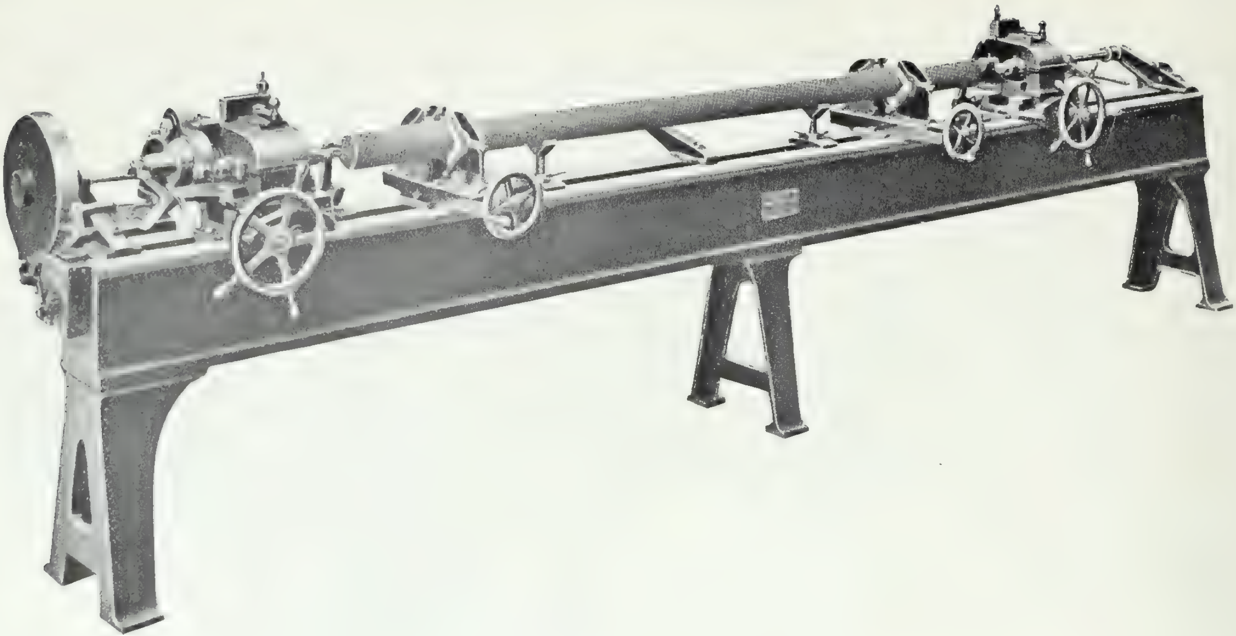
A 5" Twin Oil Strainer in lubricating oil system of a turbine installed at Carnegie Institute of Technology for the instruction of engineers sent to them for a course of instruction by the Shipping Board during the war emergency.

ELLIOTT COMPANY, 433 Grant St., Pittsburgh, Pa.

Twin Oil Strainers are furnished in sizes from 1" to 5" (2½" and larger sizes have flanged connections). Baskets of any perforation from 1/64" up. Complete information in Bulletin "AA."







The Pawling & Harnischfeger shaft centering machine

The Pawling & Harnischfeger Shaft Centering Machine

THE machine in its entirety consists of a cast iron bed of box section, strongly ribbed and planed on top and bottom; two drill heads, one stationary and one movable, each having a longitudinal motion of about 6¾ inches, moving on the base by means of a hand wheel with rack and pinion; two movable self-centering vises for shafts from ⅞-inch minimum to 8-inch maximum diameter; two adjustable supporting jacks; two end stops; a constant speed motor for either direct or alternating current; and a starting box or controller. The drill spindle is driven through an intermediate shaft from a spline shaft, which extends the entire length of the bed, and can be disconnected by a cone friction clutch while changing drills on countersink. The spindle is provided with a No. 2 Morse taper socket and a ball thrust bearing, and it is drilled in its entire length with a 13-32-inch center hole to take a knock-out pin for quickly changing from drill to countersink. All loose running gears are bronze bushed and the machine cut pinions are of steel. The drill spindle and intermediate shafts are connected by two sets of gears, one set giving a spindle speed of 600 r. p. m. for drilling, and one set for a spindle speed of 225 r. p. m. for countersinking, the change in speed being effected by a double case hardened jaw clutch; both spindles running in a right-hand direction.

The self-centering vises consist of a carriage, clamp, right and left hand screw, hand wheel and two jaws with jaw blocks for the smaller size shafts. Shafts from ⅞-inch to 8 inches in diameter can be handled. A shaft as short as 12 inches can be centered on both ends at once. For shafts shorter than 12 inches, only one drill head can be used at a time. The standard machine has a capacity of centering shafts 12 feet in length.

In turning shafts with many shoulders on a lathe with longitudinal stops, after the shaft is finished to one shoulder it is turned around and finished up to another. In order that the distance from one to the other may remain constant, it is necessary that the distance between centers on rough stock be alike, even if the shafts as they come from the cutting-off department or forge vary somewhat in length. To obtain this result two-stop brackets are provided with set screw and swinging arm, which, together with the locating pin, enables the operator to closely locate the shaft in the vise.

In the majority of cases, finished shafts are usually smaller at the ends than in the middle. By placing the blanks in the machine with the vises close together, it is not necessary to straighten crooked shafts unless they are very much out of alignment. In this way the size of rough stock can be reduced in order to finish to a certain size.

TIME TO PUT ON THE BRAKES

An Open Letter to the Trade

CONDITIONS affecting the roofing industry and allied lines are abnormal and puzzling in the extreme. On the one hand the demand from the trade is larger than ever before and greatly in excess of the ability of manufacturers to supply. On the other hand, raw materials are very scarce — almost unobtainable — with prices at unheard of levels. Rags, for example, are now selling at $85 a ton, an advance of $30 a ton during the past six months.

The situation in the East is even more acute than on the Pacific Coast, some manufacturers having advanced prices three different times during January. Some have withdrawn prices entirely; others have called in their salesmen, while a number are booking orders only for shipment at their convenience and at prices in effect when shipment is made. These Eastern conditions are already being reflected on this coast in the form of a greatly increased demand, and with advancing prices on the part of some manufacturers.

As to the advisabilitv—indeed, the necessity—of keeping prices down in general, there can be no argument. We, in common with thoughtful and patriotic citizens everywhere, recognize that prices cannot go higher without extreme danger.

How to meet the situation is the great question. Anticipating, in some degree at least, the conditions that would follow as a result of the restriction of building during the war, this company practically rebuilt its roofing plant at a cost of more than a million dollars. These improvements increased its output over 100 per cent, making it today the most modern, the most efficient and the largest single roofing plant in the world.

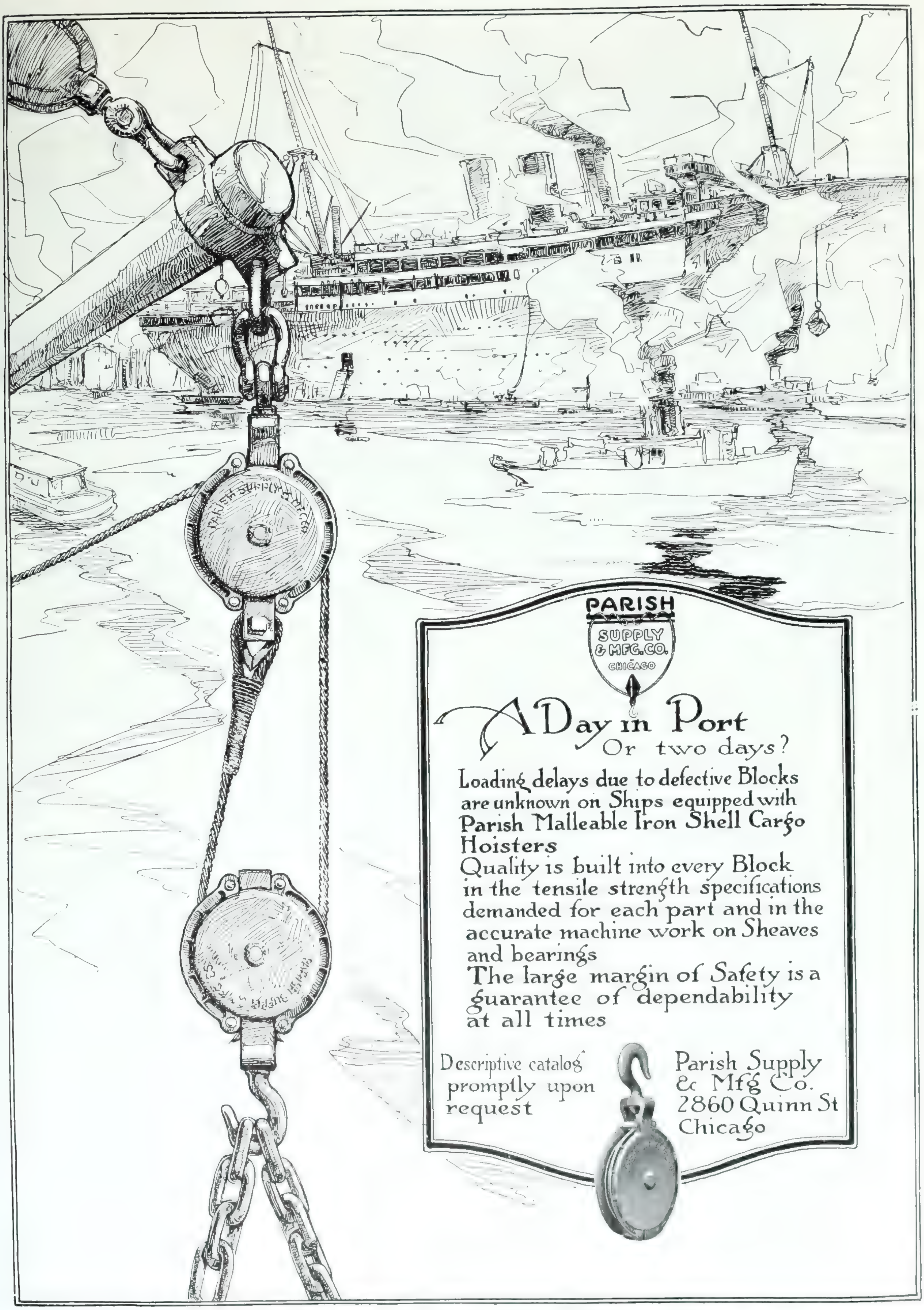
As a result of these increased facilities, our manufacturing costs are considerably lower than those of most manufacturers. Because of this fact and our sincere desire to assist in stabilizing prices generally, it is our purpose not to take advantage of prevailing conditions to exact the limit in prices. In other words, we will give our customers the benefit of our increased facilities and the stocks of raw materials which we have on hand and will advance prices only when our present large stocks are exhausted and we have to replace them at still higher prices.

In the meantime, we advise our customers not to speculate, but to buy to cover their immediate requirements only. If the building in sight in your city or community indicates a demand on you during the next three months for 100 squares, 500 squares, or a carload of roofing, buy that quantity and no more, but place your order now to insure delivery of the goods when you need them.

We urge also that our customers in turn do not attempt to secure from their customers the highest prices obtainable, but that they be satisfied with a fair and reasonable profit, because, in our opinion, it is only by so doing that our mutual interests and those of the country at large can be conserved.

Yours most sincerely,
The Paraffine Companies, Inc.
B. J. Williams, Director of Sales.

(Section continued on page 144)



A Day in Port
Or two days?

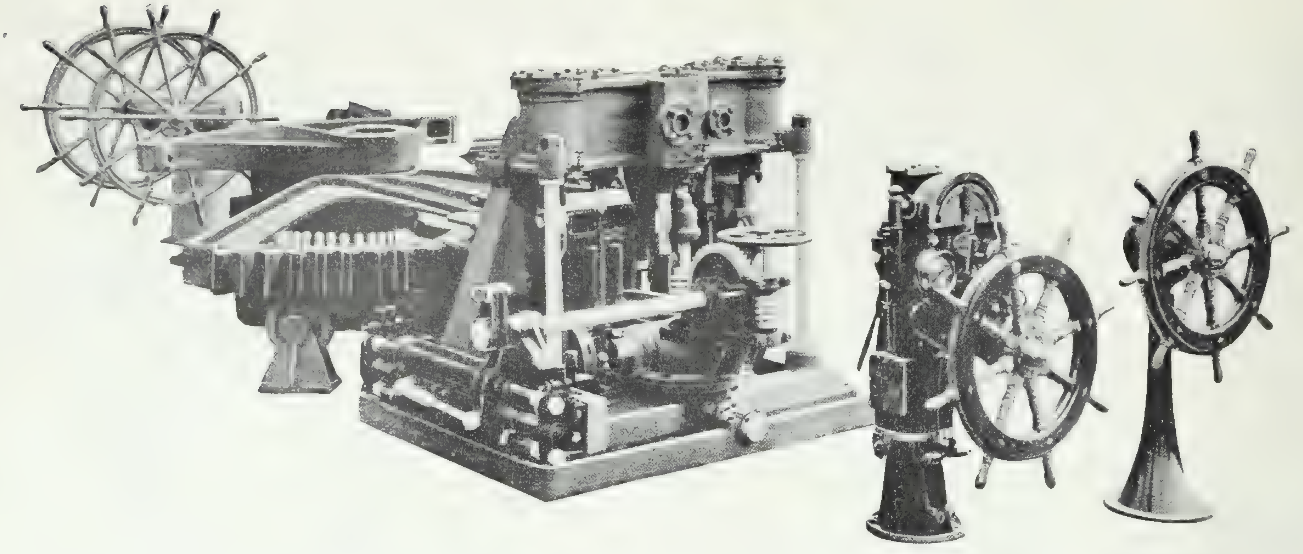
Loading delays due to defective Blocks are unknown on Ships equipped with Parish Malleable Iron Shell Cargo Hoisters

Quality is built into every Block in the tensile strength specifications demanded for each part and in the accurate machine work on Sheaves and bearings

The large margin of Safety is a guarantee of dependability at all times

Descriptive catalog promptly upon request

Parish Supply
& Mfg Co.
2860 Quinn St
Chicago



Steam steering engine of the spring geared, quadrant type, with hydraulic telemotor. Four of these were built by the Allan Cunningham Company of Seattle for the 10,400-ton cargo vessels built by the Skinner & Eddy Corporation on its own account

Allan Cunningham Reports Progress

THE Allan Cunningham Company of Seattle, until recently operating as the Pacific Machine Shop Manufacturing Company, are enjoying a continued volume of orders for marine auxiliary equipment since the war emergency.

The reorganization, which retains all of the former officers, gives this company increased facilities to take care of its rapidly growing business.

Among recent contracts awarded the Cunningham Company is an order for four complete steering engines of the spring geared quadrant type with hydraulic telemotor as pictured in the cut herewith for the four 10,400-ton cargo vessels which the Skinner & Eddy Corporation designed and are now operating on their own account.

Another order of interest at this time, and of an emergency nature, was from the Yokohama office of the U. S. Shipping Board for a complete steering engine, also of spring quadrant type. The original inquiry was in shape of a cablegram dated January 23 referring to an advertisement in Pacific Marine Review. The transaction was consummated and the complete order delivered along side the steamer sailing from Seattle February 4—**ten working days from date of original inquiry.**

The Cunningham Company were among the pioneers of the United States and foremost on the Pacific Coast to make a thorough and comprehensive study of the application of electricity to marine service. The electrical products of the concern, such as electric anchors, windlasses, cargo winches, capstans, steering gears, generating units, etc., are now to be seen on practically all of the prominent motorships and motortankers built on the Pacific Coast during the last ten years.

The Cunningham patented electric cargo winch which provides one man control of two winches with an electrical device enclosed in a watertight housing under bedplate, is destined to become popular for motorships and all vessels where the primary idea is efficiency and despatch in handling varying classes of cargo.

"Cory" Seventy-fifth Anniversary

CHARLES CORY & SON, INC., 290 Hudson street, New York City, will celebrate their seventy-fifth anniversary this spring by moving into their new, modern, reinforced concrete and glass factory building, which is now nearing completion on the corner of King and Varick streets, New York City.

The story of the Cory Company is an interesting one, having begun when steamships were very scarce, and to commemorate its seventy-fifth anniversary a history of the institution is now in the course of preparation by J. S. Jones, engineer of the firm. Its advent is expected about the time that the company will move into its new factory.

Charles Cory established the business in 1845, at which time it consisted of the manufacture and installation of brass railings for ships, ships' bells, bell pulls and speaking tubes. Later on, however, upon the invention of the mechanical engine telegraph, this company was the first in the country to manufacture this appliance and has always been a pioneer in designing and manufacturing signalling equipment for ships.

Three generations of Corys have guided the [illegible] of the company since its inception in 1845, and it has constantly and consistently taken the lead in the development of marine requirements for electrical and mechanical signalling devices, as well as lighting equipment for the various navies and merchant marine service.

John F. Cory, son of Charles Cory, managed the business from 1866 until 1892. During this period the firm started the manufacture and installation of electrical telegraphs and other electrical signalling apparatus for the navy and merchant marine.

Charles Cory, the second, grandson of the founder, was the third member of the family to assume charge of the business. His career of twenty-two years ended with his death in 1914.

John M. Cory, president and treasurer, is the second grandson of the founder. He is largely responsible for the firm's more recent, rapid growth. Due to his able administration as president and treasurer, and to the many inventions of marine electrical appliances by Frank W. Wood, vice-president, the Cory Company has achieved an enviable reputation, and is without doubt the foremost and largest manufacturer of marine electrical equipment in the world today.

Visualizing the growth of Charles Cory & Son, Inc., in the past seventy-five years, will be facilitated by comparative figures. The business originally started in 1845 at 278 Division street, New York City, where they occupied a total area of 1500 square feet. Today, in their three factories at 286 Spring street, 290 Hudson street, and 487-489 Greenwich street, the floor space is in excess of 70,000 square feet. The new building will contain more than 100,000 square feet and be completely occupied by the Cory company.

The firm has further expanded during the administration of John M. Cory, until it now has branches in New York, Philadelphia, New Orleans, Seattle and San Francisco; also offices in Bath, Camden, Baltimore, Newport News, Portland, Long Beach, (California) and Canada, as well as agencies in all the principal cities of the United States.

The Cory company is known the world over. By means of its many branches and branch offices it is enabled to give services in every important seaport on both the Atlantic and Pacific Coasts, which is a valuable asset to the purchaser of its appliances.

Buffalo, N. Y. A new Prest-O-Lite charging plant.

Convenient Producing Plants

The Backbone of Prest-O-Lite Service

NATION-WIDE Prest-O-Lite Service brings straight to the user's hands a single cylinder of highest-temperature gas—or hundreds of cylinders—

Such a Service must have a backbone strong enough to carry the tremendous load of national demand, flexible enough to meet the ever-changing needs of any one of an army of users.

40 Plants and Warehouses Supply

Prest-O-Lite

DISSOLVED ACETYLENE

Wherever you may be located, however large or small your requirements, there is an efficient Prest-O-Lite *producing* plant near—ready to serve you quickly and well.

THE PREST-O-LITE COMPANY, Inc., General Offices 30 East 42nd Street, New York
Kohl Building, San Francisco
In Canada—Prest-O-Lite Co. of Canada, Limited, Toronto

CONDULETS

V CONDULET

The V and VH series of Condulets remain storm-proof and protected against dampness and salt air, even when globes become broken or are removed for lamp renewals.

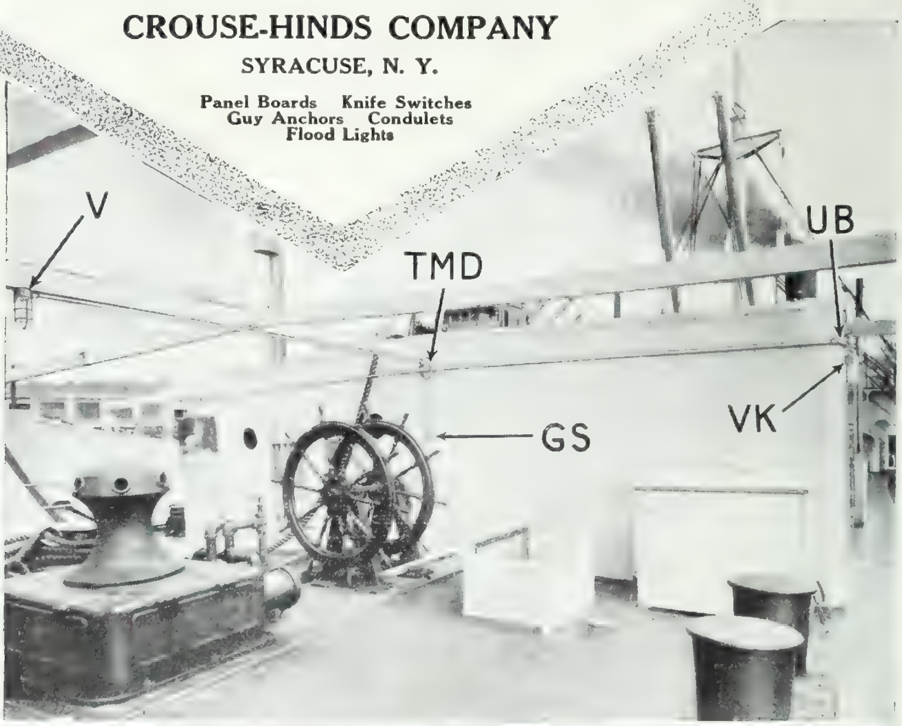
Marine Condulets

Condulets are indispensable to sea-worthy ships. They make an electrical installation not only storm and weather-proof but also keep it protected from the deteriorating action of salt-laden air.

If you are in any way responsible for a ship's equipment, you should have the Crouse-Hinds Catalog.

CROUSE-HINDS COMPANY
SYRACUSE, N. Y.

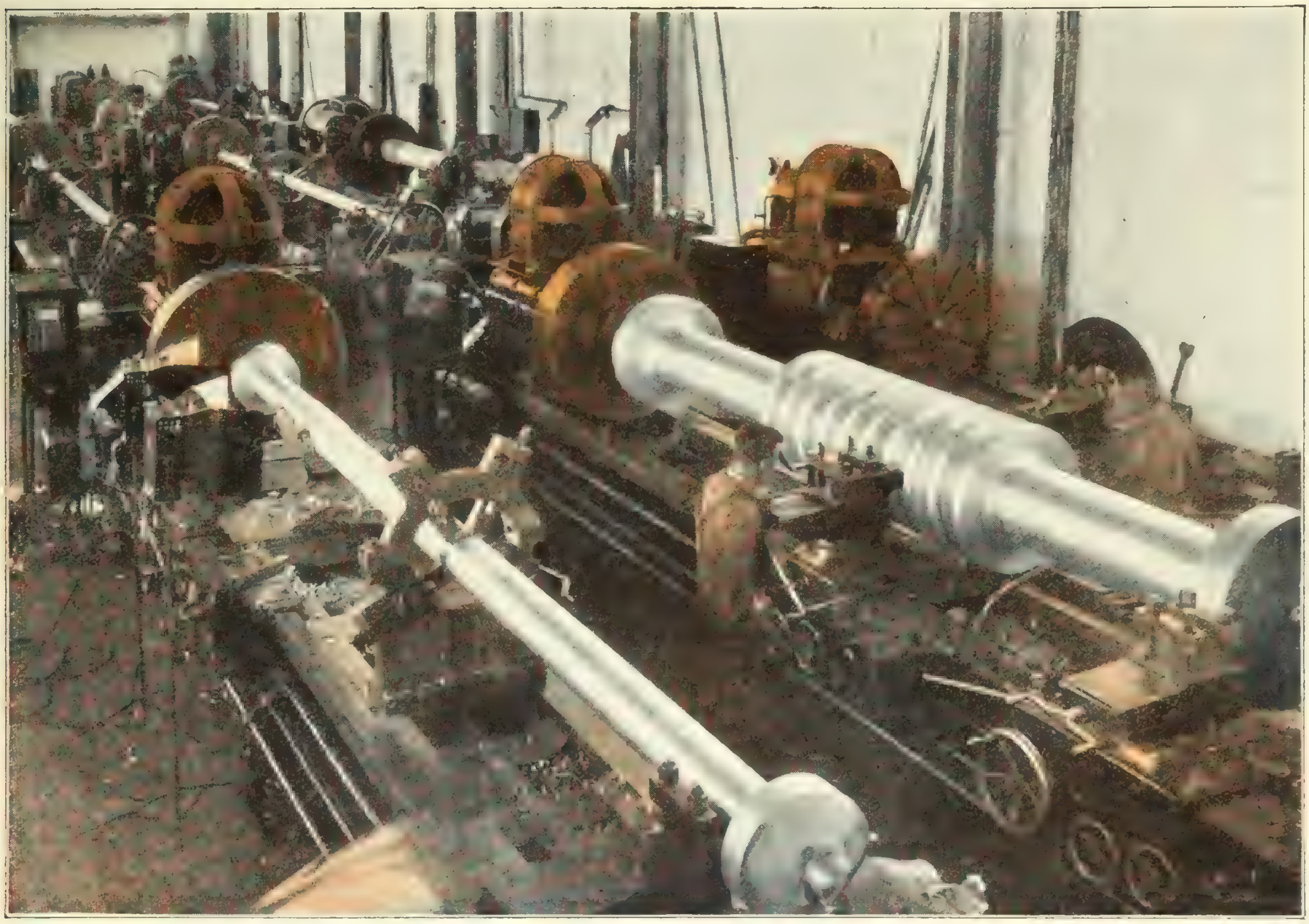
Panel Boards Knife Switches
Guy Anchors Condulets
Flood Lights



Condulet the Job

CROUSE-HINDS

CAMDEN



AN ABUNDANCE of Equipment, Operated with Experienced Skill, Makes

CAMDEN FORGINGS

GOOD TO USE

The purchase precedes the use and the inquiry the purchase.
So take with us the first step, namely, *send us the inquiry.*

BUYERS' MEMO

- High and Low Carbon Bars
- Press Columns and Rams
- Pull Back Cylinders
- Water Cylinders
- Valve Bodies
- Plungers
- Weldless Steel Rings
- Lathe Spindles, solid and hollow bored
- Long Feed Screws
- Power Press Crank Shafts
- Cam Shafts
- Eccentric Shafts
- Crusher Shafts
- Gear and Pinion Blanks
- Locomotives
  - Side and Main Rods
  - Crank Pins
  - Axles
  - Rod Straps
  - Piston Rods
  - Guides
  - Parts of frame, both in iron and steel
- Hammered Iron Bars for locomotive repairs
- Marine Shafts
- Marine Connecting and Eccentric Rods
- Rolls
  - Bending
  - Feed
  - Straightening
  - *Embossing*
- Large Wrenches
- Saw Arbors
- Steam Engine Forgings
- Pump Crank Shafts
- Generator Shafts
- Pump Connecting Rods
- Large Nuts
- Turbine Shafts
- Mill Shafting
- Trolley Car Axles
- Electric Motor Axles
- Any forging to your print and specifications, in either iron or steel

CAMDEN FORGE CO.
CAMDEN, N. J., U. S. A.

The South Plant, Baltimore Drydock and Ship Building Company. The giant stiff leg derrick, outfitting shops, boiler shop and ship ways.

THE BALTIMORE DRY DOCKS & SHIP BUILDING CO.

HOLDEN A. EVANS
President

J. M. WILLIS
Vice-Pres. and Gen. Mgr.

Three Complete and Modern
Ship Building Plants
Two Large Dry Docks
Two Marine Railways

SHIP REPAIRS

handled in the quickest and most economical manner. Our equipment includes two shear legs, capacity 100 and 80 tons, respectively; ample crane facilities and the most up to date machinery.

NEW CONSTRUCTION

Complete equipment for building vessels up to 12,500 tons d. w. Builders of Steel Cargo Carriers, Oil Tankers, Barges and Tugs

BALTIMORE, MD., U. S. A.

New York Office, 120 Broadway—*Phone Rector 5945*

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BRUNSWICK

A Trip Through the Shops Where

Brunswick Ice Machines are Built

Portion of Valve Shop: Turning out Valve Bodies, Scale Traps and Fittings.—All fittings are extra heavy, especially designed for ammonia work.

Exclusive manufacturers in United States of Hall CO_2 refrigerating machinery.

BRUNSWICK REFRIGERATING CO

110 - 130 JERSEY AVE.
NEW BRUNSWICK N. J.

SAN FRANCISCO	SEATTLE
DE LAVAL DAIRY SUPPLY CO.	PACIFIC ICE MACHINE & SUPPLY CO.

Most Adaptable to Marine Installations

Because It Meets the Requirements of:—

Simplicity

The Terry has but one wheel, which is made from a single piece of steel with buckets or pockets milled out of the solid metal.

Maintained Efficiency at Low Speeds

The Terry principle of operation, which permits returning the steam again and again to the same wheel, is more efficient at lower speeds than any other type of turbine. By this principle, furthermore, the original efficiency is maintained after years of service because bucket erosion does not alter the steam angles.

Ease of Repairs

The Terry casing, glands and bearings are all horizontally split, permitting quick access to the interior. All parts subject to wear can be replaced without disturbing steam or exhaust connections or the alignment of the unit.

Minimum Attention

Probably the greatest difficulty with the steam turbine in marine service is the lack of experience of the operating engineer. The Terry meets this difficulty because of its extreme simplicity of design. The Terry turbine does not require as much attention as the average electric motor. As the Chief Engineer of the Burnham-Morrill Co. said, "The Terry is something you can start and let go without watching."

Low Cost of Up-keep

With the Terry Turbine the only parts subject to rubbing are the bearings and stuffing boxes. The rotor will withstand extreme steam wear without loss of efficiency. Pump, blower and generator units in marine installations have operated for years without repairs.

Reliability

Simplicity, ease of repairs, low up-keep cost and minimum attention mean reliability. The best proof, however, is the successful application of more than 6500 Terry Turbines on land and at sea.

Write for Bulletin M-25 explaining in detail why you will make the right selection if you

SPECIFY TERRY

The Terry Steam Turbine Co. **Hartford, Conn., U. S. A.**

T-78

Pacific Coast Shipbuilding Returns

Albatross Metal Furniture Company, Portland, Ore.
(Standard Vault & Metal Works)

Purchasing Agent, **K. Kerekes.**

Manufacturing steel cabinets and lockers for ships.

Albina Engine and Machine Works, Inc., Portland Ore.

General Manager, **Mr. William Cornfoot.**

Overhauling and marine repairs a specialty.

Allen Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **G. E. Hunt.**

Two Allen type vessels, 274.6 B. P. by 44.9 by 26.4.

American Concrete Pipe & Shipbuilding Co., Seattle, Wash.

One 7,500-ton concrete steamship.

One 150-foot steam concrete tugboat.

Two concrete scows, 120 feet long.

American Marine Iron Works, Portland, Oregon

Purchasing Agent, **Carl R. Jones.**

Contracts covering cast iron fittings for steel and wood yards of G. M. Standifer Construction Corporation, Vancouver, Wash.

Ames Shipbuilding and Dry Dock Co., Seattle, Wash.

Purchasing Agent, **J. M. Roth.**

Twenty-seven vessels under contract, mostly 8800- ton freighters.

Anacortes Shipbuilding Co., Anacortes, Wash.

Acting Manager and Purchasing Agent, **Will W. Dunn.**

Two wooden vessels, Ferris type, 281 by 46 by 23.6; engines 19-36-56; 1500-h. p. watertube boilers. Delivery 1920.

Anderson Shipbuilding Corporation, 816 Alaska Building, Seattle, Wash.

Purchasing Agent, **W. G. Hall.**

Apex Manufacturing Company, Emeryville, Cal.

Purchasing Agent, **A. Youngholm.**

Several hundred metallic life boats for U. S. Shipping Board and shipyards.

Astoria Marine Iron Works, Astoria, Ore.

Purchasing Agent, **Mr. J. A. Jackson.**

Completely outfitting 27 Hough and Ferris type wooden vessels.

Contractors for United States and French governments.

Overhauling and repair of ships a specialty.

Marine railway under construction capable of handling ships up to 12,000 tons register. Fabricators of steel buildings, bridges, tanks and other structures.

Babare Bros., Old Town, Tacoma, Wash.

Purchasing Agent, **Mr. Geo. Babare.**

Four wooden freighters, Ferris type.

Ballin Water Tube Boiler Co., Portland, Ore.

Sixteen Ballin type water-tube boilers for eight steamers. For the Supple & Ballin Shipbuilding Co.

Twelve Ballin type water-tube boilers for six steamers building at the G. M. Standifer Construction Corporation.

Barnes & Tibbitts Shipbuilding & Dry Dock Company, Alameda, Cal.

President: **W. G. Tibbitts.**

Vice-President: **J. D. Barnes.**

Secretary: **J. J. Barnes.**

General repair and dry-docking business.

Benicia Shipbuilding Corporation, Benicia, Cal.

Purchasing Agent, **L. S. Jones,** Alaska Commercial Bldg., San Francisco, Cal.

Bethlehem Shipbuilding Corporation, Ltd.
Union Plant, Potrero, Risdon, Hunter's Point, Alameda Works (Alameda Side)

General Manager, **Jos. J. Tynan.**

Assistant General Manager, **A. S. Gunn.**

Secretary and Treasurer, **Arnold Foster.**

Purchasing Agent, **O. W. Street.**

Alameda plant: Thirteen tankers, 10,100 dw.

Potrero works: Three freighters, 12,500 dw.

Fitting out two tankers, hulls Nos. 5259 and 5260.

Ralph J. Chandler Shipbuilding Co., Wilmington, Cal.

Six wooden vessels, Ferris type, 281 ft. 6 ins. by 46 ft. by 26; engines 19 by 32 by 56 by 3; 1400 h. p. Two tubular boilers. For U. S. Shipping Board.

Chilman's Shipyard, Hoquiam, Wash.

Purchasing Agent, **Mr. Iver Chilman.**

Two 3-mast auxiliary schooners 130 by 33 by 14. One 300-h. p. engine, for Belgian interests.

Columbia Engineering Works (Linnton), Portland, Ore.

Purchasing Agent, **Mr. C. W. Steele.**

Capacity of yard: 5 vessels at one time.

Prepared to build any type of wooden ship. Specialize in schooners of 1000 to 3000 tons deadweight.

Columbia River Shipbuilding Corp., Portland, Ore.

Purchasing Agent, **J. C. Bowles.**

Eight steel merchant ships, 8800 tons dw., General Electric and De Laval turbines, Scotch marine boilers. Four of above now on ways.

Commercial Boiler Works, Seattle, Wash.

Purchasing Agent, **Mr. J. H. Fox.**

Contracts for:

Fifty Scotch marine boilers, 14.9 inside dia. by 11 ft. long, H. S. 2695.5 sq. ft., W. P. 210 lbs., for vessels building on Pacific Coast. Delivery, twelve completed boilers per month.

J. Coughlan & Sons, Vancouver, B. C.

Purchasing Agent, **F. Brammall.**

Four 8100-ton dw. freighters, 400 by 52 by 31, 3000-h. p., three Scotch marine boilers. For Dominion Government.

Two 8800-ton dw. freighters, 427 feet by 54 feet by 29 feet, 9 inches.

Crowley Launch & Tugboat Co., San Francisco, Cal.

Purchasing Agent, **John L. Crowley.**

Two 28-foot launches with 10-h. p. engines.

Two 38-foot launches with 30-h. p. engines.

Four 45-foot launches with 50-h. p. engines.

Eight covered barges, 125 by 40 by 12.

Derrick barge, 75-ton lifts, 125 by 50 by 12.

J. F. Duthie & Co., Shipbuilders & Engineers, Seattle, Wash.

Purchasing Agent, **E. C. Gaumnitz.**

Twelve 8800-ton cargo vessels, 2800-h. p., 425 feet by 54 feet by 29.9; Scotch boilers.

Elliott Bay Dry Dock Company, Seattle, Wash.

Local repair work, cleaning, painting and overhauling.

Elliott Bay Shipbuilding Co., Seattle, Wash.

Purchasing Dept., **C. A. Morrow.**

Six vessels, 260 by 46 by 26.

Contracts for five 3500-ton carriers.

Elliott Bay Yacht & Engine Co., Seattle, Wash.

Large amount of repair work.

Feeney-Bremer Company, Tillamook, Ore.

Contracts for three wooden ships, Ferris type, 281.6 by 46 by 26.

Foundation Company of British Columbia, Ltd., Victoria, B. C.

Purchasing Agent, **Mr. D. D. Lo[illegible].**

Twenty 3000-ton dw. twin screw wooden steamers, 293.2 by 47.6 by 23.6, two Scotch marine boilers.

Foundation Co., Portland, Ore.

Local Purchasing Agent, **G. M. Raymond.**

Foundation Co., Tacoma, Wash.

Purchasing Agent, **Mr. Whiteside.**

Seattle Office: Smith Building.

Fulton Shipbuilding Company, Wilmington, Cal.

Purchasing Agent, **A. H. MacFarland.**

Four Hough design wooden steamers.

Nine Ferris design wooden steamers, 3500-ton, engines 19 by 32 by 56, 1400-h. p., two tubular boilers.

Grant Smith-Porter Ship Company, Aberdeen Yard, Aberdeen, Wash.

Manager: **Charles Albertson.**

Superintendent: **J. C. Langille.**

The Grant-Smith-Porter Ship Co., Portland, Ore.

Purchasing Agent, **Mr. P. S. Sinnock.**

Contract for twenty-two Ferris type ships; length 286 feet, beam 46 feet, depth 28 feet; two standard E. F. C. boilers.

Grays Harbor Motorship Corporation, Aberdeen, Wash.

Purchasing Agent, **Mr. H. L. Rich.**

Twelve 4000-ton ships of Ward type. For Emergency Fleet Corporation. Deliveries about two a month.

Eight building slips, maximum length 350 feet.

Complete machine shop for installing machinery.

Hammond Lumber Co., Eureka, Cal.

Purchasing Agent, **W. R. McMillan.**

Two steamers, Ferris type.

Hanlon Dry Dock & Shipbuilding Company, Oakland, Cal.

Purchasing Agent, **H. P. Armes.**

Seven cargo vessels, 320 feet 9 inches by 46 feet by 26 feet 9 inches, 22 feet 1½ inch draft; three watertube boilers. For Emergency Fleet Corporation.

Harrison & Lamond, South Vancouver, B. C.

One auxiliary schooner.

Helser Machine Works, Inc., Portland, Ore.

20 large size hawser reels for Pacific Coast Shipbuilding Co.

12 same as above for Pensacola Shipbuilding Co.

30 same as above for J. F. Duthie & Co.

44 same as above for The Columbia River Shipbuilding Co.

56 8¼ by 8 single geared winches, single gypsey.

28 8¼ by 8 single geared winches, double gypsey.

56 9 by 9 single geared winches, single gypsey.

All of above winches for Southwestern Shipbuilding Co.

180 cargo winches for Schaw-Batcher Shipbuilding Co.

200 9 by 9 cargo winches.

300 8¼ by 8 cargo winches.

80 9 by 9 cargo winches for Southwestern Shipbuilding Company.

Hesse-Martin Iron Works, Portland, Ore.

Purchasing Agent, **Mr. W. L. Ireland.**

All auxiliary machinery for ten wooden steamers building by the G. M. Standifer Construction Co.

All auxiliary machinery for twenty-four wooden steamers building by the Grant Smith-Porter Ship Co., at Aberdeen.

Anchor windlasses, cargo winches, steam capstans and steam steering gears for eight wooden steamers building by Supple & Ballin at Portland.

Forty steam cargo winches for ten steel steamers building by the Northwest Steel Company.

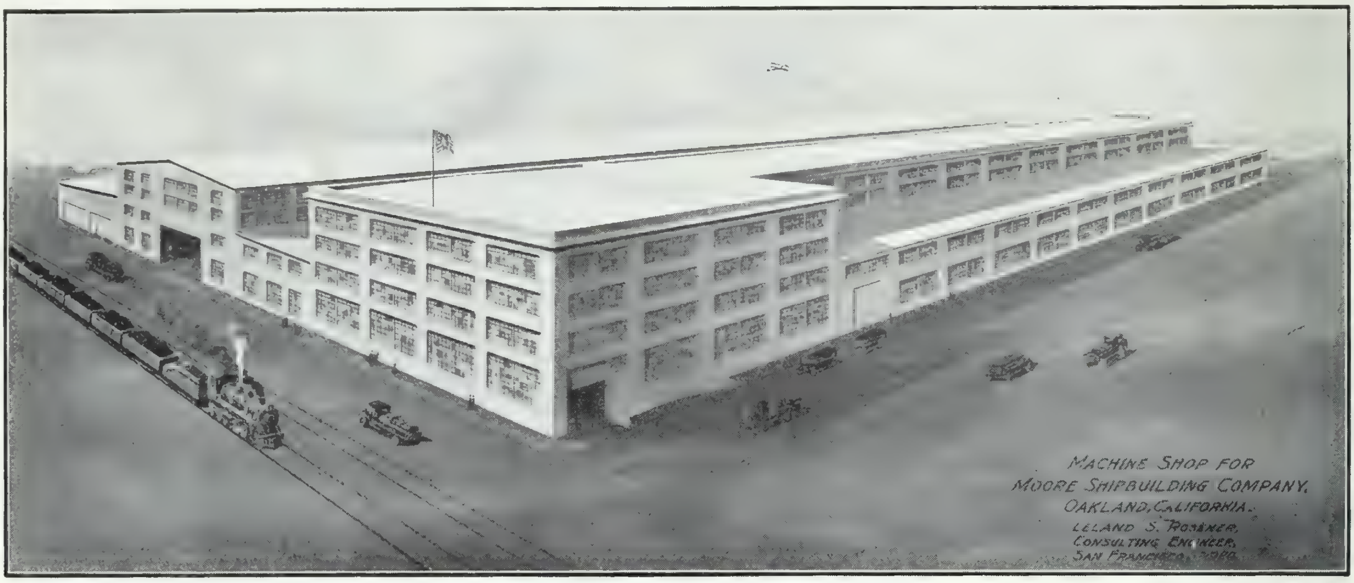
One hundred and thirty anchor windlasses, forty steam steering gears and fifty hand steering gears.

Anchor windlass for J. R. [illegible] Company at San Francisco.

Anchor Windlass for McCormick Steamship Company.

Steam capstans and miscellaneous deck equipment for various concerns.

An engineering organization which masters the particular requirements of its clients, specializing in industrial plants and harbor improvements.



The new machine shop of the Moore Shipbuilding Company, Oakland, with a floor area of over 95,000 square feet.

A notable example of Leland S. Rosener engineering service is to be found in the plant of the Moore Shipbuilding Company. The two new 6500-ton railway drydocks, the plate and angle shops, the boiler shop, special shipyard cranes and other equipment and structures are examples of the engineering service rendered by this organization.

An experienced staff comprising civil, mechanical and electrical engineers.

LELAND S. ROSENER
Consulting Engineer
INSURANCE EXCHANGE BUILDING San Francisco

Herzog Electric & Engineering Company, San Francisco

Purchasing Agent, **H. C. Toumey.**

G. W. Kneass, San Francisco, Cal.

Purchasing Agent, **G. W. Kneass.**

Two tow boats, 60x15, 125-h. p. engine. For Peterson Tow Boat & Lighterage Company.

Three hundred metal life boats for Bethlehem Shipbuilding Corporation, Union Plant.

Kiernan & Kern Shipbuilding Co., Portland, Ore.

Four composite steamers of Ballin design.

King & Winge Shipbuilding Company, Seattle, Wash.

Manager, **J. E. King.**

Kruse & Banks, North Bend, Ore.

Purchasing Agent, **Robert Banks.**

Two steam schooners, 240 feet over all, 43 feet beam, 17 feet depth of hold, double end type. For J. R. Hanify Company.

One five-masted sailing schooner, with a carrying capacity of 1,750,000 feet of lumber. For private interests.

Three building ways.

Llewellyn Iron Works, Los Angeles, Calif.

Builders of Marine Engines, Boilers, Tanks, etc., for Emergency Fleet Corporation.

Present contracts include 1400-h. p. and 2800-h. p. marine engines with marine boilers for same, for most of the ships being built on the Pacific Coast.

Also reinforced concrete bars for concrete ships being built for the Emergency Fleet Corporation at the San Francisco Shipbuilding Company's yard in Oakland and at the Pacific Marine & Construction Company's yards in San Diego.

Long Beach Shipbuilding Company, Long Beach, Calif.

Purchasing Agent, **Frank W. Philpot.**

Eight steel steamers, 8800 tons dw., 2700 h. p., triple-Scotch boilers. For U. S. Shipping Board.

One steel motorship for California & Mexican Steamship Company.

One steel vessel for sugar and coal trade, for Cuban interests.

Los Angeles Shipbuilding & Dry Dock Co., Los Angeles, Cal.

President, **F. L. Baker.**

Vice-President and General Manager, **S. L. Naphtaly.**

Works Manager, **John Murray.**

Comptroller, **F. G. Phillips.**

Thirty 8800 - ton dw. vessels, 410 by 54 by 29.9, 3500 I. H. P. three Foster water-tube boilers. For Emergency Fleet Corporation. Delivery 1919-1920.

Five 11,000-ton dw. vessels, 430 ft. 3 in. by 54 by 29.9 to second deck, and 38.3 to upper deck. For Emergency Fleet Corporation. Deliveries 1919-1920.

Equipment ample to build passenger, freight and naval vessels of any size and type, including machinery and equipment.

Angeles launched December 27.

The Wm. Lyall Shipbuilding Co., Ltd., North Vancouver, B. C.

Three auxiliary schooners, 235 W. L. by 44.6 by 20.6 moulded.

Two 200-h. p. Fairbanks Morse Semi-Diesel engines for these boats.

Eight full-powered steamers, 1500 tons deadweight. For Republic of France.

Main Iron Works, San Francisco, Cal.

Four ocean-going tugs; engines 17 by 25 by 42 by 30; complete for Emergency Fleet Corporation.

Shafting for concrete ships for Emergency Fleet Corporation.

Repairs to vessels for Emergency Fleet Corporation.

Mare Island Navy Yard, Mare Island, Cal.

Battleships (superdreadnaughts): California (44), 82.8 per cent completed February 1, 1920; Montana (51), 5 per cent completed February 1, 1920; California displacement, 32,500 tons; Montana displacement, 43,000 tons.

Destroyers: Litchfield (336), 86.9 per cent completed February 1, 1920; Zane (337), 82.3 per cent completed February 1, 1920; Wasmuth (338), 65.1 per cent completed February 1, 1920; Trever (339), 61.4 per cent completed February 1, 1920; Destroyer (340), 36.1 per cent completed February 1, 1920; Destroyer (341), 33.1 per cent completed February 1, 1920.

Seaplane Derrick No. 4, for Naval Air Station, San Diego; 82.5 per cent completed February 1, 1920.

Note.—This barge including house and boom is electric welded throughout.

Navy Aubulance Boats Nos. 2 and 3, 65 foot motor tug type (175 h. p. Union engine): No. 2 (for New York), 85 per cent completed February 1, 1920; No. 3 (for Norfolk), 85 per cent completed February 1, 1920.

Marine Pipe and Machine Works, Inc., Seattle, Wash.

Purchasing Agent, **Mr. E. A. Lamb.**

One 6-cylinder Sumner type heavy oil engine, 650-h. p. For Chilean Government.

Two 1200-h. p. triple exp. steam engines.

Special marine repair department.

Martinolich Shipbuilding Co., 306 California Bldg., Tacoma Wash.; Yard at Dockton, Wash.

Purchasing Agent, **Mr. Martinolich.**

Three wooden 4-masted auxiliary schooners, 250 by 43 by 21; twin 240-h. p. Skandia engines. For Norwegian interests.

Matthews Shipbuilding Company, Hoquiam, Wash.

Purchasing Agent, **G. F. Matthews.**

Five-masted sailing schooner, 262 feet by 44 feet by 21 feet 6 inches. Lumber capacity, 1,750,000 feet. For owner's account.

McAteer Shipbuilding Company, Seattle, Wash.

Purchasing Agent. **Mr. Ramm.**

One steel vessel, 160 by 30 by 16.

Two four-masted schooners, 250 by 44 by 21; Skandia engines.

McEachern Ship Co., Astoria, Ore.

Purchasing Agent, **Mr. O. E. Draper.**

Three steamers, 286 by 46 by 28; Hough design.

Meacham & Babcock Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **Mr. W. N. Voegtly, Jr.**

Ten hulls, Ferris type.

Moore Shipbuilding Company, Oakland, Cal.

Purchasing Agent, **M. G. Waites.**

Contract for nine 9400 dw. steel freighters, 402 feet 6 inches by 53 feet by 34 feet 6 inches; 2800 h.p. For United States Shipping Board.

Three of the above vessels on the ways; six in outfitting basin.

Contract for ten 10,000-ton dw. steel tankers, 425 feet 6 inches by 57 feet by 33 feet; 2800 h.p. For United States Shipping Board.

Three of the above vessels on the ways; four in outfitting basin; three keels yet to be laid.

Contract for one 10,100 dw. steel tanker, 425 feet 6 inches by 57 feet by 33 feet, 3300 h. p., for Vacuum Oil Company. Vessel on ways.

Contract for two 14,000 dw. steel freighters, 480 feet by 62 feet by 41 feet 10 inches, 5500 h. p., for Matson Navigation Company. Keels yet to be laid.

Contract for three 10,100 dw. steel tankers, 425 feet by 57 feet by 33 feet, 3300 h. p., for Standard Oil Company of New Jersey. Keels yet to be laid.

Contract for one 4750 dw. steel tanker, 330 feet by 46 feet by 19 feet 10 inches, for Standard Oil Company of California. Keel yet to be laid.

Motorship Construction Co., Vancouver, Wash.

President, **Merrill A. Reed.**

Purchasing Agent, **J. W. Dougherty.**

Builders of cannery tenders, tugs, barges, river steamers, power boats and concrete barges.

National Engineering Corporation, Wilmington, Calif.

Outfitting ships for Emergency Fleet Corporation.

New Westminster Construction & Engineering Co., New Westminster, B. C.

Purchasing Agent, **Mr. H. M. Fullerton.**

Four 2800 dw. wooden freighters, 250 by 43.6 by 25, 950-h. p.

Five 1500-ton dw. wooden freighters, 204 by 40.6 by 17, 550-h. p. twin engines, watertube boilers.

Nilson & Kelez, Seattle, Wash.

Purchasing Agent, **Mr. Kelez.**

Eight wooden hulls, Ferris type.

Northwest Steel Company, Portland, Ore.

Purchasing Agent, **Mr. W. C. Smith.**

Four freighters, 2800 I. H. P., 423 feet 9 inches by 54 feet by 29 feet 9 inches, 8800 tons dw., geared turbine drive.

Three freighters, 2800 I. H. P., dimensions same as above; three Scotch marine boilers, oil burners, reciprocating engines.

Pacific American Fisheries, South Bellingham, Wash.

Purchasing Agent, **Mr. B. U. Slyster.**

Pacific Boat & Iron Works, Portland, Ore.

Metal lifeboats and life rafts for steel yard in this district.

Contract for Corser's one-man simultaneous releasing hooks on all lifeboats.

Capacity: Three boats a day.

Pacific Coast Shipbuilding Co., 311 First National Bank Bldg., San Francisco, Cal.; Plant, Bay Point, Cal.

Purchasing Agent, **Mr. J. A. Smiley.**

Ten 9400 dw. steamers. Seven launched.

Two oil barges.

Pacific Construction Co., Ltd., Coquitlam, B. C.

Purchasing Agent, **Mr. R. W. Holland.**

Two 2800-ton dw. wooden freighters, 250 by 43.6 by 25, 950-h. p.

No. 3, Wooden steamer, 250 by 43.6 by 25, 1000-h. p. water-tube boilers.

No. 4, Same as No. 3.

Nos. 5 and 6, 1500-ton full-power barges, 204.8 by 39.8 by 17, 275 I. H. P. engines, 5 water-tube boilers.

Pacific Marine and Construction Company (Scofield Engineering Company) San Diego, Cal.

Contracts for two concrete ships of 7500 tons, 420 by 54, draft loaded 27 feet, light 17 feet, carrying capacity 58,000 barrels.

Thirty-four-acre yard. Two building ways for sidewise launching. Two other ways.

Pacific Marine Iron Works, Portland, Ore.

Purchasing Agent, **Mr. V. L. Hamlin.**

Contracts for four 1600-h. p. triple expansion engines.

Contracts for six 1400-h. p. triple expansion engines.

Patterson-MacDonald Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **W. J. Thomas.**

Ten wooden steamers, 281.6 by 46.10 by 27, twin screw, triple expansion engines, 1550-h. p. 30-15½-25½-42. Two Heine boilers.

Pacific Shipbuilding Corpn., Seattle, Wash.

Purchasing Agent, **C. H. Jones.**

Yard designed with six building ways.

Peninsula Shipbuilding Co., Portland, Ore.

Purchasing Agent, **Mr. H. H. Fisher.**

Two sailing vessels, 287 feet by 49 feet 8 inches by 27 feet 6 inches. For United States Shipping Board.

Capacity of yard: Four ways, wood construction, installation wharf 1000 feet by 125 feet.

Puget Sound Boiler Works, Seattle, Wash.

One Scott Patent Water Tube Boiler, 200-h. p. pressure, for Anderson Shipbuilding Co.

Contracts for condensers, water feed tanks, boiler casings and smoke stacks.

Large amount of local marine repair work.

Rolph Shipbuilding Company, Eureka, Cal.

Purchasing Agent, **John D. Stelling.**

One steamer and one barge. For U. S Shipping Board.

Two barkentines, two steam schooners and one tug boat. For Rolph Navigation & Coal Company.

Three barkentines, 3500 tons, converted Ferris type steamers for United States Shipping Board.

Sanderson & Porter, Raymond, Wash.

Five way yard. No plant equipment for outfitting of hulls.

BABCOCK & WILCOX MARINE BOILERS AS INSTALLED IN THE MATSON LINERS.

THE BABCOCK & WILCOX BOILER WITH COVERS REMOVED SHOWING ARRANGEMENT OF TUBES AND DRUMS

THE STEAMSHIP MAUI, FLAGSHIP OF THE MATSON FLEET, BUILT IN SAN FRANCISCO AND EQUIPPED WITH BABCOCK & WILCOX MARINE WATER TUBE BOILERS.

BABCOCK & WILCOX

MARINE WATER TUBE BOILERS

We have boilers installed in the merchant service on the Pacific Coast in 1897, in active service today. Twelve successive orders from one company; 7 from another; 6 from a third; 4 from two others, and 3 from six others.

These boilers hold the record for economy, capacity and endurance in the Navies of the World.

They have shown the same characteristics in the Merchant Marine. Babcock & Wilcox Boilers and Superheaters in one vessel are saving more than 15 per cent over Scotch boilers in sister vessels.

Babcock & Wilcox Boilers have all essential parts heavier than corresponding parts in Scotch boilers, giving greater security against corrosion. They are lighter, safer, easier to clean and to operate than Scotch boilers, and much more efficient.

THE BABCOCK & WILCOX CO.

New York San Francisco

CHAS. C. MOORE
Pacific Coast Manager
Sheldon Building, First St., cor. Market SAN FRANCISCO, CAL.

San Diego Marine Construction Co., San Diego, Cal.

Purchasing Agent, **C. W. Stose.**
No. 136, Tow-boat "Pullet," 55 by 12 by 7.6; 100 h. p. oil engines.
No. 137, Tow-boat, 56 feet by 12 feet by 7 feet 6 inches; 100 h. p. Fairbanks-Morse type C. O. engine. Immediate delivery. For stock.
No. 138, V-bottom pleasure boat, 40 feet by 9 feet by 2 feet 6 inches; 6-cylinder, 3½ by 5¼ Continental motor. C. W. Stose, owner.

San Francisco Shipbuilding Co., 310 California St., San Francisco, Cal.

General Manager, **V. H. Poss.**
Purchasing Agent, **E. F. Atkinson.**
Two 7500-ton dw. bulk oil steamers, reinforced concrete, at Government Island Plant, Oakland, Cal.

Schaw-Batcher Company Ship Works, South San Francisco

Purchasing Agent, **K. I. Dazey.**
Ten single-screw freighters, 8800-ton dw., 427 by 54 by 29.9; 2800-i. h. p. reciprocating engines, 24½ by 41½ by 72 by 48; three Scotch boilers.

Seaborn Shipyards Company, Tacoma, Wash.

Four-way yard prepared for any kind of wood construction.

Seattle Machine Works, Inc., Seattle, Wash.

Purchasing Agents, **Frank H. Wheelon** and **D. Crause.**
One 500-h. p. triple expansion engine for McAteer Shipbuilding Co.

Seattle-North Pacific Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **F. H. Magune.**
Ten freighters, 402.5 by 53 by 34.5. Parson turbine, three Foster boilers. Deliveries 1919.

Skandia Pacific Oil Engine Co., Oakland, Cal.

Purchasing Agent, **Mr. E. B. Brown.**
Ten 825 B. H. P. Werkspoor Diesel engines for installation in 5600 tons steel fabricated motorships.
Two 550-B. H. P. Werkspoor Diesels.
Four 240-h. p. and two 120-h. p. Skandia engines.
Two 850 b. h. p. Werkspoor Diesels for installation in tanker.
Additional engines of smaller capacity.

Skinner & Eddy Corporation, Seattle, Wash

Purchasing Agent, **Ray Anderson.**
Contracts for twenty 9600-ton dw. freighters for U. S. Shipping Board.

Sloan Shipyards Corporation, Olympia, Wash.

Purchasing Agent, **Mr. L. P. Byrne.**
Sixteen freighters, 281.6 by 46 by 26, 19-32-56 by 36; 1400-h. p.

Somarstrom Shipbuilding Co., Columbia City, Ore.

Four wooden steamers, Hough design, 288 feet long.
Four wooden steamers, Ferris type.

Southwestern Shipbuilding Co., Los Angeles, Cal.

Twenty-three single screw freighters, 8800 tons dw., 427 by 54 by 29.9; 2800 i. h. p. reciprocating engines; three Scotch boilers. For U. S. Shipping Board.

G. M. Standifer Construction Corp., North Portland, Ore., and Vancouver, Wash.

Purchasing Agent, **Mr. H. Luckett**, Vancouver, Wash.
Four wooden freighters, 281 by 46 by 26; 1700-h. p., Ferris type.
Five composite steamers, Ballin design, 4500 tons.
Fifteen steel steamers, 9500 tons.
Three shipyards, fifteen building berths.

Stephens Bros., Stockton, Cal.

One 50-foot by 14-foot fish-carrying launch for F. E. Booth Company of San Francisco, Calif.
One 29-foot by 5-foot 6-inch runabout for Goodlin & Allen Bros. of Stockton.
One 25-foot by 5-foot 3-inch runabout equipped with 4-cylinder, 22-h. p. Wisconsin motor, for Staten Island Land Company
One 32-foot by 16-foot flat bottom scow for Wolfinger Bros.
One 34-foot by 16-foot flat bottom scow for T. Ito Company
One 25-foot by 5-foot 3-inch runabout equipped with 4-cylinder, 22 h. p. Wisconsin motor, for Boyden Morrell Company.
One 25-foot by 5-foot 3-inch runabout equipped with 4-cylinder, 22-h. p. Wisconsin motor, for Stockton Growers' Exchange.
One 25-foot by 5-foot 3-inch runabout equipped with 4-cylinder, 22 h. p. Wisconsin motor, for Cochrane Brokerage Company.

St. Helens Shipbuilding Co., St. Helens, Ore.

Purchasing Agent, **Mr. A. F. Barnett.**
No. 49, steam schooner, 250 over all by 40 by 22, to the order of Charles R. McCormick & Co., San Francisco, Cal.

W. F. Stone Shipbuilding Co., Oakland, Cal.

Purchasing Agent, **Mr. Lester F. Stone....**
Four 150-foot wooden hulls for seagoing tugs, 30-foot molded beam by 17 ft. depth.
One tug, 95 feet by 21 feet by 11 feet, 500 horsepower gas engine.
Miscellaneous repair work.

Tacoma Shipbuilding Company, Tacoma, Wash.

Purchasing Agent, **Mr. D. D. McKay.**
Contracts for six Ferris type vessels. For U. S. Shipping Board.
Motorship Ambassador, 120 by 22 by 12 feet for W. H. Rust.

T. R. Trahey, Ballard, Wash.

One oil barge, 110 feet long and 32 feet wide, capacity 150,000 gallons. For General Petroleum Company

Tregoning Boat Co., Seattle, Wash.

Purchasing Agent, **Mr. C .Tregoning.**
A large number of lifeboats and ship power launches.

Todd Dry Dock & Shipbuilding Co., Tacoma, Wash.

Purchasing Agent, **Mr. C. L. Bankson.**
Eight cargo vessels, 380 by 53 by 23.9, 2500 h. p. 3 watertube boilers.
Twenty-four cargo vessels, 380 by 53 by 23.9, 2500 h. p. 3 S. E. S. boilers.
All of above for Emergency Fleet Corporation. Deliveries by January, 1920.

Todd DryDocks, Inc., Harbor Island, Seattle, Wash.

Purchasing Agent, **Mr. C. R. English.**
General drydock and repair work.

Union Construction Company, Oakland, Cal.

President: **W. W. Johnson.**
Vice-President and General Manager: **H. G. Peake.**
Purchasing Agent, **Mr. Chas. L. Froding.**
Contracts for 10 steel ships of 9400 tons, Isherwood type, 402.5 by 53 by 34.5; three watertube boilers, 2800-h. p. turbines. For the U. S. Shipping Board.
One 1685-ton Diesel-engined oil tanker for the Standard Oil Company of California.
One 10,000-ton tanker for the General Petroleum Company.

Vancouver Shipyards & Engine Works, Ltd., Vancouver, B. C.

Contracts in hand for two wooden vessels.

Wallace Shipyards, Ltd., North Vancouver, B. C.

Purchasing Agent, **Mr. C. Wallace.**
Contracts for four 8,100 dw. steel vessels.
One steamer, 320 by 44 by 25, single screw, triple-expansion, reciprocating engines, 1800 h. p., 4300-ton dw. capacity.
Two steamers, 331 by 46 by 25, single screw, triple expansion, reciprocating engines, 2500 i. h.p., 5100-ton dw. capacity.

Western Canada Shipyards, Ltd., Vancouver, B. C.

Five 195 by 39.8 by 17 watertube boilers.

Willamette Iron & Steel Works, Portland, Ore.

Purchasing Agent, **S. F. Woodbury.**
Three 13 feet 9 inches diameter by 11 feet 9 inches long Scotch marine boilers. For Todd Dry Dock & Construction Company, Tacoma, Washington.
Nine Scotch marine boilers for vessels building in Pacific Coast yards for Emergency Fleet Corporation.
Fifteen 14 feet 9 inches by 11 inches long Scotch marine boilers for G. M. Standifer Construction Corporation. Hulls 11 to 15 inclusive.
Two gunboat type boilers, 7 feet 8½ inches diameter by 17 foot 7 inches long, for Rodeo Vallejo Ferry Company, San Francisco, Cal.
Five submerged flue type boilers for Haviside, Withers & Davis, San Francisco, California.
One submerged flue type boiler for Union Construction Company, San Francisco, California.
Building tanks and intalling machinery, ship Everett, for St. Helens Shipbuilding Company, St. Helens, Oregon.

Wilson Shipbuilding Company, Astoria, Ore.

Purchasing Agent, **W. G. Wray.**
Four wooden vessels, 281.6 by 46 by 26; Ferris type. For Emergency Fleet Corporation.

Wright Shipyards, Tacoma, Wash.

Purchasing Agent, **Mr. Geo. P. Wright.**
Two wooden steamers, "Elissa" and "Endymion," 3500 tons each, length 282 feet, beam 46, depth 26. For U. S. Shipping Board.

Yarrows, Ltd., Victoria, B. C.

Two slipways suitable for building vessels up to 350 feet in length.
Marine railway, 315 feet long, 3000 tons dw. capacity.
Graving dock, 480 feet long, 65-foot beam.
Makers of manganese bronze propellers and large marine engine castings.
Engaged chiefly with repair work.

OTHER SHIPBUILDING COMPANIES

Ballard Marine Railway Company, Seattle, Wash.
Chico Shipbuilding Co., 4185 Arcade Building, Seattle, Wash.
Clapp & Reed Shipbuilding Company, Seattle, Wash.
Columbia River Shipbuilding Co., Vancouver, Wash.
Craig-Wilde Ship Company, Los Angeles, Cal.
Wm. Cryer & Son, Oakland, Cal. W. E. Cryer, Purchasing Agent.
Fellows & Stewart, Inc. V. B. Stewart, Purchasing Agent, Wilmington, Cal.
French-American Shipbuilding Corp., 418-420 Marsh-Strong Bldg., Los Angeles.
Halstrom Shipbuilding Co., Inc., Seattle, Wash.
International Shipbuilding Company, Columbia City, Ore.
Marine Iron Works, Seattle, Wash.
Muller Shipbuilding Company, 410 I. N. Van Nuys Building, Los Angeles, Cal.
Oceanic Shipbuilding Co., Milwaukee, Ore.
John E. Price & Company, Hoge Building, Seattle, Wash.
Port Blakeley Shipyard, Port Blakeley, Wash.
Puget Sound Navy Yard, Bremerton, Wash.
T. B. Puck & Co., Honolulu, T. H.
Raymond Shipbuilding Co., Raymond, Wash.
Sehrs Shipyard, Port Townsend, Wash.
South Bend Shipbuilding Co., South Bend., Wash.
Union Timber & Products Co., O. L. Craven, Pres., Port Towsend, Wash.
Washington Shipbuilding Corp., C. E. McMasters, Pres., Burke Bldg., Seattle, Wash.
West Coast Shipbuilding Co., H. W. Hellman Bldg., Los Angeles, Cal.

Announcement

TITUSVILLE FORGE COMPANY

formerly

Titusville Plant of the Bethlehem Steel Company

Line Shafts — Thrust Shafts

Connecting Rods — Crank Webs

During the time that this Plant was owned by the Bethlehem Steel Company many improvements were made, and we are summarizing as follows:

Chemical and Physical Laboratory, completely equipped, including 200,000 pound Riehle Testing Machine and Microphotographic apparatus.

In addition to our own work we are enabled to perform any chemical or physical tests required by other manufacturers.

Furnace temperatures are gauged by Pyrometer registering in the Laboratory at a main station and recording in the various shop departments for the heat treater's guidance.

Two special overhead fired oil burning Annealing Furnaces of latest types and efficiency. Can anneal forgings up to 48 inches in diameter and 43 feet in length.

Oil and water quenching tanks capable of quenching forgings 48 inches in diameter or 26 feet in length.

Hydraulic Forging Presses of sufficient capacity to thoroughly forge work up to 48 inches in diameter or 43 feet in length.

Machine Tools, consisting of Turning and Boring Lathes, Planers, Saws, Millers, etc., which are large enough to rough or finish any size forging our Forge Department can produce.

SPECIALIZATION

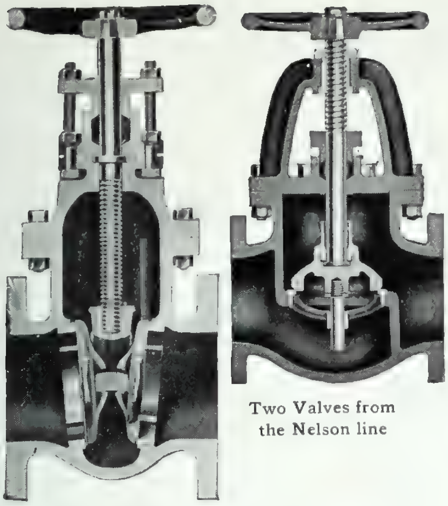
Diesel and Semi-Diesel Engine Shafts, finished complete, guaranteed to meet tests prescribed by customers and inspection permitted by any representative Testing Engineers. Any size up to that which a 112-inch Lathe can swing. Gas and Steam Engine Crankshafts either in the rough, rough machined or finished complete.

Marine Forgings of any description, either to Lloyd's or American Bureau of Shipping requirements.

As we manufacture nothing but forgings, we can give you the undivided attention of experts in our line. You may specify your large forgings to be pressed from either sand or mold cast ingots, as you may prefer. At your request we send chart showing physical characteristics of different carbon steels at certain annealing and tempering temperatures.

TITUSVILLE FORGE COMPANY

TITUSVILLE, PENNSYLVANIA



Two Valves from the Nelson line

A SAFE VALVE INVESTMENT

THE Nelson Valve Company of Philadelphia has realized for some time the necessity of carrying a complete stock of its well-known valves on the Pacific Coast to enable the jobbers to take care of the great demand for the Nelson line.

Nelson valves are guaranteed to perform successfully the service for which they are rated and recommended. The Nelson valve is based on the principle that refinement of design and construction pays for itself in service.

The Nelson Valve Company is carrying as complete a stock as present factory conditions will warrant, at 75 Fremont street, San Francisco, California, with branch offices at 201 Maynard Building, Seattle, and 310 Hibernian Building, Los Angeles. Robert B. Graham, who has been familiar with the Nelson line for years, is in charge of the warehouse and sales for this line in connection with the W. H. Gilbert Sales Company, 918 Hearst Building, San Francisco.

For the best classes of high-pressure pipe line construction, especially where there is superheat, Nelson steel valves meet the requirements of the most particular purchasers. They also have other fields of usefulness, as in oil refineries and industries where high temperatures, high pressures or severe conditions require great strength of body.

Nelson steel valves include types for all important classes of service—gates, globes, non-returns, checks, cushioned checks—and specifications suited to a wide range of conditions. They have thoroughly demonstrated their value by years of successful service in leading power plants and industries.

TRADE LITERATURE

Condensing Apparatus. Catalog for 1920, Worthington Pump & Machinery Corporation, 115 Broadway, New York City.

Worthington condensing apparatus needs no special introduction to the engineering public. It includes every type of jet, barometric and surface condenser, and auxiliaries for low or high vacuum work in every field included in the engineering arts.

Forty years' experience in the manufacture of this class of apparatus has placed this firm in the very forefront of the profession as regards the material, workmanship and design of its products.

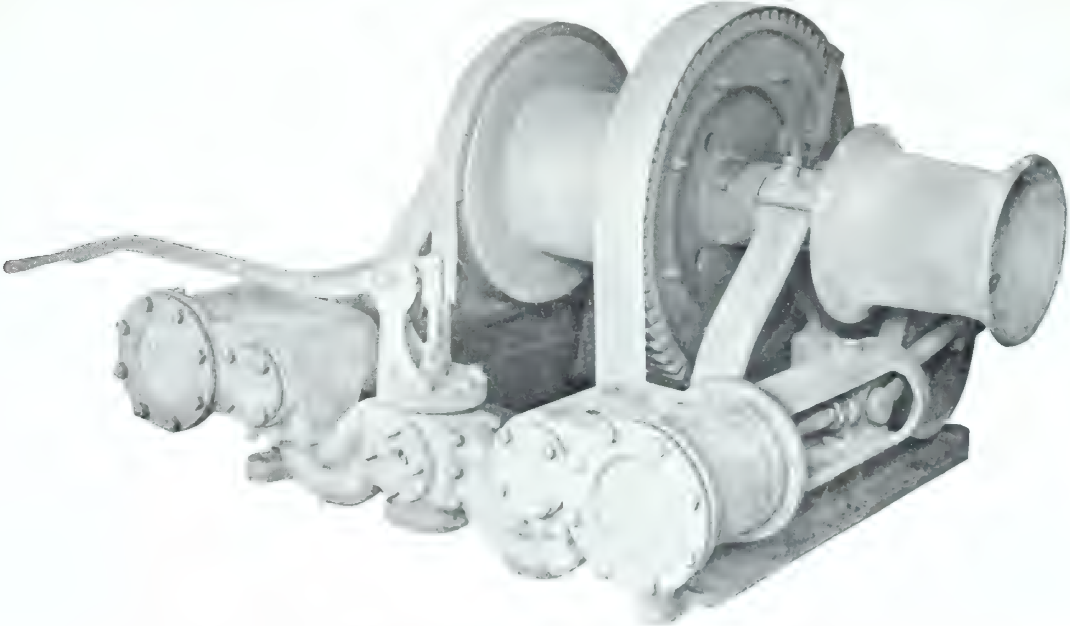
The book now received consists of 116 pages, describing the various types of condensers and pumps, from those used in small pleasure craft up to those which meet the requirements of the greatest pumping plants in America.

The Worthington works at Harrison, New Jersey, cover forty acres of ground. Associated with this home plant are the Snow-Holly Works at Buffalo, New York; the Power & Mining Machinery Works and Ingeco Engine Works at Cudahy, Wisconsin; the Blake & Knowles Works, East Cambridge; the Dean Works at Holyoke, Massachusetts; the Laidlaw Works, Cincinnati, and the Hazelton Works at Hazelton, Pennsylvania.

Branch houses of the Worthington Pump & Machinery Corporation are to be found in every industrial center of the United States and Great Britain.

At the end of the catalog there is a 26-page section devoted to useful information which might well be termed: "Condensed information for users of condensers."

Photographic fac-simile of the new ingot of John Finn's Special Armature Metal. The John Finn Metal Works produce special alloys and Babbitt metal to fit the particular requirements of engineering problems



A heavy duty steam cargo winch built by the Helser Machine Works at Portland, Oregon, and installed on many of the 8800-ton freighters for the United States Shipping Board

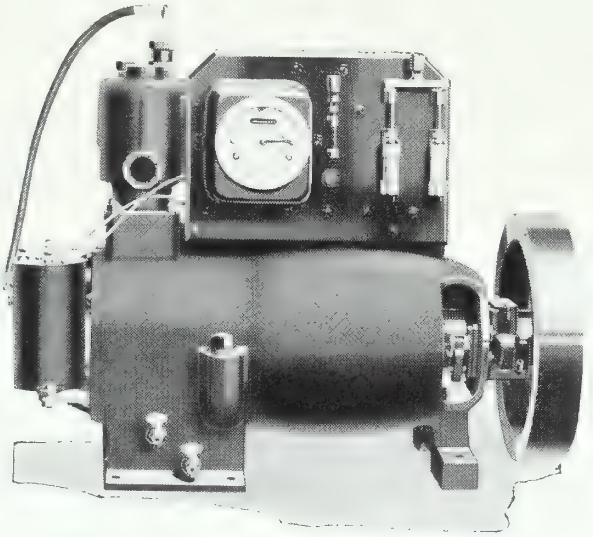
Lighting and Power Plants

Built along uniform lines, ranging in size from 300 watts to 15 KW.

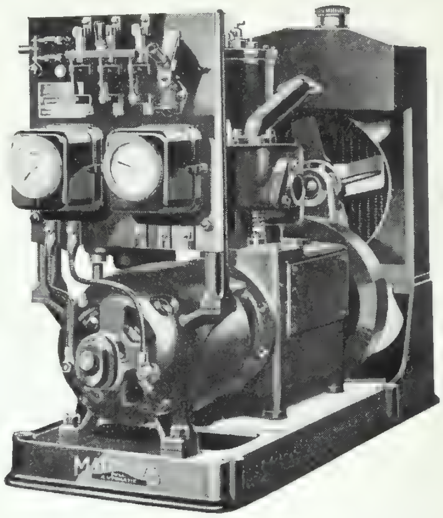
MATTHEWS
FULL AUTOMATIC
TRADE MARK

Mathews Marine Engine
General Electric Generators
Willard Batteries
Stewart Vacuum System
Schebler Carburetors

EVERY PART OF EQUIPMENT IS A NATIONAL STANDARD OF HIGHEST POSSIBLE QUALITY



Model H, "Little Husky," full automatic electric lighting plant of 300-watt capacity, capable of lighting fifteen 20-watt lamps. Weight 140 pounds.



Model JR, 1 KW full automatic electric lighting and power plant of ¾ h. p., capable of lighting fifty 20-watt lamps. Net weight 395 pounds. This solid, compact unit measures 45"x34"x22"

Highest Grade Equipment backed by Herzog Service

Mathews Full Automatic Lighting and Power Plants
Herzog Telemotors
Herzog Electric Steering Gears
Carlisle & Finch Searchlights
Electric Cargo Hoists
Electric Anchor Hoists

De Laval Steam Turbines
De Laval Oil Purifiers
De Laval Pumps and Blowers
Turbine Driven Generators
Marine Fittings and Fixtures
Marine Repairs

HERZOG ELECTRIC AND ENGINEERING CO.

172 Steuart St San-Francisco

Will You be Represented There?

At the greatest gathering of Maritime Men and Firms in the Country's History?
Over 140 firms have taken space already

The National Marine Exposition

April 12 to 17

GRAND CENTRAL PALACE, NEW YORK

Under the auspices of The National Marine League, which for seven years has been working to create a popular voting and investing interest in the American Merchant Marine, for the purpose of establishing American independence on the sea.

Partial List of Exhibitors up to February 1:

U. S. Shipping Board
Standard Oil Company of N. Y.
International Mercantile Marine
American Bureau of Shipping
Submarine Boat Corporation
Todd Shipyards Corporation
General Electric Company
Crane Company
Baltimore Dry Dock & Shipbldg. Co.
Skinner & Eddy Corporation.
U. S. Department of Commerce
Camden Forge
Sperry Gyroscope Co.
Lidgerwood Co.
The Staten Island Shipbuilding Co.
Downey Shipbuilding Corporation
U. S. Steamship Co.
Luckenbach Line
Steward Davit & Equipment Corp.
Hooven, Owens, Rentschler Co.
Wall Rope Works, Inc.
Waterbury Company
Whitlock Cordage Co.
Power Specialty Co.
P. S. Thorsen
John Reid & Co.
Aldrich Publishing Co.
Brunswick Refrigerator Co.
The Cutler-Hammer Co.
Columbian Bronze Corporation
The DeLaval Separator Co.
Marine News
Irving Iron Works Co.
W. & J. Tiebout
The DeLaval Steam Turbine Co.
American Mast & Spar Co.
Penn Seaboard Steel Corporation
The Penton Publishing Co.
"Motorship"
Chadburn Telegraph Co. of America
C. H. Wheeler Mfg. Co.
Asbestolith Mfg. Co.
The American Library Association
Neptune Association
Vulcan Iron Works
American Manufacturing Co.
Simmons-Boardman Publishing Co.
Travel Club of America
Charles Cory & Son, Inc.
Page Steel & Wire Co.
Wilson Welder & Metals Co., Inc.
The Columbian Rope Co.
The Newburgh Shipyards, Inc.
Mallory Industries, Inc.
The Oxweld Acetylene Co.of N. J.
Cutting & Washington Radio Corp.
The H. E. Boucher Mfg. Co.
Camp Sims
Morse Dry Dock & Repair Co.
Coen Company
Hyde Winlass Co.
Schutte Koerting Co.
National Marine Engineers' Beneficial Association
The Lunkenheimer Co.
The H. W. Baker Linen Co.
Allison & Co.
Devoe and Reynolds Co., Inc.
New Process Chemical Co.
Atlantic and Pacific Mfg. Co.
Gold Car Heating & Lighting Co.
Albert Kingsbury
Boston Manufacturing Co.
Locomotive Superheater Co.
Delco-Light and Products Co
K-G Welding & Cutting Co., Inc.
Pneumercator Company, Inc.
The American Manganese Bronze Co.
Alberger Pump & Condenser Co.
The McNab Company
The Bramhall Deane Co.
William B. Williams
Virginia Iron Works, Inc.
Topping Brothers
B. F. Sturtevant
The American Navigator Log Corp.
The Winton Company
Herbert H. Cory, Inc.
Wagner Furnace Bridge Wall, Inc.
Ship Master's Club.
Ocean Paint Works, Inc.
The Turbine Air Tool Co.
Electrose Mfg. Co.
The Upson-Walton Co.
Wailes Dove-Hermiston Corp.
Guarantee Exterminating Co.
Uttmark's Nautical Academy
Shipping Publishing Academy, Inc.
Shipbuilding & Harbor Construction Co.
David Kahnweiler's Sons
Devoe & Reynolds
American Marine Paint Co.
The Dodge Sales & Engineering Co.
United Marine Contracting Corp
Linotol Flooring Co.
Neptune Ship Supply Co.
Simon Lake
The DeVilbiss Mfg. Co.
The Argonaut Salvage Corporation
The Clothel Company
Union Sulphur Co.
Simpson Gordon Patents, Inc.
Electric Arc Cutting & Welding Co.
Shipbuilding Products Mfg. Co.

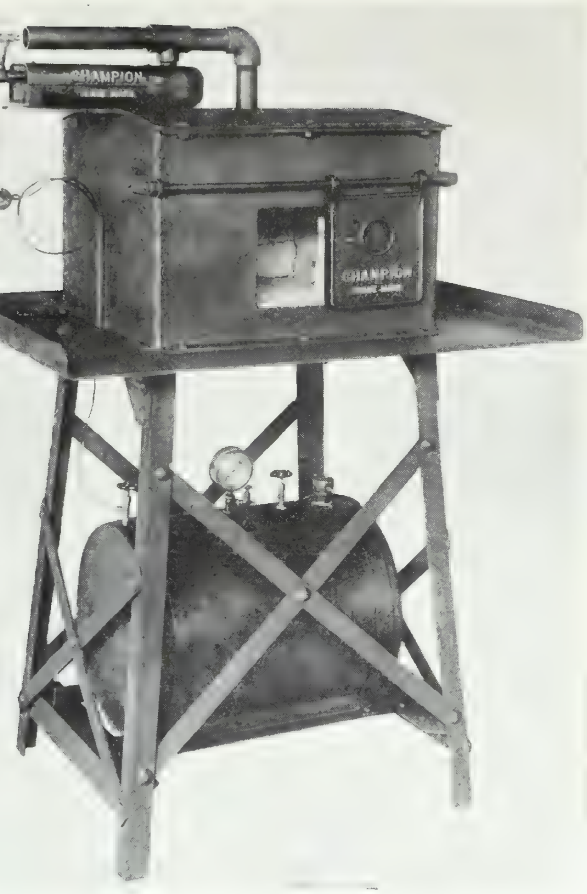
The Exposition will be opened personally by the Secretary of Commerce and the Chairman of the Shipping Board. Men are coming from the Pacific and the Gulf Coasts to see this first marine exhibit in twenty years. If you have any stake in the future of the American Merchant Marine, you cannot afford to go unrepresented at this important event.

Telegraph Now for Booth Space

GOOD LOCATIONS STILL AVAILABLE. COST $2.00 PER SQUARE FOOT

THE NATIONAL MARINE LEAGUE OF THE U. S. A.

268 PEARL ST., NEW YORK



Portable Furnace Generates Heat of 3000 Degrees in Five Minutes

A HIGH, sustained temperature, generated in a short period of time with the strictest economy of operation, are the principles upon which the design of the furnace of the Champion Kerosene-Burner Company of Kenton, Ohio, is based. This heating unit, entirely self-contained, is used for heating rivets, heat-treating tools, "shrinking on" processes and similar operations calling for an intense heat in a small portable hearth.

The secret of this quick, fierce-burning flame lies in the fact that the kerosene is reduced to a gas the moment before it is ignited. The effect is just the same as that secured by the vaporizing jet in the carburetor of an internal combustion engine. No water remains to form smoke or unpleasant odors.

A long series of experiments have proved that the flame which gives a range of heat from 2500 to 3000 degrees Fahrenheit burns without the least trace of hydrogen. In other words, the flame is not an oxidizing agent.

The self-contained feature of this new furnace gives it a distinct advantage in its own field of work. A fuel storage tank is carried on the lower platform of the stand. These tanks are of various sizes, depending on the use to which the furnace is put. For the general run of work one filling of the reservoir is sufficient to operate the furnace, with feed valve wide open, for a ten-hour day.

For this reason no pipe connections need be installed at different points or in the shop or field. With the flame still going, the furnace can be lifted by a crane and deposited on another part of the job right next to the work which is waiting for it.

Compressed air, at a pressure of from 80 to 90 pounds, forces the fuel from the storage tank to the burner, which is located just above the hearth. This air is forced into the tank by means of an ordinary air pressure hose, which can be disconnected when the desired pressure is obtained, or by a pump if air pressure is not available. A pressure gauge on the top of the tank shows the amount of air remaining inside at all times.

In spite of the fact that fuel is constantly being drawn out of the tank, with a consequent lowering of the fluid level and enlargement of the air space, experiments have shown that the original air pressure still remains adequate to properly feed the burner. Only in exceptional cases does the air supply have to be given extra attention, after it has once been taken care of in the morning.

By the simple opening of a few valves the air forces the kerosene from the storage tank through the copper tubing shown in the illustration, into the burner. No pumps or other extraneous accessories are needed.

The tank, placed as it is at the bottom of the stand, is easy to fill. There are no complicated pumps to run, or any intricate system of valves to take care of. As a result the furnace can be operated by an unskilled man. The rapidity with which the furnace may be heated obviates the necessity of the operator reporting twenty or thirty minutes ahead of time in order to get his furnace ready for work.

Another feature of the All-In-One furnace, as it is called, is its conservation of fuel. Tests extending over more than a year's time have proved that the kerosene consumption, even with the furnace operating at full blast, will not exceed more than three-quarters of a gallon an hour. In a ten-hour day the furnace would only require seven and one-half gallons. At a wholesale price of 14 cents a gallon, the daily cost of fuel amounts to only $1.05.

The non-oxidation feature permits of leaving the work in the furnace for an indefinite period without the danger of its burning up. For this reason work can be heated, cooled and reheated time after time without any diminution in size.

The high temperature to which the furnace can be raised results in a thorough "cooking" of the work. This is especially noticeable in riveting operations. Under the hammer the All-In-One treated rivets flow into every part of the hole. This obviates the slow, expensive work of cutting them out after they have cooled and replacing them by hand.

In the ordinary crude oil furnace the number of rivets which can be heated at one time is limited. In the All-In-One furnace the number is unlimited. If necessary, a whole keg of rivets can be dumped into the hearth and preheated. Rivets for immediate use can be placed directly under the flame of the burner, while the others, already in a semi-heated condition, can be raked in as needed.

Nearly a year ago the Champion Engineering Company installed a battery of these furnaces. In that time their production of fabricated steel girders by the aid of these furnaces increased 35 per cent.

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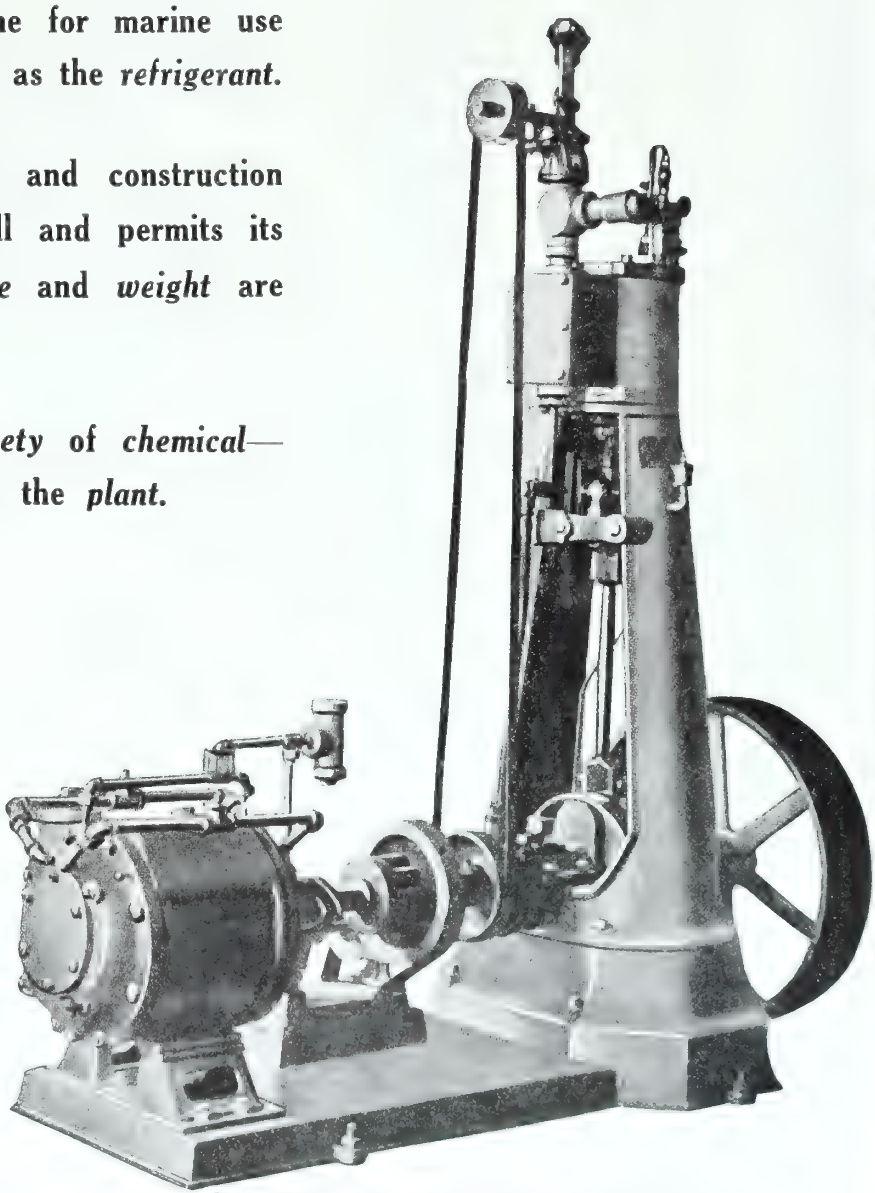

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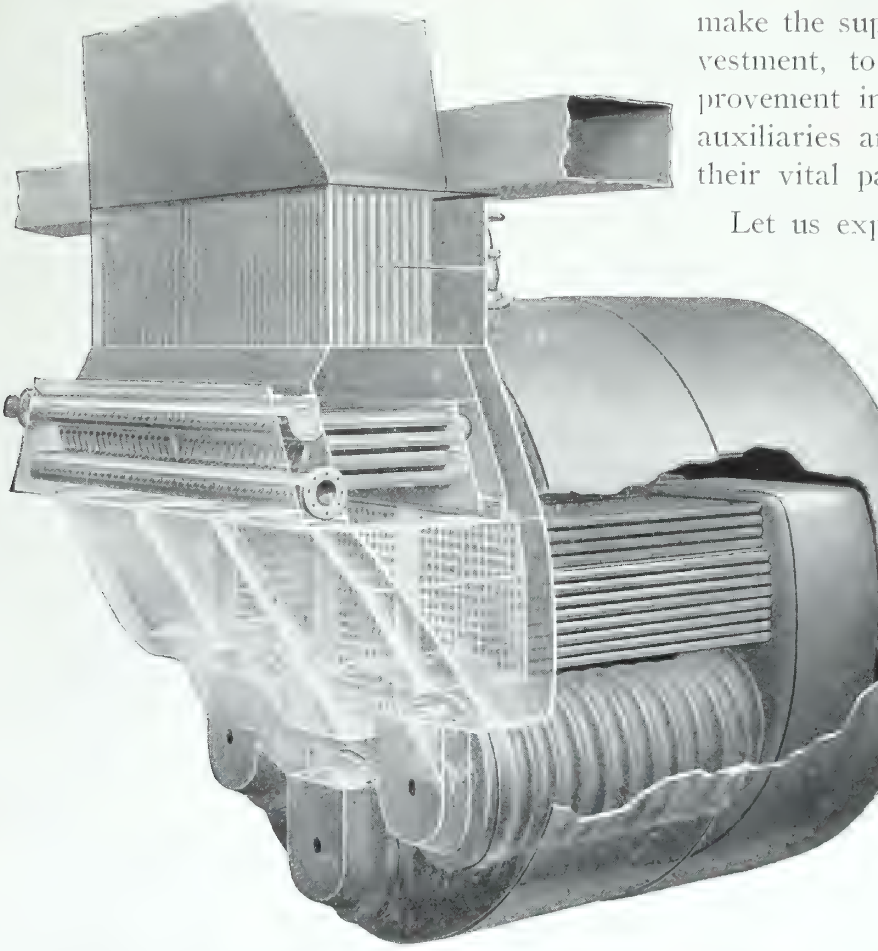

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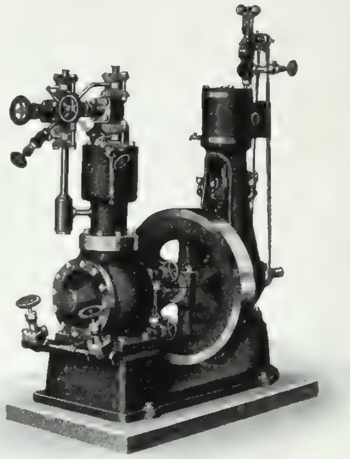

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Book Reviews

Marine Insurance, Its Principles and Practice, by William D. Winter, LL.B. Four hundred twenty-five pages. Published by the McGraw-Hill Book Company, Inc., 239 West 39th street, New York. $3.00 net.

The author of this very comprehensive treatise is third vice-president of the Atlantic Mutual Insurance Company of New York, and special lecturer on marine insurance of the New York University, so that he brings to bear upon this subject a mind well trained, from both the theoretical and practical standpoints.

The work is compiled from material contained in the lectures delivered in his courses at the university. This has been rewritten and published in book form, so that it might be available to shipping men, bankers, merchants, insurance brokers, and all who require a general knowledge of marine insurance.

The treatment, while thorough, is simple, and the style quite entertaining. Especially can this be said of the historical introduction, which reaches back into the dim legendary past of marine operations, and lays out before the reader a very comprehensive picture of the manner in which protection for cargoes traveling by sea was first recognized as necessary, and then organized by the ancient merchants into forms which have become the basis of all modern navigation law and marine insurance practice.

Physical geography, ships and shipbuilding are treated in separate chapters, insofar as they affect the knowledge of marine insurance. The book is thoroughly indexed and paragraphed, and should be in the library of every ship operator.

It may be truthfully said that not one operator in a hundred really understands the legal meaning of the phrases used in the standard marine insurance policy, these policies having been created in their present form at a time when there were no steamships on the sea, no wireless, and none of the modern aids to navigation and to safety of life and property in ocean travel. The language in the policy is therefore not so much a matter of the English words used as of the technical, legal decisions which have been formed over long periods of time. For this reason it is highly necessary that shipping men and operators should keep themselves informed of the constant changes in meaning of the wording of insurance policies.

Brown's Nautical Almanac. Published by James Brown & Son, 52 Darnley street, Glasgow. 617 pages. 2s. 6d. net.

Brown's Nautical Almanac has long been a friend to the British navigator. During the great war the annual issue of this book was attended with tremendous difficulties, many of which are not yet removed, and the publishers are to be heartily congratulated upon being able to bring out this edition for 1920 in so complete a form. While designed especially as a harbor and dock guide for the British Isles, many of the tables of information and much of the astronomical and navigation data are of universal value.

English Port Facilities, Captain F. T. Chambers, United States Navy; 387 pages, numerous maps and tables.

The report of the Port Facilities Commission of the United States Shipping Board on English Port Facilities covering the ports of London, Liverpool, Manchester, Glasgow, Newcastle upon Tyne, Hull, Grimsby, Bristol and Cardiff. A very extensive and carefully prepared series of maps, descriptive data and general information which should be in the hands of every overseas shipper in America, and of every port and harbor commissioner. It would open the eyes of some of these latter gentlemen to read the lists of cargo handling machinery at English seaports, and to know that much of this machinery is in efficient operation today after from twenty-five to forty years of strenuous service.

Oil Tank Steamers, Captain Herbert John White; 150 pages, numerous diagrams and illustrations; published by James Brown & Sons, Glasgow; 7s. 6d. net.

This is a second edition of the author's well known work, in which he brings up to date the data and technical descriptions of vessels, especially designed for the bulk carriage of crude petroleum and its distillates. At this time, when the entire world is intensely interested in the fuel oil problem and more tankers are being built than any other special type of freight steamer, this book should find a very useful place for itself in the libraries of naval architects and marine engineers.

Opportunities in Merchant Ships, by Nelson Collins; 95 pages, frontispiece illustration; published by Harper & Brothers; 75 cents net.

We can truthfully recommend this little book to any young man who has an idea of going to sea, either before the mast or in the engine room squad. The conditions of life at sea, its romance, its hardships and its compensations, are all portrayed. Following a chapter on "Why to Go to Sea and Why Not to Go" and another on "How to Go"; chapter number three, entitled "At Sea" would warm the heart of any old-time mariner or engineer. Books like this should be in the libraries of every public school in the country. They would very materially assist in forming a state of shipmindedness among the rising generation.

Wander Ships, by Wilbur Bassett, Ensign of the United States Navy; 136 pages; frontispiece; published by the Open Publishing Company, Chicago.

Five typical stories of legendary ships are given in this book and in numerous notes following each story the legends and literature surrounding each type is traced from the earliest times down to the days of modern marine navigation. These legendary ships are divided, as to type, into giant ships, punishment ships, phantom ships, devil ships, and death ships. The volume will certainly receive a very friendly reception from all lovers of the folk-lore or the sea.

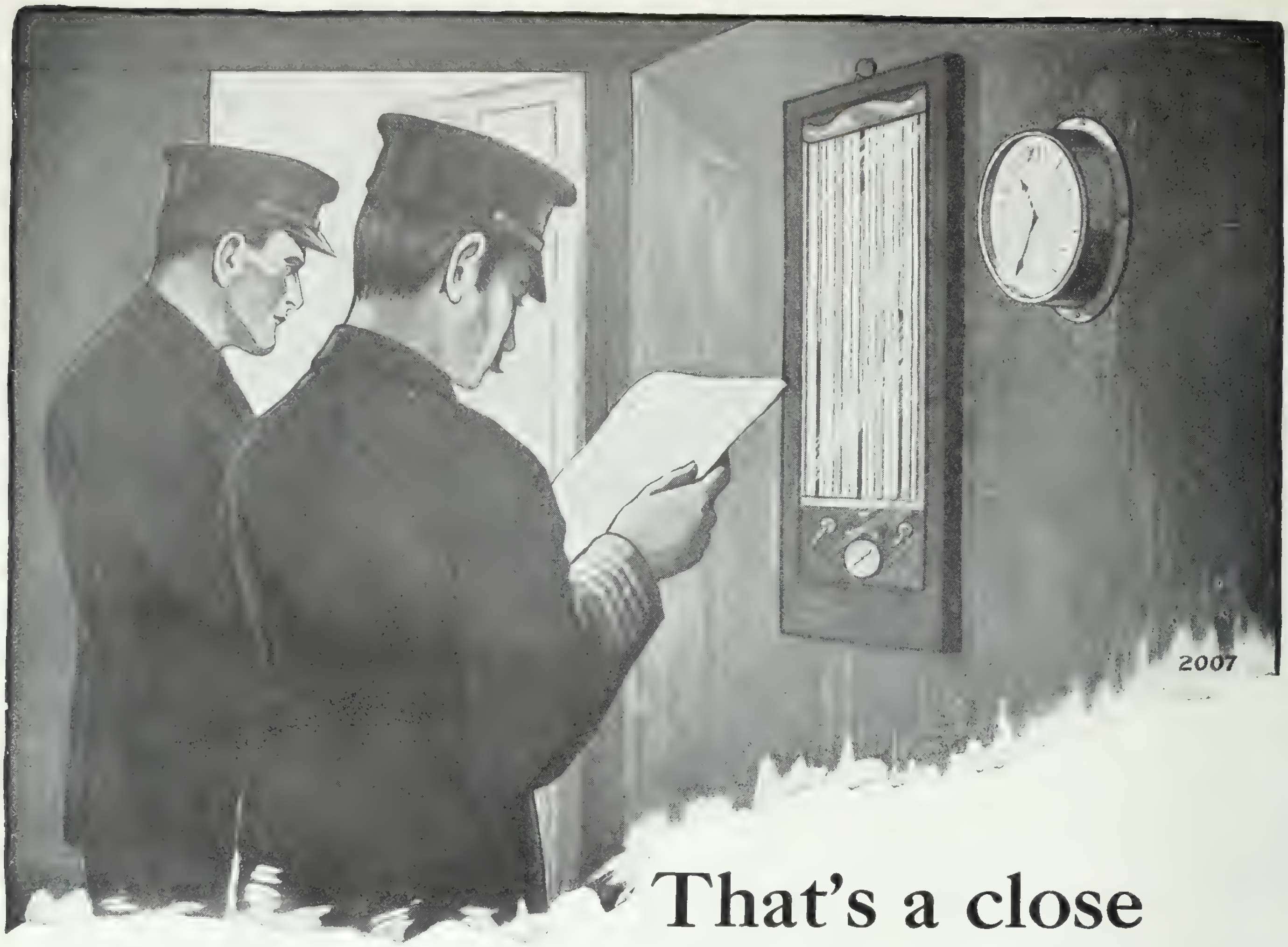
Regulations for the Electric Equipment of Ships: First edition, September, 1919. Published by E. & F. N. Spon, Ltd., 57 Haymarket, London, S. W. Price in cloth covers, 2s. 6d net.

The Institution of Electrical Engineers of Great Britain appointed in May, 1916, a special committee with the title of "Ship Electrical Equipment Committee," the members of which were drawn partly from the institution and partly from outside bodies; all those having interest in the matter being represented. This committee made a careful comparison of the rules issued by the British corporation for the survey and registry of shipping and various French, German, Danish and American rules for the electrical equipment of ships.

All questions of principle were discussed and the preliminary drafts of the rules were handed to a small editing sub-committee who definitely drew up the rules and submitted them again to the main committee. In this way consistent diction, arrangement and sub-division has been attained throughout. The results of this committee's work are presented in the book. Concurrently with the work of this committee the British Engineering Standards Association has been at work standardizing apparatus that would comply with the regulations of the electrical institute committee. A small standing sub-committee of the Institution of Electrical Engineers has been appointed and will be permanently sitting to receive any suggestions for improvements that may recommend themselves to operators and shipping men, so that all changes will be quickly cleared up and the rules kept fully abreast of electrical progress.

Ludlum Steel: 162 page booklet; published by the Ludlum Steel Company, Watervliet, New York.

This book describes the carbon and alloy tool steels and high speed steels manufactured by the Ludlum Steel Company, and includes a very excellent treatise on the use of high speed steels and on the effect of different alloys upon the composition and use of the resultant steel. Instructions are given for forging, annealing, hardening and tempering the different grades of tool steel, and for the care of different classes of tools. Much useful information is contained in general tables of data in the end of the book. The Ludlum Steel Company is represented in San Francisco by Thomas S. Hutton with offices at 75 New Montgomery street. Mr. Hutton will be glad to provide interested parties with a copy of this book.



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The National Magazine of Shipping

April, 1920

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Freight Handling in England as Applied to Our Home Problem

By **F. T. Chambers,** Captain, C. E. C., United States Navy

SUMMARY

Captain F. T. Chambers was sent by the United States Shipping Board with a commission to investigate port management and port development in the United Kingdom.

After an exhaustive study of the organization for the control of ports, cargo distribution, dry docks, repair plants, and all matters pertaining to the turn-around of ships in British harbors, he prepared a complete report of his investigations, which was published by the Shipping Board.

This article is an address delivered by Captain Chambers at the Convention of the Material Handling Machinery Manufacturers' Association held on February 26th at the Waldorf Astoria, New York City. The illustrations shown herewith are taken from Captain Chambers' report and to those who are interested particularly in the London docks, we would refer to the insert plans of the Victoria and Albert dock, which were published in the February issue of Pacific Marine Review.

I HAVE been asked by your association to read a paper upon the subject of my observations abroad in connection with freight handling, and I am more troubled in the matter of selection of material than by the dearth of such material.

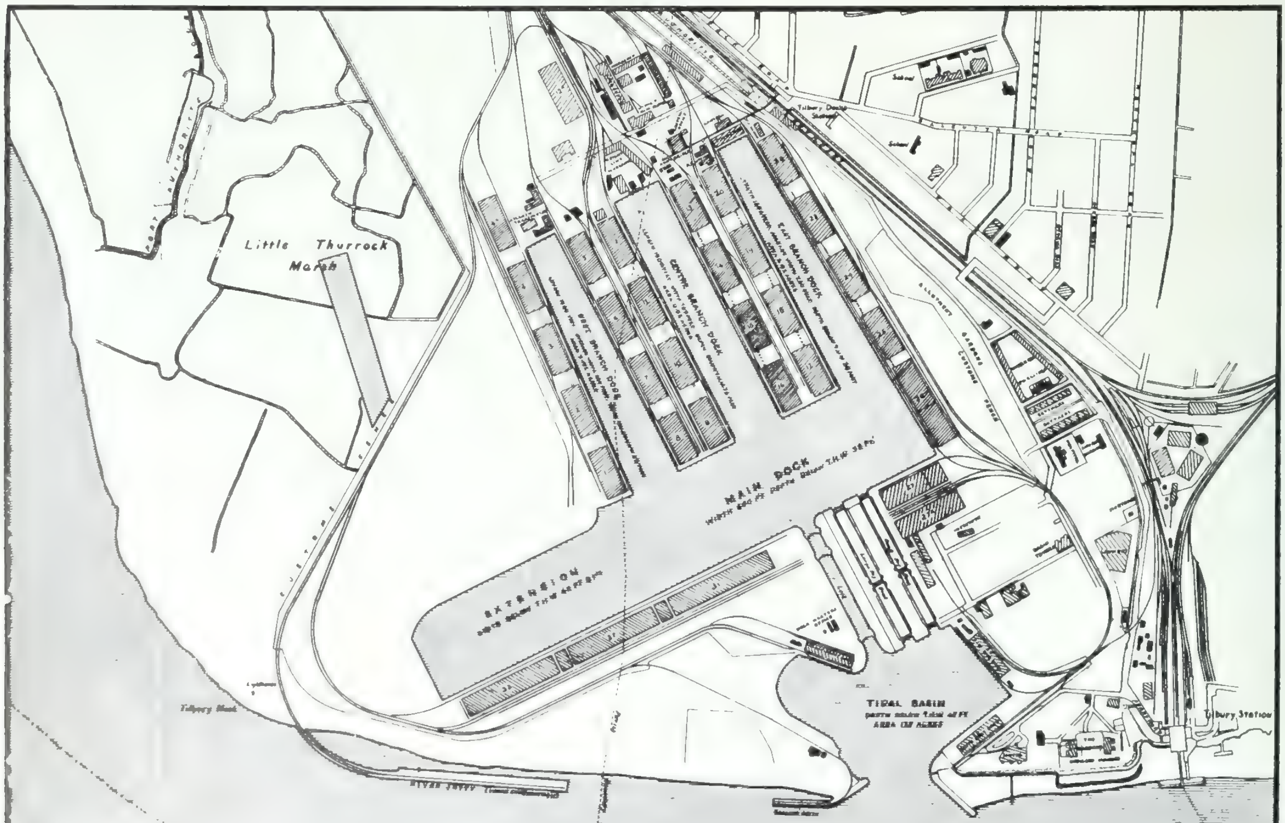
In the summer of 1918 I was sent abroad by Mr. Hurley, chairman of the Shipping Board, at the head of a mission to study the various features of port management and port development, with a special view of obtaining such information with regard to handling methods as might, when applied to our home problem, reduce ship turnaround. This study involved the organization for the control of ports, the zoning of cargo distribution, drydocks and repair plants, bunkering and cargo coal, oil bunkering, warehouses, handling and railways, tugs, barges and lighters, labor and stevedoring, and, while not pertinent to the turnaround of ships, at the special request of Mr. Hurley, I gave a small amount of attention to shipbuilding.

I shall endeavor now to confine myself largely to the subject of freight handling, but it is impossible to divorce this one feature of terminal detail from its surroundings. It should go almost without saying that, no matter how good the tools, real results will not be obtained if they are unskillfully handled. A study of our home situation convinces me that in few cases do we have proper management of our ports and terminals, and that in most instances, where it is the intention to initiate, or to extend port improvements, the one idea is to thrust one or more piers into the harbor without regard to whether this will prove the best form of development. In fact, it seems to me that I am not exaggerating when I say that taking the situation the country over, with a few exceptions, the one idea is to build a pier similar to some other pier that has been built locally, or of which the local people have seen a picture.

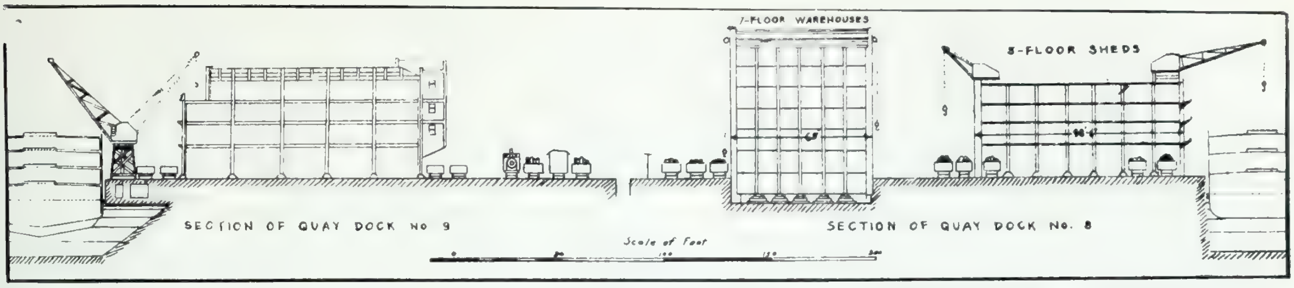
The formation of your association was a step in the right direction, and should result in much good. The Port Facilities Commission of the Shipping Board, of which I am a member, makes the proud boast that it was through the instrumentality of its chairman that you gentlemen were first brought together for coordinate action. You cannot expect to produce the best results simply by advocating the installation of machinery for mechanical handling of cargo. Many of us are quite familiar with the splendid results attained by means of mechanical appliances for transportation purposes in manufacturing plants, where the materials to be handled are of uniform size or description. Most of us are also well versed in the principles adopted along the Great Lakes for the economical handling of bulk cargo, and the absolutely satisfactory results attained in this special line. Without difficulty we can cite instances both in this and the manufacturing line, as to reduced costs, but, unfortunately, we are in no such advantageous position when we come to discuss the transfer of miscellaneous freight between railroad and ship.

In pursuit of the general subject in England, I naturally sought out the authorities who were in charge of the war traffic of the British ports, and was fortunate in meeting Sir Norman Hill, chairman of the Port and Transit Executive Committee of the British Ministry of Shipping, and some of his associates on that committee. Sir Norman Hill was quick to point out to me that the greatest difficulty in securing quick tournaround was, as he expressed it, in the matter of flow. In other words, they found that by a liberal supply of waterfront cranes plus the ship's own gear, they were able to discharge the cargo from one ship very quickly, but, unfortunately, the disposal of this cargo, in order to free the transit shed for the next ship, was a more difficult matter. He likened the transit shed to a reservoir of which the ships and railway are the intake and discharge pipes, respectively. Their problem at the time was one almost exclusively of import, but the reverse of the situation also holds true in normal times. My observations both at home and abroad convince me that Sir Norman Hill's diagnosis of the situation is absolutely correct, and I hold that if your association is to succeed it must impress this fact upon those who are studying the matter of improved or increased terminal facilities.

The measure of efficiency in loading or discharging cargo should be the time required to receive freight underneath the hatch and to stow it, and in the opposite direction to break down the cargo and to place it under the hatch ready for the hoisting sling, and until other operations are as speedily performed as that of stowing or breaking down, the performance should not be considered a perfect one. In order, therefore, that your machinery may not suffer in reputation for inefficient performance, you should see to it that such regulations are enforced that the transit sheds are in every case promptly cleared so that there may be no delay for lack of stowage space. This apparently can only be accomplished by means of penalties strictly enforced, and even then the results will not be satisfactory unless space is provided in the transit sheds for the stacking in classified groups of the greater part of a ship's cargo opposite the ship's berth, with aisle space for the handling of the goods and their removal by mechanical appliances. This means in most cases wider transit sheds than are now in use in our home ports, and such width cannot be had upon narrow piers which berth a ship on each side. Many of us have had it explained to us by shipping men and engineers in this country that the English quay system involving dock basins behind locks, has been adopted in every instance on account of the wide range of tide, and, beyond question, this has been the most potent factor in the lock basin development. But it does not explain why the most modern English dock systems are constructed as long, narrow basins with a quay wall on each side, when some of the older systems have piers within basins. Probably the most modern English comparison of the difference between pier and quay construction is at Manchester. The ship canal was only opened in 1894, so that the whole terminal at Manchester may be considered fairly modern. The first berths constructed consist of narrow piers with provision for ships on both sides, and single-story transit sheds. Their latest development at Dock No. 9 is a slip 2700 feet long, with transit sheds 110 feet wide and four stories high. Incidentally, I may say that they insist that these are not warehouses but transit sheds. In addition to the crane tracks, there are two lines of standard gauge railway tracks on the waterfront between the sheds and basin, two lines of standard gauge tracks at the rear, and back of this a large railway yard. Also there are enough electrically-operated gantry cranes to allow one to each hatch of every vessel. The booms of these cranes are of sufficient reach to plumb the center of the hatch of a vessel when a coal barge or lighter is lying between the ship and the quay, and also to handle cargo to or from any of the four floors of the sheds. A glance at the map of the Manchester terminal will give sufficient evidence of the growth from narrow piers to wide quays. To prove that the four-story transit shed has given satisfaction, the company has in prospect the construction of five-story transit sheds, 132 feet 6 inches wide, to be served both on the water front and in the rear by electric gantry cranes. The cranes already installed at No. 9 dock are also fitted with distant control apparatus, so that the operator may stand on the deck of the ship looking



Plan of Tilbury Dock, London, England



Section Through Typical Manchester Quay Installations Note—Three and four Railroad Tracks alongside Warehouses

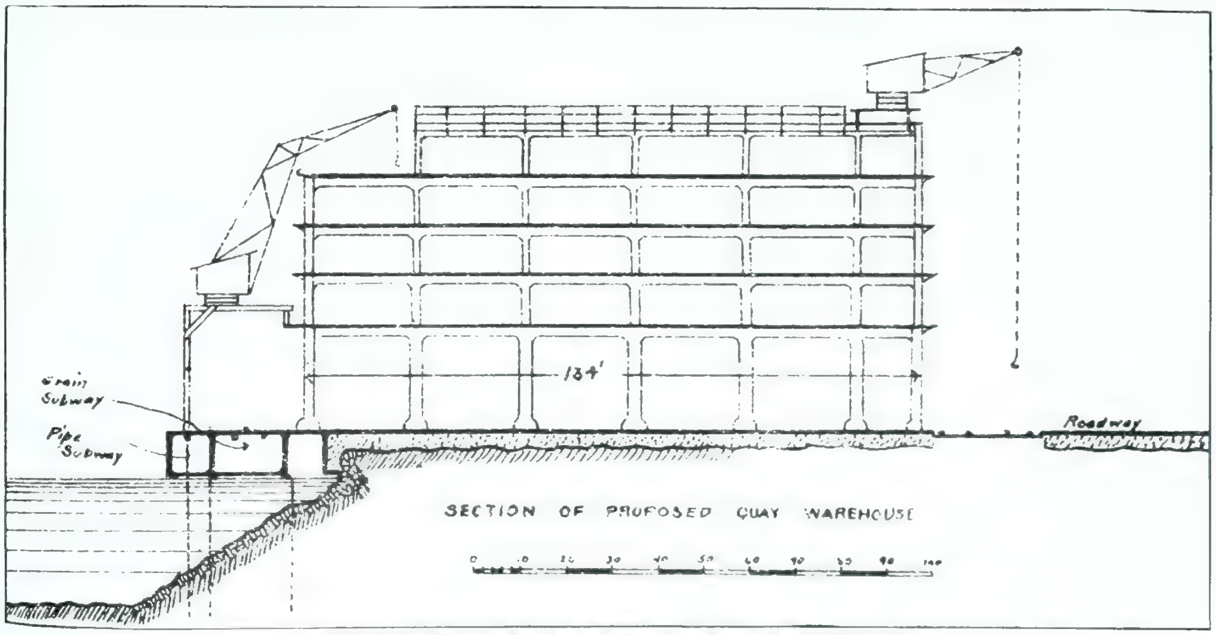
into the hold, and still operate his machine with perfect satisfaction.

London docks give a most excellent illustration of growth in the matter of convenience and expedition in handling. True, the older docks are mostly of the basin type without piers, but at both the Victoria and Albert docks and the Tilbury dock, which are the latest and best equipped with modern appliances, the construction started with basins having piers. The Royal Victoria dock is a wide basin into which numerous comparatively narrow piers project from the northerly side, and these piers naturally have berths for ships on both sides, but in the extention of this dock the Royal Albert basin was constructed. It consists of a long, narrow water way, with berths only at the quays on two sides. Here, too, as at Manchester, the transit sheds line practically the entire quay, and have two lines of standard gauge railway, both front and back, and other tracks forming a considerable railroad yard. The cranes, too, are of the most modern type, and sufficient in number to allow one to each hatch of the vessel.

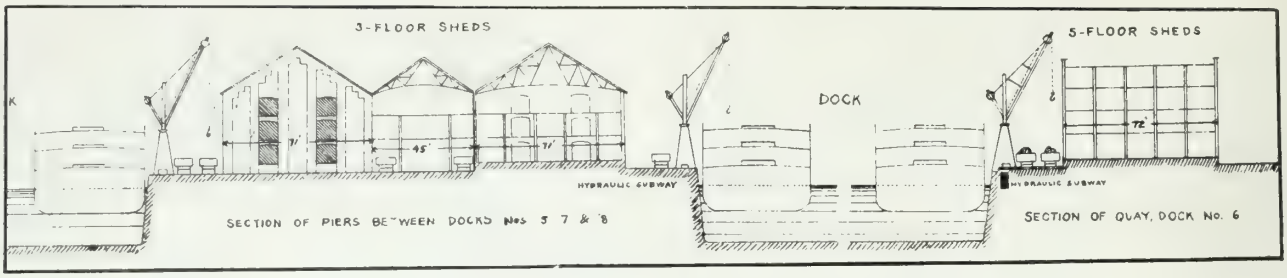
At Tilbury the first construction consisted of a basin almost square in plan, with two piers projecting into it. These piers are 250 feet and 300 feet wide, respectively, and 1600 feet long. Their transit sheds and railroad system are similar in layout to those at the Albert dock; yet when this basin was extended, the long, narrow quay plan was adopted. The new Royal Albert dock south is also a long, narrow basin, with berths only on the sides. It seems, therefore, fair to assume that when compared with the greater transit shed capacity attained by means of the quay system, the pier system is found wanting.

Before leaving the subject of general layouts, I wish to invite attention to the so-called jetty system, as exemplified at the Millwall grain dock and at the Royal Albert dock. Parallel with the face of the quay wall of the basin, a pier system is built of just sufficient width to accommodate the long reach gantry crane, the distance between the inner face of the pier and the outer face of the quay being just enough to accommodate barges and lighters, such as those which handle grain and coal. The cranes, instead of being established on the quay, are placed on the so-called jetty, and have sufficient reach to handle material from the ship's hold to the railroad cars or transit shed on shore. The ship, of course, docks on the outer side of the narrow jetty, and is thus enabled to load or unload from barges or lighters on both sides at the same time, or from shore.

Contrast the transit shed space offered by the quay system, especially at Manchester, with the proposed 1000-foot by 125-foot pier at Staten Island. Is not this question of capacity one which can be worked out in actual figures, and can such actual figures be made to justify a total width of 125 feet to accommodate ships on both sides? Is the English system of ample railroad trackage for such modern docks not based upon wide shipping experience, and can it be successfully contended that the Staten Island pier will have satisfactory railroad connections? Is it not a fact that both incoming and outgoing cargo must be received on the dock, and that full speed of handling cannot be attained unless ample space is provided for the greater part of the cargo of each individual ship opposite its berth? And surely maximum speed of handling cannot be maintained if all the cargo un-



Section of a Proposed five-story Quay Warehouse at Manchester



Typical British Quay and Transit Shed Construction

loaded from a ship must be transported by trucks along the entire length of a long pier, and then across a busy street before it reaches a warehouse. Surely the most satisfactory general system requires that so far as practicable the ships shall be a continuation of the railways, and vice versa.

With regard to the general character of handling, nearly the whole of this work which is done mechanically is by means of cranes. Speaking generally, the older installations are hydraulically operated, and of thirty hundredweight capacity, and four cranes are usually provided for each berth. Practically, all the new cranes are electrically operated, and the most recent ones at Albert and Tilbury docks have a sixty-five-foot reach. Track gauge is fifteen feet, and the standard gauge track passes directly beneath, with room for the standard freight car. There were four to six of these electric cranes for each ship's berth. Almost without exception, there are two to three lines of standard gauge track between the edge of the quay wall and the face of the transit shed. Hand trucks are used almost exclusively to transfer the material between crane sling and the transit shed, or the railway tracks at the rear of the shed.

At London there are probably more one-story than two-story sheds; whereas at Liverpool the two-story sheds seem to predominate. There are many warehouses alongside the quays, especially at the older London docks. Belt conveyors were noted at flour mills on the quay side, and a notable installation of such belts at the cold storage warehouses at the Albert dock. Not only are there fixed belts running the entire length of the second story just inside the doors of the transit shed, but there were probably as many as fifty separate portable belt units which could be used in connection with the fixed belts, so that material could be handled to or from any point on the floor. Also, in connection with the Albert dock cold storage warehouses, a notable combination of mechanical appliances was observed unloading quarters of beef from a vessel at the quay. The ship's gear landed these quarters of beef upon a portable belt unit, which transferred the cargo from the edge of the hold to the side of the transit shed, where a chain was hooked around the shank of each quarter of beef by hand and fastened to an overhead trolley, which delivered its load either to storage or to lighters waiting alongside, but further down the dock.

Grain elevators, both of the suction and of the chain belt bucket type, were noted unloading ships at various places. The suction elevators usually had their own floats, while the chain belt bucket installations were portable units, suspended from the ship's booms. In this connection it should be said that at Manchester the entire length of the quay is equipped with a grain tunnel, in which are installed three wide belts. The roof of the tunnel is provided at frequent intervals with manholes, into which the chutes of the chain belt bucket portable units can be projected, in order that grain may be unloaded mechanically from a vessel, while mixed cargo is being taken out with the cranes, or ship's gear. The belts in the tunnel lead to a grain elevator at the head of the 2700-foot slip, where the grain is received upon vertical elevators for mechanical handling to the various bins.

At Tilbury a vessel was being unloaded by means of the electric cranes and ship's gear, and it was interesting to note that instead of rope slings the cargo, which consisted mostly of cases of canned goods of the ordinary size, was handled upon flat wooden platforms, which in general held sixteen separate cases. These cases came off in uniform stacks, instead of in a more or less irregular mass, as would have been the case with rope slings or nets. The platform ropes, where they passed over the edges of the boxes, were provided with an angle-shaped wooden guard which served to keep the load intact. I have seen this same arrangement in this country, and it has always suggested to me that it lends itself most admirably to transfer, without breaking up of the load, to electric trucks or trailers.

Floating derricks of fifty tons' capacity were noted at various locations, and gravity (roller) conveyors were occasionally seen.

While Liverpool is not as old a port as London, the growth of the city has restricted dock space, and it has not been able to expand so freely as has the port of London. The greater part of the dock system is comparatively old, and in general it may be stated that the typical sheds are two stories high, with hydraulically-operated cranes upon the roof. Liverpool has also been handicapped in the matter of railroad connections, and there is much trucking through the city. The most modern installation is the Gladstone dock, which can be used, when required, as a drydock. At the time of inspection the Aquitania was taking on 6000 tons of coal and it was said four days would be required for the operation. There were lighters on both sides of the ship, and the bunkering was being performed by hand. The coal was shoveled into baskets, which were hoisted by a single whip to the side ports of the ship. It may be stated, in fact, that bunkering at ports in England is usually done in this manner, although there are some few mechanically equipped barges. Several of these were noted which were said to have a capacity of 1000 tons, with chain belt elevators running the entire length of the barge. At the new Gladstone dock there are four electric gantry cranes, with sixty-foot booms, the front leg of the crane resting on the track at the edge of the quay, and the back leg on the eaves of the building. At Langton dock there is a 100-ton fixed base, revolving crane.

Both at Liverpool and Manchester an interesting installation was observed, called locally a "jigger," with which single bags of material were lowered from the upper stories to waiting trucks below.

(Continued in Material Handling Section, page 104)

Shipping Board Facts

By the Traffic Manager

FOR a number of weeks the Senate Comittee on Commerce has been taking testimony from shipping men. The Traffic Manager has gleaned the following significant statements from the testimony of J. H. Rosseter, director of operations of the Shipping Board, and the Hon. John Barton Payne, chairman of the Shipping Board, and readers are invited to study these statements carefully and draw their own conclusions.

Shipping Board Tonnage, Part 3, Page 227

. Mr. Rosseter:

> "Of all classes, as of June 12, 1919, 965 ships of 5,467,105 deadweight tons were the property of the Shipping Board. If the building program is carried out as contemplated, the total will be 2400 vessels."

Mr. Rosseter did not state what this would amount to in tonnage, but 13,500,000 gross tons would be a fairly close approximation.

Wooden Steamer Cost versus Steel Steamship Cost, Pages 245 and 266

Mr. Rosseter testified that the wooden vessels cost practically $200 a ton, and that the cost of steel tonnage is about the same. This never held true before, and it is only during the Shipping Board's regime that wood and steel prices have been equalized.

Number of Departments in the Division of Operations

Director of Operations, Assistant Director in Charge of Traffic and Trades, Assistant Director in Charge of Vessel Management, Allocations Department, Assignment Department, Rates and Claims Department, Department of Shipping Information, Actuarial Department, Governmental and Foreign Relations Department, Dispatch Department, Supervisors' Department, Contract Department, Pursers' and Stewards' Department, including Supercargo, Deck Personnel Department, Engineers' Department, Radio Department, Supply Department, Construction and Repair Department, Records and Files Section, Telegraph and Cable Section, Office Supply and Office Service Section, and Tank Steamer Department. These departments are all described on pages 251 to 258 of Mr. Rosseter's testimony.

There are many more departments in the other branches of the Shipping Board.

Competition, American versus Foreign Ships, Page 264

Senator Nelson:

> "Assuming that all the government vessels we have built are turned over to be operated by private interests instead of the government, will our shipbuilders be able to compete with foreign shipbuilders, and will our ship operators be able to compete with foreign shipowners?"

Mr. Rosseter:

> "I answer, with strong personal conviction, both questions in the affirmative."
>
> (Note.—Mr. Rosseter qualified this statement later by stating that fair treatment was required for American ships, and a fair compensation for the carriage of the mail.)

Shipping Board Profits, Page 267

Taken from Mr. Rosseter's Testimony:

The total revenue from all sources from July, 1917, to April 30, 1919, was $388,270,578.12. Total operating expenses, including 5 per cent interest, was $375,438,511.49. Net profit amounted to $12,832,066.63. However, the wooden vessels were depreciated from $200 to $100 per deadweight ton, and capital charges on these vessels were based on $100 per deadweight ton. The testimony does not show what has become of the other $100; anyway, it was spent. The wooden ships completed up to the time of Mr. Rosseter's testimony numbered 253 of 884,309 deadweight tons (see Mr. Rosseter's table, page 315), times $100 per deadweight ton depreciation equals $88,430,900. A private owner would consider that he had operated at a loss.

Taxes, Page 284

Mr. Rosseter:

> "We have made large sums of money by operating the ships for government account. This is due to present abnormal conditions, making the shipping business very profitable, especially as the board has no taxes to pay."

Depreciation, Page 270

Senator Lenroot:

> "What percentage of depreciation did you allow on that?"

Mr. Rosseter:

> "Ten on steel and 12½ on wood."

Senator Lenroot:

> "Do you think 12½ would cover depreciation on wood?"

Mr. Rosseter:

> "Frankly, I do not know, Senator. It should be nearer 20 per cent."

Freights, Page 270

Senator McNary:

> "Freights are decreasing, are they not? That is the tendency?"

Mr. Rosseter:

> "Yes, sir."

Senator McNary:

> "And the revenue is based upon extraordinarily high rates that endured during the war?"

Mr. Rosseter:

> "Yes, sir."

Senator McNary:

> "But the earnings would probably decrease in the next few years?"

Mr. Rosseter:

> "Yes, sir."

Senator McNary:

> "By reason of the lowering of freight rates?"

Mr. Rosseter:

> "Yes, sir."

Operating Costs, Page 271

Chairman Nelson:

> "Do you anticipate any reduction in the cost of operation?"

Mr. Rosseter:

"Except in the matter of oil fuel, I anticipate an increase in the cost of operation, Senator."

(Note.—The latest quotations to the government on fuel oil show an increase of 100 per cent.)

Chairman Nelson:

"In what way?"

Mr. Rosseter:

"The social tendency, higher wages, higher dock costs, higher costs of materials going into the ship in the way of renewals, and higher costs in repair account. It is really a serious problem."

Return Cargoes, Page 274

Senator Simmons:

"You were outlining a little while ago what you referred to as difficulty in many lines of trade in securing return cargoes, making it necessary that the ships should return in ballast. Do you anticipate, when the channels of trade are freed of all restrictions, international restrictions, and business becomes normal again, that there will be any relief against that condition?"

Mr. Rosseter:

"No, Senator. We have reached a point of constantly increasing disproportion which might now be fairly expressed as two to one. Our exports exceed in tonnage about two to one our imports, and I think the spread will increase."

Government Efficiency, Page 286

Chairman Nelson:

"Can they (the Dispatch Government) handle this large fleet with as much efficiency as they could be handled by various private owners and operators?"

Mr. Rosseter:

"We struggle day in and day out, and it is very disheartening to find that in the end we get an efficiency which looks to me as not much better than 50 per cent. Sixty per cent is about the best we can do."

Chairman Nelson:

"Is there any fundamental reason for this deficiency?"

Mr. Rosseter:

"The task is too colossal."

Charter Rates Paid by Government to European Shipowners Compared to Rates Paid American Shipowners, Pages 294-295

Mr. Rosseter:

"Of these foreign classes, 50 Dutch, 33 Norwegian, 19 Danish, 16 Swedish, 6 Japanese, 2 Chinese, we had on May 31, 1919, an aggregate of 126 steamers, totaling 710,056 deadweight tons' capacity, for which we were paying, hired on time charter terms, from approximately $8.25 to $10.75 per deadweight ton per month, and for the Dutch we were paying approximately $8.31 per ton per month for 'bare ship.' **These rates average double the amounts allowed American owners by the Shipping Board for steamers taken under requisition charter.**"

Honorable John Barton Payne, Chairman, Before the Senate Commerce Committee on the Sale of Ex-German Ships

Government versus Private Ownership, Page 19, Part 1

Senator Simmons: "Judge, you expressed a while ago the opinion it was to the public interest to dispose of these ships. You were talking just before you made that declaration about passenger ships. Did you refer to other ships as well?"

"Mr. Payne: "No, Senator; everything I have said in relation to this sale has reference to passenger ships. I do, however, think it ought to be the government's policy to sell all of these ships, cargo and passenger, as rapidly as the country is prepared to absorb the ships, because I think it is much better that the ships, both passenger and cargo, should be operated by private hands rather than by the government."

Price of Ships, Page 19, Part 1

The Chairman: "In order to get this done, Judge, you would not reduce abritrarily the price below the going price, and the price that the conditions seemed to warrant?"

Mr. Payne: "I have not thought it wise to do so. As a matter of fact, we have been watching these hearings (before the Senate Commerce Committee on the establishment of an American merchant marine) here with great interest. Perhaps as a principle, if I could state one, it would be this: Assuming that we are correct in the conviction that these ships ought to be sold, we ought to be willing to sell them for slightly less than it would cost to build them plus the difference between the spot delivery and the future delivery, which would be involved in the building of the ship."

Tonnage Lost During the War Almost Replaced, Page 20, Part 1

Senator Nelson: "Is it not true that within two years or more England and the neutral countries will be able to supply the loss of tonnage resulting from the war, and that there will be a greater abundance of ocean tonnage than there is today?"

Mr. Payne: "Yes; as to the latter part of the question. I do not think England is building ships rapidly. I think they are making rather slow progress."

Senator Nelson: "Well, it is remarkable—I have heard it estimated that England lost from 8,000,000 to 10,000,000 tons during the war. Now, here is a statement from the Commissioner of Navigation for the fiscal year ended last July, and it gives the tonnage of Great Britain in June, 1914, at 18,892,000 tons, and it gives the tonnage as of June, 1919, at 16,345,000 tons, indicating a loss, in round numbers, of 2,500,000, which shows that they have made up a great deal."

(Note.—Nine months have elapsed since the above United States Commissioner reported, and today Great Britain has probably more than regained her lost tonnage.)

Shipping Experience, Pages 14-16, Part 1

Senator McKellar: "Have you had any shipping experience before going in the Shipping Board?"

Mr. Payne: "I never had; have not had much yet."

(Note.—This is quoted merely to show that the government acts directly opposite to the private shipowner in selecting the head of his working staff. With a private owner, the man at the helm is generally the most experienced.

Since the first appointment to the Shipping Board in January, 1917, there have been eight commissioner resignations, and it is announced that the chairman, John Barton Payne, and Commissioner Thomas A Scott will resign in the next few weeks, which will bring the resignations up to ten. John Barton Payne is now being appointed Secretary of the Interior in place of Hon. Franklin K. Lane; and Admiral Benson has been appointed chairman of the Shipping Board.

How can one expect to keep our great American merchant marine on a straight and definite course when there are so many changes of masters at the helm? Each new master has a different idea as to how his ship shall be equipped and navigated.

The Senate Commerce Committee is now trying to work the Shipping Board back on its proper course. Success to it!)

A Government Conducted Auction (German Ships), Pages 17-18, Part 1

In ordinary business the term "auction" implies that the object offered for sale will be disposed of to the highest bidder, but not so with the Shipping Board.

Senator McKellar: "Judge Payne, I understand that you propose to sell these (German passenger vessels) at auction on Monday. Now, will you consider yourself in any way bound to accept the price bid by any corporation or individual for all of those ships?"

Mr. Payne: "On the contrary, Senator, the board passed a resolution that they would authorize the sales division to go forward with these sales subject to the approval of the board. In other words, if, when these bids are obtained, the board is of the opinion that the price is inadequate, either as a whole or as to individual ships, the board has expressly reserved to itself the right and the duty of determining that question and rejecting the bids."

Senator Fletcher: "That is, when you consider the price inadequate. Could you do it for any other cause?"

Mr. Payne: "We could do it for any other cause."

The Chairman: "In other words, it is not an auction to the extent we usually hear auctions spoken of, where, for instance, we have but two bids and they must go to the highest bidder, but you have reserved the absolute right of rejecting all offers and bids, if deemed wise to do so?"

Mr. Payne: "By formal resolution of the board."

Shipping Board Action on Bids, Page 23, Part 1

Senator Nelson: "Those bids have not been made yet; they are to be opened Monday."

Senator McNary: "Oh, I appreciate that, but how long can you hold them after that?"

Mr. Payne: "Oh, we do not have to accept them at all. A reasonable time."

Senator Nelson: "I understand the Judge to say they would be held until they made an investigation."

Senator McNary: "Oh, well, I mean thirty or sixty or ninety days."

Mr. Payne: "No time is specified."

Senator Calder: "These ships will be tied up at the dock until this is determined?"

Mr. Payne: "Yes, sir."

Senator Ransdell: "And at great expense to the government?"

Mr. Payne: "Yes, sir."

Government Ships Sold Up to February 18, 1920, Page 1, Part 2

Mr. Payne: "Mr. Chairman and members of the Commerce Committee, following the policy expressed in existing legislation and orders of the President, it has been the policy of the board to sell the ships to American citizens for private operation under the American flag, and in this way to encourage the creation of a merchant marine. Acting under this policy we have sold 188 ships of the value of $93,545,947.83, including eighteen ex-German cargo ships taken over under the same joint resolution as these passenger ships. The reason we have sold only cargo ships is because these passenger ships were used by the war department in troop movement. The policy, however, of establishing a merchant marine under private ownership applies equally to passenger and cargo ships."

(Note.—At his next appearance before the Senate Commerce Committee, March 10, Judge Payne testified that the number of vessels sold (of all kinds) as 197, indicating the sale of nine vessels between the period of February 18 and March 10. This does not indicate a great desire on the part of the public to invest in government ships at government prices. A very long time will be required to dispose of them at this rate.)

Inadequate Government Organization for the Direct Operation of Ships, Page 30, Part 2

Mr. Payne: "It should be understood that the ships (German passenger ships), whether owned by the government or by private capital, must in either case be operated by the shipping companies which are now bidding for the ships. The government has no adequate organization for the direct operation of ships."

Navy Yard Repair Bids versus Private Bids, Page 34, Part 2

Senator Kirby: "Is there any reason why a private ownership can recondition those ships (German passenger ships) at any more reasonable or lower rate than the government can?"

Mr. Payne: "I doubt it, if I am an expert on that subject."

Senator McNary: "Conditioning of the ships at private yards or navy yards?"

Mr. Payne: "The navy yards in competition with the private bidders, and one of our ships, at least, is being reconditioned in the navy yard."

The Chairman: "Isn't the navy bid simply an estimate?"

Mr. Payne: "Yes; we have to pay whatever it costs."

The International Mercantile Marine, Pages 36-37, Part 2

Mr. Payne: "The International Mercantile Marine is an American corporation, is officered by Americans—I am not sure but what there is one Englishman on the board—it is listed on the stock exchange in New York, and is entirely controlled by Americans. It owns at least two British companies, which are subsidiary to the International. These companies are officered—at least the directors are English—but they operate wholly from the English side. Our conclusion, therefore, was that there was no harm in an American company owning subsidiaries in Great Britain, and that the International Mercantile Marine Company was a 100 per cent American company and entitled to be regarded by the Shipping Board as such."

The Chairman: "The board made a pretty thorough investigation so as to ascertain its real character?"

Mr. Payne: "Yes, sir; and the documents are on file now with the board."

The Chairman: "Do you remember what it shows as to the ownership of stock, whether that was practically all American?"

Mr. Payne: "Wholly American."

Freight Rates and Wooden Ships, Page 38, Part 2

Senator Fernald: "As a business man, you apprehend that there will be quite a reduction in rates by that time (a twelve months' period)?"

Mr. Payne: "Well, Senator, we are already beginning to feel it in our cargo ships. I sent to the chairman a letter the other day which had been submitted to the board by our operating division, and the net of it was that they recommend that we now tie up all of our wooden ships, because there is no adequate demand for their use, and we must, if we run them at all, run them at a heavy loss. Now, with that staring us in the face, with the exchange situation in Europe, which is, perhaps, to a large extent, responsible for it, we feel that all commercial matters will lay, and it is bound to have an effect on every form of shipping rates."

Expense to Government of Idle German Passenger Ships, Page 29, Part 2

The Chairman: "Assuming that the government retained these ships (German passenger ships), if it does not proceed at once to recondition them, they will have to be tied up, and the expense of looking after them and the depreciation will be considerable?"

Mr. Payne: "Yes; the cost to us every day is about $12,000 in personnel and dockage, to hold these ships."

(Note.—In the above statement, depreciation was not added to the total expense per day.)

Hog Island Cannot Make Repairs, Page 39, Part 2

Senator Calder: "Is it not a fact that a ship repairing plant is a very different thing than a shipbuilding plant?"

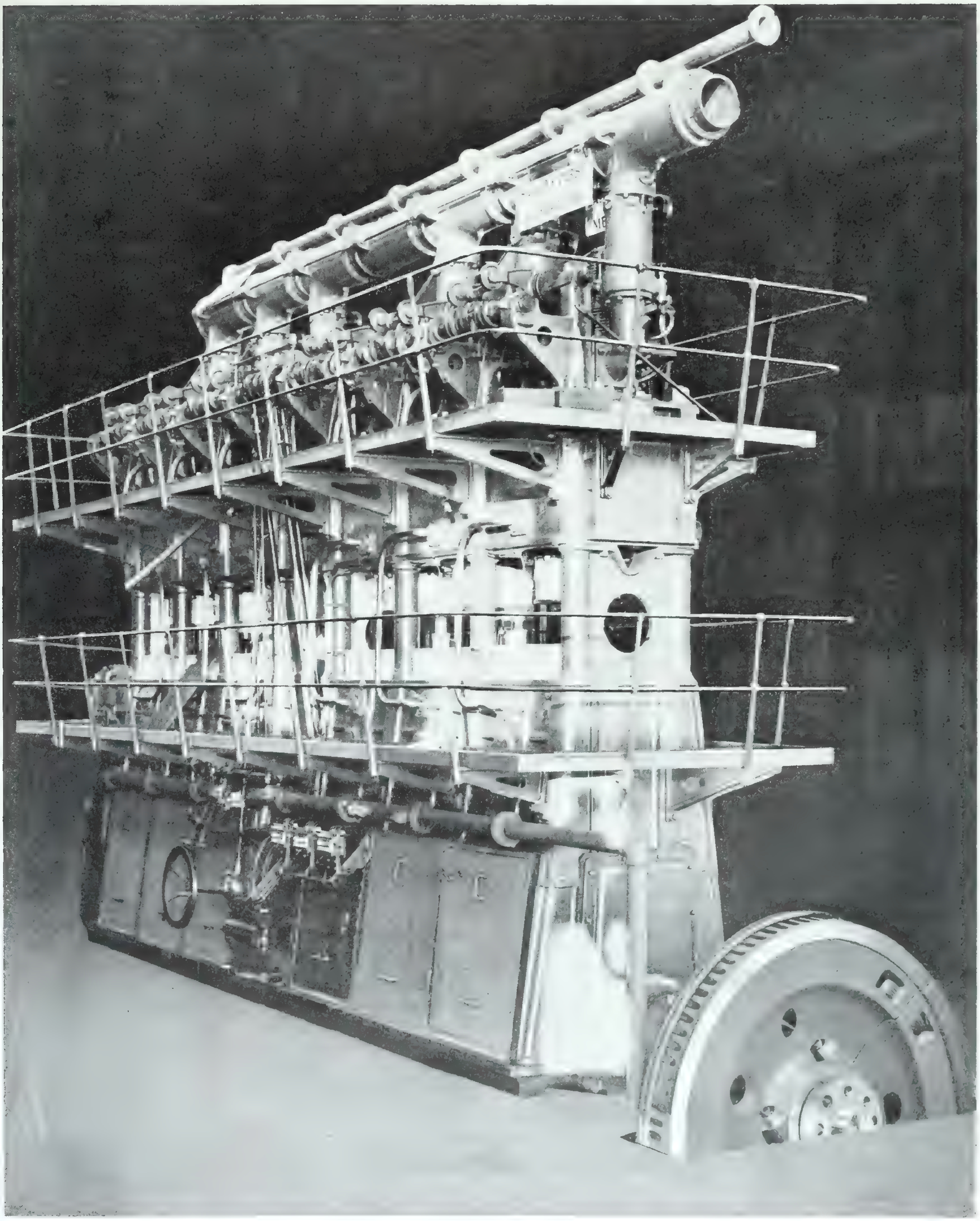
Mr. Payne: "Some of the plants have both. But it is a separate institution, as such, from the construction plant. That is why I had to answer a while ago, 'The government has Hog Island, but we have no facilities there whatever for repairing or reconditioning ships.'"

Additional Legislation Required to Keep Government Vessels Permanently Under the American Flag, Page 43, Part 2

Senator Ransdell: "It has been suggested to me, Judge Payne, that our law is not specific, not definite enough on the question of requiring the purchasers of ships of the board to maintain them permanently under the American flag, which, I take it, is the wish of all patriotic Americans. I would not ask you to give an absolute opinion on that unless you have studied it closely, but I would like to have your bare statement and that of the board counsel, and see whether or not, in the opinion of your counsel, the law is so plain and clear that there will be no way to get around it, because it has been suggested to me by people in whose judgment I have a great deal of confidence that the law is incomplete and indefinite now, and if you sell this fleet to the private bidders at the present time that they could, if they so desired, turn them over to some other country."

Commissioner Stevens: "I think I can give a statement on that. If you want the ships to remain permanently under the American flag, some additional legislation will be required; the present law states that during the time of war, or during the time of national emergency, declared by proclamation of the President, no ship may be transferred without the permission of the Shipping Board; but if the war were over, and the President by proclamation declared that there was no longer an emergency in shipping, then you would not have to come to the Shipping Board to get permission. That legislation is necessary, unless the Senate is never going to act on the treaty, or we will not have a peace, or we will have a President who will always say we have an emergency."

Largest Marine Diesel Engines Built on the Pacific Coast



Werkspoor 1000-horsepower direct-reversing full-Diesel Marine Engine; one of a pair built by the Skandia Pacific Oil Engine Company for the 5000-ton motor boat tanker now under construction by the Moore Shipbuilding Company for the Standard Oil Company of California. See page 107

Notes From the East

By "Americus"

THE pot is boiling furiously in merchant marine matters; the center of ebullition is located in the Capitol building at Washington, and hence that place has been the mecca of persons representing interests of all kinds connected with the future of our shipping.

While the Senate Committee on Commerce has drawn the limelight of public gaze, the House has quietly, and in a business-like way, disposed of two important pieces of legislation which have been pending for some time before that body. The first, which had the unanimous approval by the lower House, was the bill making the American Bureau of Shipping the official classification society of the government. It requires that "for the classification of vessels of the United States and for such other purposes as are the proper functions of a classification bureau, all departments of the government and all commissions created by the government are hereby directed to recognize the American Bureau of Shipping as their agency so long as the American Bureau of Shipping continues to be maintained as an organization which has no capital stock and pays no dividends." It further directs that one representative each of the Department of Commerce and of the Shipping Board shall be elected as members of the executive committee of this American classification society and that the official list of vessels published by the government shall contain notations indicating all American merchant vessels which are classed by this bureau. It does not require that all vessels owned by American citizens shall be classed by the bureau, as was strongly advocated by a number of the Committee on Merchant Marine. The object of the bill is to give the American Bureau the same recognition by this government as is given by other maritime powers to similar societies abroad. As the members of the Senate Committee on Commerce have expressed themselves very strongly in favor of such legislation, there seems but little doubt that this important bill will soon become law. The other bill passed by the House was to permit American cargo vessels to carry not more than fifteen passengers each, without coming under the requirements of law and regulations applicable to passenger vessels. Such legislation cannot fail of being of the greatest value to the upbuilding of our merchant marine, as it will enable American commercial representatives to proceed to foreign ports and transact business without being compelled to make circuitous passages to such ports on foreign passenger vessels.

The author of both of these bills is the Hon. George W. Edmunds of Pennsylvania, than whom there is no more intelligent and more patriotically active man in Congress. He is the ranking member on the majority side of the Merchant Marine Committee and he has devoted a great deal of time and study to the problems connected with the development of shipping in this country. Largely through his efforts a very comprehensive plan to foster American marine insurance facilities will shortly be forthcoming in the shape of a bill to correct existing inequalities to which American underwriters are subjected.

The hearings before the Senate Committee on Commerce are about at an end, and the past, present and future of our American merchant marine have been thoroughly threshed out. The old copybook adage of "Many men of many minds" is well exemplified by the great diversity of the testimony adduced. Steamship owners, ship operators, labor unions, pro bono publico experts, shipbuilders and every conceivable sort of witness having any ideas concerning shipping have all had their day at court, and the output of the committee in the shape of a definite shipping policy is anxiously awaited by all concerned. As previously predicted in this column, it does not look favorable for a wholesale disposal of Uncle Sam's ships at greatly reduced prices, regardless of the good arguments for such a culmination which have been advanced by shipowners. While the majority of the committee undoubtedly are opposed to government ownership and operation, the time does not seem ripe for Uncle Sam to immediately let go his hold of the Shipping Board ships. The furore raised by certain elements of the press against the sale of the ex-German ships has undoubtedly had a strong effect against such a procedure. This proposed sale, right or wrong according to your own viewpoint, has incidentally been the cause of unearthing a very strong latent sentiment among the American people, which will act as a deterrent on our lawmakers for taking too hasty action about selling any of the ships which are considered as good assets for future American commerce on the seas.

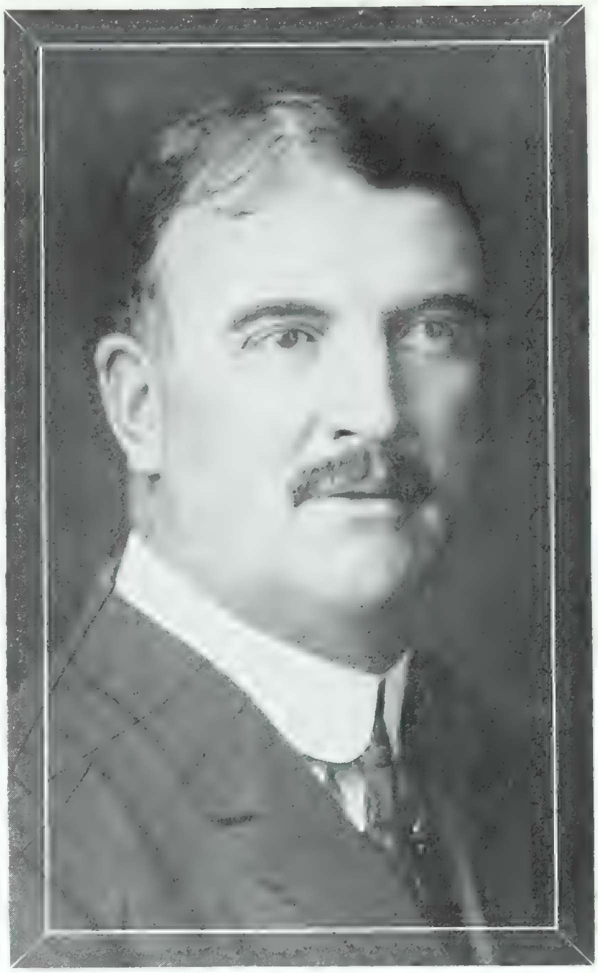
There seems to be a strong sentiment in the committee to include in the Senate shipping bill a clause giving preferential railroad rates to goods to be shipped abroad in American bottoms. This, if enacted, should be of great advantage to Pacific Coast ports in their trade with the Orient, as it will give American-owned vessels a much needed advantage, over the ships of our rivals, in securing cargoes shipped from east of the Mississippi for Asiatic ports. Another proposed section of the bill will extend our coastwise laws to the insular possessions of the United States, including the Philippines and Hawaii. Such legislation would be entirely logical if we are to awake from our hitherto foolishly generous policies of giving our rivals all the advantages which we give our own people. We now have the ships and every governmental aid possible should be given to keep them employed in extending our own business.

The great national kaleidoscope, the Shipping Board, keeps on making new combinations, the color effect of which may be artistic, but the business effect of which is viewed with great apprehension by the people most interested. If the combination of commissioners could remain fixed for a definite period, shipping men opine that great good would be accomplished. Senators on the Commerce Committee are viewing these frequent changes with considerable perturbation. At one of the recent hearings the proposal was made that the chairman of the board should be a lifetime position. It was also suggested that the board be increased in numbers from five to seven. By far the best suggestion made at one of the hearings was that the salaries should be increased to $12,000 per annum, to correspond with salaries paid to members of the Interstate Commerce Commission. A salary of $7500 a year these days is totally inadequate to attract men of the necessary ability and experience, who do not have ample incomes of their own. Experienced men can make more money outside, and men who have accumulated both private means and the necessary experience are few and far between. It may not be generally known, but it is a fact nevertheless, that when the original shipping bill was passed by the House of Representatives, it provided that the salaries of members of the Shipping Board should be $10,000 per year. In this the Senate Committee concurred, but when the bill reached the floor of the Senate, one particular senator moved that the pay be reduced to $7500, remarking that he did not believe that those men should get more salary than a United States senator. Unfortunately his amendment was adopted, and we are now reaping some of the results of this shortsighted policy. While there is no dearth of enterprising citizens who are willing to serve as senators at $7500 a year, there is a considerable shortage of competent men willing to act on the Shipping Board and kindred governmental commissions for that stipend. Many of us believe that senators and congressmen should have their salaries raised, but if they are too modest to vote themselves increases, by all means let them increase the salaries of the members of the Shipping Board and thus encourage men to stay put when once appointed to those important places.

The appointment of a retired naval officer as chairman of the board and the announcement that another naval officer would be placed in charge of operations of the Shipping Board, came as quite a surprise to shipping men generally. The sentiment concerning this action is somewhat mixed; some who believe that naval training does not fit officers for business pursuits do not look very favorably on the situation, while others take a more optimistic view and console themselves with the fact that these new appointees are both very high-classed gentlemen who know a lot about ships, even if not so well versed in commercial matters. If they are both kept in the positions for a sufficient length of time to form and carry out definite policies, that will help ameliorate some of the criticisms of the board.

We are all getting ready to make the forthcoming Merchant Marine Exposition at Grand Central Palace here in New York a howling success. The show begins on April 12 and we extend a cordial invitation to the sturdy merchant mariners of the Pacific Coast to visit us at that time, and add their Western spirit to make the exposition one long to be remembered and ofttimes repeated. Our rusty looking old snowbanks, which have stayed with us most of the winter, will be gone by that time, and April, you know, is reputed to be a wet month, even in New York.

New York and the East generally expect to send a goodly delegation to the forthcoming Foreign Trade Congress in San Francisco, and we all hope that much good for the future of American shipping will result from this interchange of ideas and formulation of policies.



The late Douglas Erskine

DOUGLAS ERSKINE

At his home in Alameda, Douglas Erskine, widely and popularly known as "Dougie," and loved by the marine fraternity of San Francisco, peacefully passed away at the age of fifty years. Few men in San Francisco were better known or liked than this genial Scotchman who coming around the Horn from Glasgow in his uncle's yacht thirty years ago, adopted San Francisco as his home.

His prowess in early years on the football field and his pleasing personality brought him prominently forward in athletic and sporting circles. On graduation from college he went into journalistic work, serving on the various papers and soon had worked his way up to the position of sporting editor of the Examiner.

About three years ago Douglas Erskine resigned this position to become associated with John Rosseter in the shipping business as publicity manager for W. R. Grace & Co. and the Pacific Mail Steamship Co.

During his fifteen years of service for the San Francisco Examiner and his three years with the Pacific Mail, he endeared himself to all his associates not only by his love of athletics and his personality but by his sense of fairness and his remarkable ability for writing descriptions of sporting events. He was keenly interested in yachting and in golf and made himself many pals on the links.

His cheery smile and apt sayings will be sorely missed by his many friends on California street and along the water front

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J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor
G. N. SOMERVILLE. . . . . . Associate Editor
J. G. BRAY . . . . Pacific Coast Adv. Mgr.

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

SEATTLE OFFICE
560-561 Empire Building
J. A. KENNEDY, Manager

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F. E. SHORT, Manager

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NEW SHIPPING BILL

WITH the hearings on shipping before the Senate Committee on Commerce out of the way, developments in regard to legislation are beginning to crystalize. Senator Jones has incorporated his views in the Senate Committee Print of House Resolution 10378 (the Greene bill). The measure briefly would give the Shipping Board many of the powers now exercised by the British Board of Trade, and in addition includes several of the more important bills passed by the House as separate measures. While retaining the provisions of the Greene bill, the draft prepared by Senator Jones adds sections covering the following features:

1. Limits government ownership and operation to not more than ten years.

2. Includes Section 6 of the Ransdell bill exempting earnings of American ships from Federal excess profits taxes for ten years, and provides that the funds shall be invested in tonnage built in American yards.

3. Creates a fund to be used by the Board in new construction of modern ships, or to be loaned to shipowners for this purpose.

4. Creates a board of seven representing various sections of the country, with a salary of $12,000 each.

5. Frees marine insurance associations or pools from the provisions of the anti-trust laws.

6. Amends the La Follette act to induce Americans to go to sea by giving opportunity to qualify as able seamen after one year's sea service.

7. Transfers docks and terminals from the War Department to the Shipping Board.

8. Gives the Shipping Board authority to revise or make regulations for shipping not covered by law or not contrary to the law.

9. Gives the board authority to deny foreign ships entry to American ports when the owning companies are guilty of rebates, unfair conference agreements or other discriminatory practices.

10. Provides for the abrogation of commercial treaties restricting the right of the United States to grant discriminating duties in favor of goods brought in American ships.

11. Includes the new draft of ship mortgage bill written by Ira A. Campbell.

12. Recognizes the American Bureau of Shipping.

13. Makes minor changes in the La Follette act regarding the payment of wages to seamen.

14. States as a premise that the merchant marine should be owned ultimately by private companies.

15. Authorizes sale of ships at fair market prices by the board.

16. Prevents sale of ships from American to foreign owners without consent of the board.

17. Provides for government aid in establishing new routes and ports.

18. Provides for the carrying of apprentices on American ships.

19. Authorizes the Shipping Board and Postmaster General to decide fair prices to be paid for carrying the mails.

20. Extends the coastwise laws to dependent islands after six months.

21. Reinstates the coastwise acts of 1914 excluding foreign ships, but providing that foreign ships admitted during the war and now owned by American companies may remain.

22. Directing the Shipping Board to provide ample ship service from the terminus of the Alaskan railroad.

23. Authorizes cargo ships to carry not more than twelve passengers.

24. Provides for the enforcement of Sections 14, 15 and 16 of the Shipping Act of 1916.

The loadline bill is left as a separate measure. The Rowe bill, apparently, is dropped.

Senator Jones has named a sub-committee of nine to draft the final form of the bill. This body recently met to begin work. Further hearings are authorized on mail pay, ship depreciation for estimating taxation and the fuel oil situation, but no announcement has been made on this point. The sub-committee consists of five Republicans and four Democrats, divided according to sections. They are as follows: Pacific Coast, Jones of Washington, McNary of Oregon and Chamberlain of Oregon; North Atlantic Coast, Calder of New York, Fernald of Maine, and Colt of Rhode Island; South Atlantic and Gulf, Simmons of North Carolina, Fletcher of Florida, and Ransdell of Louisiana. It is anticipated that drafting of the bill will require two or more weeks.

This bill as outlined is certainly a step in the right direction in shipping legislation, and if the right men can be gotten on the Shipping Board to execute the provisions of this sort of legislation in a wise and judicious manner, there is no doubt that it will work out to the ultimate benefit of the American operator and owner of overseas' ships.

FREEBOARD REGULATION

SOME three years ago the United States government through the Secretary of Commerce appointed a committee to investigate and report upon the general subject of Freeboard Regulation. Due to the war this matter was temporarily placed on the table, but in the meantime it was brought up in Congress and legislation of some character is sure to be passed in the near future; consequently the Department of Commerce has requested this committee to begin work immediately.

In order to properly investigate all phases of the subject, the committee has appointed three sub-committees—one on the Atlantic Coast, one on the Great Lakes, and one on the Pacific Coast. The Pacific Coast sub-committee has now been organized with membership as follows: Mr. George Armes, representing shipbuilders; Mr. A. C. Diericx, representing operators; Mr. A. W. Follansbee, representing underwriters; Mr. A. F. Haines, representing operators; Captain A. F. Pillsbury, representing surveyors; Mr. J. C. Rohlfs, representing operators; Captain C. W. McNaught, representing the Portland district; an appointee not yet named to represent the Los Angeles district; Mr. O. J. Olson, member of the central committee; Professor W. F. Durand, member of the central committee and chairman of the Pacific Coast sub-committee.

The duty of this sub-committee will be to gather statistics and data and to formulate suggestions and recommendations based on a knowledge of local and special conditions from which the central committee may be able to make a final report for submission to the Secretary of Commerce.

This work should be pushed forward as rapidly as possible on account of the fact that actual legislation regarding this matter is now before Congress, and if this legislation is formulated without taking into account special conditions which prevail on the Pacific Coast, serious injury will be worked on our local maritime interests. The proper study of this problem will require some considerable time with the employment of an office staff and competent direction, and for this work funds are necessary.

The committee, which is of course serving without pay, is appealing for support to the interests which will be affected by the legislation proposed and it is to be hoped that these interests will for their own sake supply the where-with-all for this work.

BUREAU OF SHIPPING RESEARCH

FOR some time there has been a growing interest among the shipping fraternity of the United States in the establishment of a bureau or department at Washington which would do for the merchant marine what the Bureau of Railroad Economics has done for the railroads. The tremendous mass of misinformation and opposing testimony brought out by the hearings of the Senate Committee on Commerce has emphasized the need of such an establishment. It was very noticeable at these hearings that, while all practical shipping men were of the opinion that the government should, as quickly as possible, relinquish to private control the American merchant marine, still there was a great diversity of opinion as to the detail of the methods which should be employed to this end.

MATERIAL HANDLING MACHINERY CONVENTION

THE meeting at the Waldorf-Astoria Hotel in New York City on February 26 and 27 of the Material Handling Machinery Manufacturers of the United States brought out a great many interesting papers and discussions.

Elsewhere in this issue we print in full three of the most important of the papers, namely—"The Freight Handling in England as Applied to Our Home Problem," by Captain F. T. Chambers; "Warehouses and Terminal Operating Problems," by Mr. George B. Green, and "Motorizing Terminals," by Mr. B. E. Fitch.

One of the most interesting sessions of the convention was that held by the advertising managers, presided over by A. J. Barnes of Shepard Electric Crane & Hoist Company. Mr. Barnes and his section had made a survey as to the potential possibility of sale for mechanical handling machinery. The result of the survey was a showing that there is a potential and actual demand for 214,464 industrial units in the industrial field alone, such as industrial trucks, tractors, locomotives, portable conveyors, and detached electric hoists; that only 5 per cent of the plants in the United States are extensively employing this class of machinery, and that only 35 per cent of the manufacturers of the United States are at all familiar with mechanical handling equipment.

A questionnaire sent out extensively to the manufacturers shows that 27 per cent of the sales made were initiated by the salesmen; 23 per cent were the result of observation of machinery in operation in other plants; 13 per cent were due to advertising, and about 5 per cent due to the result of recommendations by friends.

From the marine standpoint, a study of 114 steamship companies covering docks and piers showed that only 15 per cent of the docks and piers were properly equipped with mechanical handling devices. A study of 321 railway terminals showed only 25 per cent properly equipped.

ERRATA

ON page 62 of the Pacific Marine Review for March, 1920, appeared a full page cut over the caption "Werkspoor 1000-horsepower direct-reversing full-Diesel marine engine," and a cut of the 2250-horsepower Burmeister & Wain engine was substituted by the printer for the cut which should have gone over this caption.

On page 97 of the March Pacific Marine Review in the article entitled "High Efficiency Obtained Through Scientific Carburetion," the statement was made that the equipping of a 110-horsepower Union marine type gas engine with Ensign carburetors had reduced the fuel consumption from 20 gallons per hour to 13½ gallons per hour. It has been called to our attention that 20 gallons per hour is far too high for the standard performance of the Union engine and on investigation we find that this statement was gathered by the writer of the article from a careless remark made by the engineer of the launch.

Union Gas Engines regularly produce eight horsepower per hour per gallon, which would for 110-horsepower give a fuel consumption of a little under 14 gallons per hour.

OUR COVER

For the use of the beautiful photograph from which our cover for this issue is taken we are indebted to Leopold A. Hugo of Santa Cruz.

Stevenson Taylor, President of American Bureau of Shipping

American Classification for American Ships

STEVENSON TAYLOR, president of the American Bureau of Shipping, and C. A. McAllister, secretary of that national classification society, were in San Francisco during the end of the first week in March.

On the evening of March 5, Mr. F. H. Evers, surveyor under the American Bureau of Shipping for the San Francisco district, gave an informal dinner at his home, 24 Seventeenth avenue, in honor of Stevenson Taylor. On this occasion the following guests were present:

Stevenson Taylor
Captain Pillsbury
J. C. Rohlfs
A. J. Frey
James Talbot
O. B. Kibele
Oliver J. Olson
Colonel Seagrave
J. T. [illegible]
A. J. Christy
Captain Saunders
F. M. Barry
J. S. Hines
C. J. Klitgaard
J. J. Tynan
M. Gunn
A. Foster
C. A. McAllister
E. G. Tuck
Captain Curtis
F. H. Evers

Mr. Evers proved a very genial host and the function will long be remembered by those who attended as one of informal and unrestricted jollity.

The American Bureau of Shipping, under the capable leadership of President Taylor, is making great strides toward the accomplishment of its ambition, which is to provide for American shipowners a classification service superior to that provided by any society in the world.

The recent phenomenal growth of the American Classification Society is shown best by the tonnage actually classed during each of the last five years, which is as follows:

Year 1915—111 ships; 154,307 gross tons
Year 1916—194 ships; 228,539 gross tons
Year 1917—262 ships; 550,285 gross tons
Year 1918—218 ships; 535,232 gross tons
Year 1919—898 ships; 3,030,962 gross tons

One of the principal reasons for the success of President Taylor in his management of the American Bureau of Shipping is the fact that he is able to attract to himself surveyors and local representatives who have the personality which recommends them to shipbuilders and shipowners, and the untiring energy which loses no opportunity of bringing the service of the bureau to the attention of prospective patrons.

World's Oil Supply and its Relation to Our American Merchant Marine

By Traffic Manager

THE following article was compiled by the Traffic Manager from the testimony of Judson C. Welliver, a writer of high standard on political and economic questions, at the hearings before the Committee on Commerce, United States Senate, on the establishment of an American Merchant Marine. This testimony was given March 4, 1920, and is contained in part XXXIV of the record.

United States Exhaustion Period

Mr. Welliver. The United States produces 60 per cent of the world's entire output of oil. Our Geological Survey has recently calculated that in 22 years, at the present rate of production, we would have exhausted our oil supplies. It is, at any rate, a fact on which the geologists and producers of the world are entirely agreed that we are very rapidly exhausting our supply of oil, while the rest of the world has been able to conserve its supply. It is also a fact that the oil future of the world is today almost absolutely in the hands of the British Empire.

England and the Royal Dutch Company

The difference between the situation of our country and of the British Empire in the matter of oil can perhaps be explained by the statement that our great oil establishment, the Standard Oil and its affiliated interests, has never been in any large way a producer of petroleum. It has simply been a refiner and marketer of petroleum, whereas the other great world combination in oil, the Royal Dutch Shell Company, which is now commonly understood to be in the actual financial control of the British Empire, of the government of the United Kingdom, in other countries, are all original producers. They produce from the wells, from the original sources all over the world, and in addition conduct the business of refining and marketing all over the world.

Frank H. Evers, Surveyor at the port of San Francisco for the American Bureau of Shipping

The Chairman (Wesley L. Jones). It is understood then that the British Government as a government is interested in this oil company?

Mr. Welliver. It is so understood, Senator. There is a good deal of mystery about the relations of the British Government to the Royal Dutch combination. When I was in England during the war it was the commonly accepted understanding that the Royal Dutch concern, which is originally a Holland concern, in the control of the Dutch and French branch of the Rothschild family, has been compelled to accept the terms of the British Government, because their oil comes mostly from the East Indies and India, and during the war they were unable to convey it unless they had the use of British transportation by sea. Great Britain and her allies wanted the oil, and they control the transportation, and the two very naturally and obviously got together.

Since the war, however, I read in the European papers that the control of the Royal Dutch Shell Company has actually passed to Great Britain, and the suggestion is constantly made, and it is also made by oil men in this country, that in some fashion the British Government itself has actually gone into the financial domination of it, and are following the procedure by which Mr. Disraeli got control of the Suez Canal for England, and also control of many of the oil interests in this country, as was done in the case of the Royal Dutch Shell Company, in which it has actually gotten control by buying the shares.

The Chairman. We can pretty safely assume that it is dominating and controlling and directing it in every way to the advantage of the British interests, especially British shipping.

Mr. Welliver. There is no doubt about that whatever, Senator. The Royal Dutch concern is a concern whose capitalization today is stated to include a group of companies that are concerned together, and probably at a half billion dollars. It is a combination quite comparable to the Standard Oil power and also financially. It was built around a great field, in the Island of Borneo, which came into the control of some of the Dutch interests, also the island of Ceylon, the new Celebes, and in fact the islands of the entire East.

Before the war that company was, and it is still, for that matter, very strong in Roumania, where also our own American Standard Oil Company has some interests. However, since the war it has been understood that they will dominate the Anglo-Persian Oil Company, which is a corporation that is to develop the great oil fields of Persia, now practically a British possession under the Anglo-Persian entente, which was recently negotiated. It appears to be very little understood in this country that the Royal Dutch Shell also is very strong in this country. Through the Roxana Oil Company, which is one of the largest primary producers here, it has very heavy interests in Texas, Oklahoma, and through that or other concerns, in Kansas, and I am informed in Wyoming, and very large interests in California, and, generally, it is deeply interested in the producing companies of the United States. There are a considerable number of the companies, but the Roxana Company is the most important.

Oil Territory Bordering on the Caribbean Sea

Mr. Welliver. It is also affiliated with a group, the name of which I do not recall now, as I have not had time to prepare myself to talk intelligently about this. An English group, entirely controlled by English people, already control the entire oil-producing area about the Caribbean Sea. The geologists and oil experts have recently come into substantial agreements that there is a very great and rich oil field almost surrounding the Caribbean. That would include Salvador, Nicaragua, Costa Rica, Panama, Guiana, Venezuela, Colombia and the island of Trinidad and some of the other islands. The British interests affiliated with, if not directly controlled by, the Shell group are very strong in those areas. They have worked in the greatest harmony with the governments of the various Territories and States, and I think if you gentlemen would make inquiries of the Senate Foreign Relations Committee you would find that there are some reasons to doubt whether the government of Colombia, for example, has at all times been entirely fair in its attitude toward the American concessionaries in Colombia. I think a great deal of favoritism has been displayed toward British interests in Colombia where the oil fields are potentially of great importance.

England Seeks Domination of World's Oil Supply

Senator Ransdell. How far does that favoritism go?

Mr. Welliver. I can not tell that. I have myself known of complaints about it for years past. How far back they go I do not know. They undoubtedly grow out of the old feeling between the United States and Colombia regarding Panama Canal affairs. The Shell concern is unquestionably the center of a great combination of interests by which the British Government aims and very frankly aims to control the oil of the world. Probably some of you gentlemen heard yesterday the observations of Senator Borah, which he made, based on a British parliamentary document. I think that the Senator possibly might have given a slightly misleading view when he made it. In the statement of the British oil authorities their claim is not that Great Britain controls a very large proportion or percentage of the production of oil in the world, because, as a matter of fact, more than half of the oil in the world is still produced in the United States, much to our misfortune, I think, as we are simply impoverishing ourselves whereas the others are being permitted to retain their supplies, but the British authorities claim today that more than 90 per cent, and some of them put it as high as 97 per cent, of the potential oil of the world, the future production of the world, is in fields that are now securely under British domination.

The Chairman. Are we not exporting a great deal of oil?

Mr. Welliver. During the war we exported considerable oil, but our exports of oil in the year 1919 were so much less than our imports of oil from Mexico that the balance represented a net importation for the year of 38,000,000 barrels. We produced in this country about 1,000,000 barrels of petroleum a day. We used all of that and about 38,000,000 barrels more.

The Chairman. That is, we are exhausting our own supply for our own use?

Mr. Welliver. Almost entirely for our own use, chiefly for the purpose of riding in motor cars.

The Chairman. Yes.

Senator Fletcher. I understand the United States produces something like 65 per cent of the world's output.

Mr. Welliver. I understood it was about 60 per cent.

Senator Fletcher. I understood it was 65 per cent, and I think Senator Borah was altogether wrong in saying that Great Britain was producing some 90 per cent. I think he must be wrong about that.

Mr. Welliver. It was entirely a mistake. I think I stated yesterday the percentage.

The Chairman. The other countries took what you might term special conservation measures to conserve supply, or, rather, they used their own supply to better advantage than we were using ours.

Java Fields

Mr. Welliver. The greatest oil field in the world is supposed to be in the island of Java, a field whose extent I do not know, but just from my rather vague recollection of my inquiries about it, it is presumed to be the greatest oil field in the world, so great that I have heard it stated that the product of our mid-continent fields at their greatest would hardly be worth a comparison with what this Java field will produce when it is ultimately developed. That field became the subject of a very earnest controversy between the Royal Dutch Shell Corporation and the Standard Oil interests. Our Standard Oil people ultimately became somewhat concerned about extending their sources of original supply, and the story that I got in England and that was confirmed to me in Holland was briefly that the Royal Dutch Shell and the Standard Oil became rivals in the effort to lease this field from the Dutch Government. They made quite remarkable offers for it under the royalty plan, and ultimately the Dutch Government became so impressed with the desirability of keeping the field in its own possession that it set the whole field aside, the most of the field, as a great oil reserve which is intended to be maintained in perpetuity as the property of the Dutch Government.

That field probably one day will be the means of saving the world from falling into the clutches of a combination composed of two factions, the great American combination and the great Anglo-Dutch combination, because they are rapidly extending their hold to all the oil in the world. The importance of this matter to you gentlemen sitting on the merchant marine question I do not need to suggest. Those of us who saw something of the operations of the Navy and of the merchant marine during the war had little difficulty in discovering the reason why it can be absolutely certain that if the world's supply of oil held out all the marines of the world will be operated with oil. It is absolutely necessary for naval purposes and it it is almost absolutely necessary for general shipping purposes.

Must Our Merchant Marine Revert to Coal for Fuel?

The Chairman. I saw a suggestion the other day from some shipping man to the effect that if the oil kept going up very much that coal will be cheaper than oil and that we will rather go back from the use of oil in shipping to the use of coal.

Mr. Welliver. I suppose that is perfectly obvious, that if the supply of oil and its distribution cannot be kept adequate to the requirements of maritime demands, then we have got to use something else, the point being, however, that the world has tremendous reserves of oil, and that we of all the nations have been the first approximately to approach exhaustion of our reserves and that Great Britain holds the reserves. The empire of the world in the nineteenth century seemed to be in the hands of the people who controlled its gold, and Great Britain got the gold in South Africa and she got the gold in Australia and she came to control the gold of Russia. Gold has ceased to be the instrument of controlling the world. **Oil is the symbol of the domination of the next century and Britain has got the oil.**

Oil Shale

Senator Ransdell. Have you examined the question of the value and extent of oil shales of this country? I understand we have an inexhaustible supply of oil shales.

Mr. Welliver. I have seen the process of extracting oil from the shales in this country and in England. In Scotland they actually adopted a process of extracting oil from the shale and have brought it to a point where it was commercially feasible. It is said by the highest geological authorities that if the petroleum that was in the shales in the Northern States was all taken out it would fill Lake Huron. I have no reason to doubt that statement is true, but no commercial project has been developed yet that has made it possible and I do not believe that so long as oil can be induced to come out of holes in the ground anywhere in the country that we will develop the shales very effectively.

The Chairman. Do you think we will do that only as a dire necessity?

Mr. Welliver. Only in extremis.

Oil From Coal

Senator Ransdell. Just as a shipping man said to me the other day, that you can get oil out of coal. In fact, he intimated that oil could be made out of coal and used in the Diesel engines in competition with oil and its products successfully.

Mr. Welliver. I suspect that is true. Almost everything can be made out of coal.

Senator Ransdell. He was speaking of it as a commercial possibility.

Hydro-Electric Power to Conserve Fuel

Mr. Welliver. You gentlemen doubtless are familiar with the great program of electrification that is going on in Europe now. The age of coal seems to be very entirely passed. The railroads of most of Europe will be operated by hydro-electric plants within the next generation unless European civilization goes to pieces entirely.

The Chairman. We hope that we will do a great deal of that in this country.

Mr. Welliver. In Italy they are harnessing their wonderful waterpower. Italy is the best equipped country in the world outside of Scandinavia to operate their industries and railroads with waterpower, because Italy has practically no coal. That is not so in England, despite the fact that they are rather better equipped with coal than any other country industrially. They are planning on using it for the great transportation in industrial districts where they have the coal supply and to have central stations where the electric current can be distributed to the railroads and industries on the railroads. The intention is to electrify the whole community industrially instead of using coal and steam for factory use. That project has made considerable progress since the war, and I think that another decade or so will see it further developed.

Senator Ransdell. They have not very valuable waterpower possibilities in the United Kingdom.

Mr. Welliver. Almost none. The United Kingdom is very flat and low except in certain parts. I have made this statement to you about the oil situation in general because the oil situation in the world is of the very greatest concern to us at this moment.

Mid-Continent Fields

Senator Fletcher. What about oil? I heard some gentlement talking about it. You would think that there was more oil underneath Oklahoma and Texas than there was used in a thousand years. What reason have you for suggesting that it is going to be exhausted there?

Mr. Welliver. Take the Cushing pool. The Cushing pool was producing about one-third of the oil in the United States at one time. It has become an almost unknown source of supply. The fact is that these regions simply become exhausted in the passage of a short time. The old Pennsylvania and Ohio areas are, comparatively speaking, approximately exhausted. I know the geological authorities of the United States Geological Survey have considered the matter with the greatest care and they have reported on it in great detail. I remember reading extracts years ago that at the rate of utilization of oil then the supplies would last us 29 years. Three years after that they revised the figure and fixed it at 22 years, because we were using it so much faster. The question is simply whether we are conserving our supply.

Mexican Oil Supply

Mr. Welliver. Mexico is widely regarded as the next greatest producer of oil, perhaps the greatest producer for the next couple of decades, and in Mexico the best information I have, supplied by oil people, indicates that the Royal Dutch Shell Company, which is everywhere, is very powerful in the Tampico region and in other parts of Mexico and that the Pearson-Cowdrays interest, also British, are by way of approaching the domination of a very large part of the Mexican supply. It is true that the United States is in Mexico very strongly. The Mexican Eagle Oil Company, which, I believe, is the largest single producer in Mexico, has recently announced in the British newspapers, and I think I have seen it in American newspapers also, has passed under control of the Royal Dutch Shell combination. So to one who follows oil discoveries from day to day it appears that the Royal Dutch combination is seizing the sources of original supply of oil. And that company's control is distributed throughout the world in that way. This is the thing, I think, that concerns you gentlemen of this committee that this oil control is distributed throughout the world, in the Caribbean Sea, Australia, the East Indies, the South of Russia, and Mesopotamia, in Africa, and also the east and west coasts of Africa. Everywhere the British shipping will always be within sight of oil. American ships will not. That is the definite showing that the coaling and oiling stations scattered throughout the world are absolutely controlled. That is extremely important as showing just what we face now. England has always hauled coal overseas to equip her own coaling stations because it provided cargo. Now, by way of developing a world system of production of oil and of the maintenance of oiling stations everywhere and with the control of the field supply we may also anticipate that England will use these to the general advantage of British commerce; while it is true that American ships may coal and they may oil at British stations the world over, nevertheless in an exigency when the privilege is necessary it will not be so readily accessible. That has been the discovery of Great Britain's competitors at all times and it is a perfectly obvious situation. We would do the same thing ourselves. I do not think there is anything more I can say about the subject.

The Chairman. Have you any suggestion of action that we could take or that this committee can take?

Mr. Welliver. I think one thing that this committee might properly do is to inform itself as definitely as you can through the State Department or otherwise as to the present oil situation in Mexico and the probability that developments will be permitted soon. Germany's fatal mistake in preparing for the war that she did undoubtedly prepare for was her failure to equip herself in the matter of petroleum. **The want of lubricants had as much to do with ending the war as anything else.**

Government Protection of American Interests Abroad

The Chairman. Does not this suggest a very good field of work for the State Department for its activities to see that our interests are looked after and protected? Cannot the State Department do that better than any other governmental agency?

Mr. Welliver. Some state departments that I have known could, I think.

The Chairman. I mean the present State Department.

Mr. Welliver. Whether the present department could be induced to do a thing of that sort, I do not know.

The Chairman. Is not that really the proper work for the State Department?

Mr. Welliver. It seems to me that this committee ought to be able to ask the State Department for such information as it has and to get very valuable information as to the situation in Mexico, Central America, and South America.

Senator Fletcher. Do you suggest that United States citizens are being discriminated against by any of those countries? Do they stand on a different footing than the Dutch and English and other people?

Mr. Welliver. I think there is no doubt that in the United States of Colombia there has been a discrimination against American interests there. The details of it I do not know, but the complaints are heard frequently.

Senator Fletcher. We certainly ought not to submit to that sort of thing, whatever we may do.

Mr. Welliver. I think that is true.

The Chairman. I have been told by other people who have been in different countries in South America that there is a very strong apparent propaganda against America and American interests down there.

Mr. Welliver. I think that is the truth.

The Chairman. And that there is there a great deal of discrimination against our people and in favor of other countries.

Mr. Welliver. So long as the oil supplies of the United States seemed perfectly ample for all the requirements of the world and the great Standard Oil Company could buy its supply from original producers everywhere and almost supply the world, we dominated the oil situation, and it seemed as if we might always dominate it. **But I think some day that it will be discovered that the policy of the Standard Oil Company as a whole was rather shortsighted in that they never looked to the natural supplies.**

Philippine Islands' Oil Prospects

Senator Ransdell. Has there been any oil developed in the Philippine Islands--any known supply?

Mr. Welliver. Yes, sir; and it is in the control of the Royal Dutch Shell, mostly. This fact I discovered with some interest from a British parliamentary publication. The Royal Dutch Shell undoubtedly has today the control of the world's oil future.

Senator Ransdell. We are supposed to own those islands. Is the anything we can do to handle the situation ourselves if it becomes of sufficient importance? Is there anything that we should do?

Mr. Welliver. I have no doubt that we can protect ourselves in those regards in our own territory; yes.

Senator Ransdell. Is there a very considerable supply of oil in the islands?

Mr. Welliver. The extent of that I do not know. I think it is regarded as potentially important. It is in the East India area, consisting of the Island of Java, Borneo, and those islands which I have mentioned, which were the beginning of the Royal Dutch combination, the Island of Ceylon, and the Celebes, etc. Those islands are all rich in oil.

United States Must Acquire Foreign Oil Production

Senator Fletcher. It is a very important subject, and in the Congressional Record of November 3, 1919, Senator Phelan made a statement in which he quoted Mr. Doheny. Mr. Doheny says that....

> We are now producing nearly 70 per cent of the world's production of petroleum and consume more than 75 per cent. Our oil fields are nearly all discovered, those discovered are practically all developed, and many of them are nearly exhausted. A study of the oil geology of the world brings the conviction that the United States will depend, within ten years, upon foreign-produced petroleum for more than 50 per cent of its consumption; also a study of the increase of petroleum consumption, through the development of its use for motor engines and in other ways, also caused the belief that the United States will double its requirements within the same period and that it will require more than 50 per cent of its supply from foreign sources.

Mr. Welliver. I said a moment ago that last year we imported 38,000,000 barrels more of petroleum than we exported and that quantity is liable to increase from year to year regularly hereafter. The number of internal combustion engines in the country has increased nearly a million and a half or so a year, and the price of oil seems to be quite immaterial to the people who wish to motor. They buy it at thirty cents as readily as they buy it at eleven cents.

The oil situation in the world is that we simply will not have any oil unless provision is taken to increase the supply by stimulating production and promoting the distribution of it.

Piloting by Radio

By Lieutenant Ellery W. Stone, U. S. N. R. F.
Branch Manager, Kilbourne & Clark Manufacturing Company

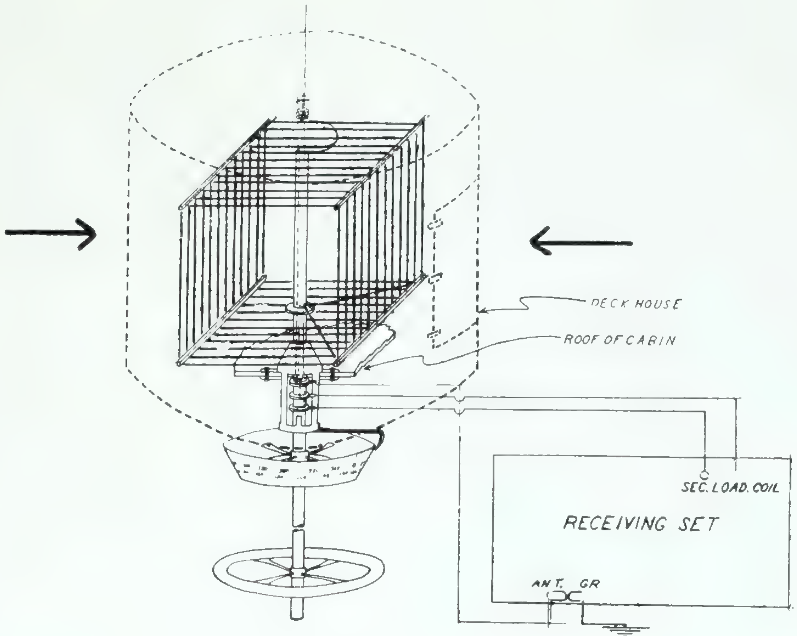

Figure 1. Diagramatic Representation of Radio Compass

AMONG the various developments of radio telegraphy, none is perhaps of more interest to shipping men than the rario compass—a device for the determination of the location of a transmitting radio station. During the war, this instrument was variously employed—for the location of submarines whose commanders were reckless enough to use their radio transmitters; for the location of army units at whose headquarters field radio sets were in operation; for the running down of enemy radio stations both within our own boundaries and those of our neighbors; for the guiding of air craft in night raids, and for the location of vessels in fog. The last mentioned adaptation of the radio compass will be considered in this article, since shipmasters of the Pacific will soon have an opportunity to avail themselves of this new aid to navigation—or perhaps we should more properly say, this aid to piloting, since it is chiefly used in coastwise sailing.

The radio compass is a device which determines the direction in which radio waves arrive at a receiving station. Under favorable conditions—i. e., without natural or artificial barriers in the path of the radio waves—the impulses from a transmitting station approach the receiving station on a direct line of bearing; in other words, the direction in which the radio wave is traveling is the bearing of the transmitting station from the receiving station. When topographical or other obstructions intervene, however, the radio wave may be bent out of its normal path and may arrive at the receiving station at an angle quite different from the bearing of the transmitter. Obviously under such conditions, readings on a radio compass are of little value, and this possibility of error must be carefully guarded against.

Generally speaking, it appears safe to say that radio waves received over water are not greatly distorted, since there are no intervening obstacles to deflect the wave from its normal path. If signals are received from a station several hundred or several thousand miles distant, proper allowance must be made for the fact that the radio wave, like the economical shipmaster, follows a great circle course—another example of the adage that electricity follows the path of least resistance. When signals are sent over the moderate distances involved in coastwise piloting, however, plane bearings are all that need be considered.

At this point, it may be of interest to consider the phenomenon of deflection in the propagation of radio waves. Just as light is reflected by a metallic sheet, so a radio wave may be reflected by a cloud, a mountain, a steel building, or any other conductive or partially conductive body. In addition, a radio wave traveling from a station directly west of a valley—and hence approaching the valley on an easterly course—may encounter mountains lying on a northeasterly bearing on each side of the valley. In passing through the valley the radio wave is likely to be guided by these conductive, bordering mountains, just as a river may be deflected from its normal course by obstacles placed in its path. If a radio compass were located at the head of the valley, it would give a bearing on the transmitter of *225 degrees, since the wave approached it at that angle, instead of the approximate bearing of 270 degrees, its actual direction from the compass. There is also another factor contributing to the distortion of radio waves, known as refraction. This phenomenon is manifested when the waves pass through media of different degrees of conductivity, but as the subject is rather involved for an article of this nature, it will not be considered further. However, as previously stated, these considerations do not play an important part in piloting, on account of the comparatively short distances involved and the fact that readings are only taken over water.

The principle of radio compass operation is briefly as follows: In radio transmission, the energy is sent from the transmitter to the receiver by two different media, the ether and the earth. Utilization of the ether is obtained by means of the elevated antenna or aerial strung between the masts of the ship, from which the waves emanate. Contact with the earth is made through the nearest bulkhead, which is connected electrically to the salt water in which the hull floats. Salt water is a perfect conductor of electricity, hence the radio currents ultimately reach the earth. The wave thus leaves the aerial virtually traveling with "its feet on the ground." In radiation from a ship's aerial, of course, the lower extremity of the wave travels over the surface of the water until it reaches the shore, whence it proceeds to travel over the less perfect conducting medium of the earth.

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*All bearings given in this article are true, not magnetic.

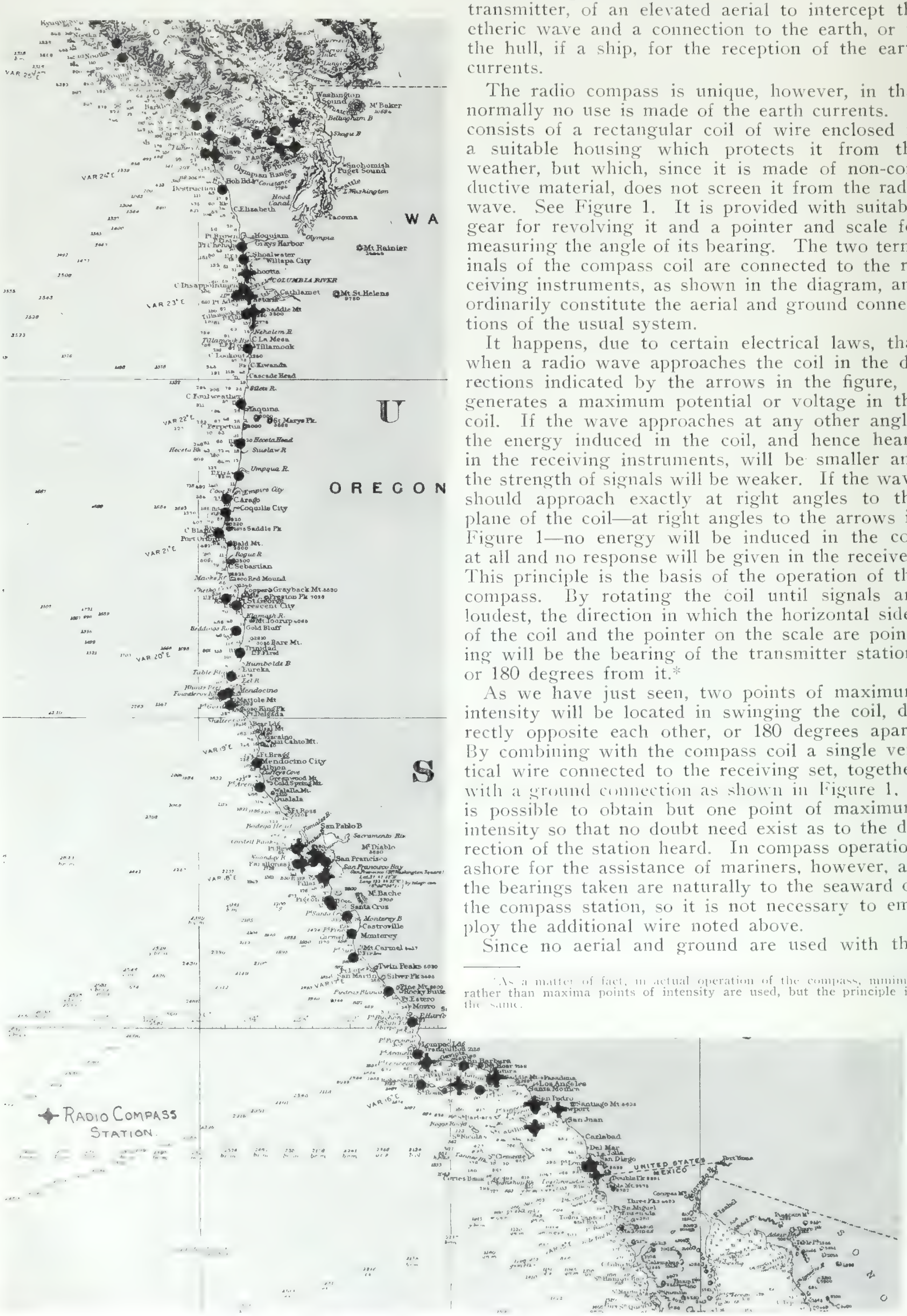

Figure 2 Map showing locations of Radio Compass Stations at Pacific Coast Ports

At the receiving station, means are provided for utilizing both factors of transmission — i. e., the space wave through the ether, and the ground currents through the earth. These consist, as at the transmitter, of an elevated aerial to intercept the etheric wave and a connection to the earth, or to the hull, if a ship, for the reception of the earth currents.

The radio compass is unique, however, in that normally no use is made of the earth currents. It consists of a rectangular coil of wire enclosed in a suitable housing which protects it from the weather, but which, since it is made of non-conductive material, does not screen it from the radio wave. See Figure 1. It is provided with suitable gear for revolving it and a pointer and scale for measuring the angle of its bearing. The two terminals of the compass coil are connected to the receiving instruments, as shown in the diagram, and ordinarily constitute the aerial and ground connections of the usual system.

It happens, due to certain electrical laws, that when a radio wave approaches the coil in the directions indicated by the arrows in the figure, it generates a maximum potential or voltage in the coil. If the wave approaches at any other angle, the energy induced in the coil, and hence heard in the receiving instruments, will be smaller and the strength of signals will be weaker. If the wave should approach exactly at right angles to the plane of the coil—at right angles to the arrows in Figure 1—no energy will be induced in the coil at all and no response will be given in the receiver. This principle is the basis of the operation of the compass. By rotating the coil until signals are loudest, the direction in which the horizontal sides of the coil and the pointer on the scale are pointing will be the bearing of the transmitter station, or 180 degrees from it.*

As we have just seen, two points of maximum intensity will be located in swinging the coil, directly opposite each other, or 180 degrees apart. By combining with the compass coil a single vertical wire connected to the receiving set, together with a ground connection as shown in Figure 1, it is possible to obtain but one point of maximum intensity so that no doubt need exist as to the direction of the station heard. In compass operation ashore for the assistance of mariners, however, all the bearings taken are naturally to the seaward of the compass station, so it is not necessary to employ the additional wire noted above.

Since no aerial and ground are used with the

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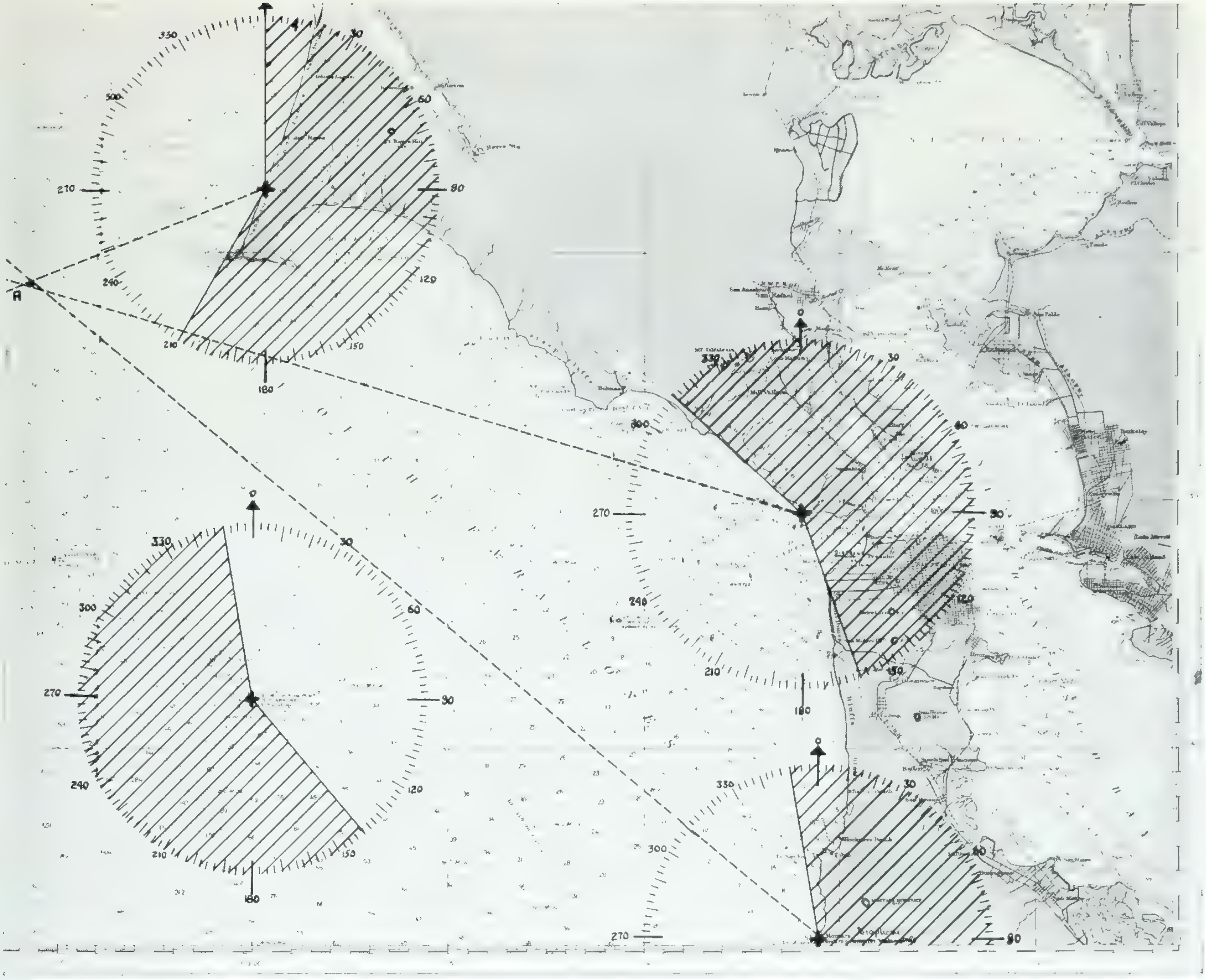
*As a matter of fact, in actual operation of the compass, minima rather than maxima points of intensity are used, but the principle is the same.



Map showing Blind Angles of the Radio Compass Stations at the entrance to San Francisco harbor. Also diagram showing how Ship at "A" gets Bearing from Three Stations

compass coil only, the coil itself acts as a sort of aerial, receiving only the space wave portion of the transmitted energy, the ground currents being lost. This results in much weaker signals than with the usual type of receiver, therefore it becomes necessary to utilize vacuum tube amplifiers to adequately increase the strength of signals.

When the compass coil is employed solely for receiving purposes, quite apart from its ability to determine bearings, it serves as an excellent interference preventer, since signals can only be heard from stations lying directly east or west of the station, if the coil be set at 90 degrees, for example. Atmospheric electricity, or static, as it is called, originating at points on bearings other than the easerly-westerly line, will also be eliminated, or if heard at all will be so weak as to cause no interference.

The radio compass was invented by Dr. Frederick Kolster of the Bureau of Standards, although it also appears that Mr. G. W. Pickard of Boston did some work along these lines some years ago. Its first practical adoption was made by the Navy Department in 1915.

The Navy has under construction nineteen compass stations on the Pacific Coast to assist merchant and naval vessels in entering ports in fog. Their location is shown on the chart in Figure 2. It will be appreciated that in obtaining a fix by cross bearings, two compass stations are necessary, and a third is desirable to serve as a check on the other two. Consequently at least two, and in some cases three and four, stations are located at the entrances of the important harbors of the coast.

At Puget Sound, compasses will be located at Tatoosh, Dungeness, Cape Alava and at a point on the San Juan Islands.

At the entrance to the Columbia River, stations will be situated a few miles north of Cape Disappointment, at Point Adams, and near the Tillamook Head light.

At San Francisco, stations will be located at Point Reyes, Bird Island, Farallon Islands, and Point Montara.

In the Santa Barbara Channel, stations are under construction at Point Concepcion, Santa Cruz Island and Point Hueneme.

At the entrance to San Pedro, stations will be in operation at Point Fermin, Newport and Santa Catalina Island.

At San Diego, the stations will be located on Point Loma near the present naval radio station and at Imperial Beach, south of the city.

Each compass station will contain living quarters for the crew as well as the operating building to house the equipment, and will be manned by five naval radio electricians. The average cost per station will be about $10,000.

Figure 3 shows the situation which will obtain at the entrance to San Francisco Bay, the four compass stations being located, as noted above, at Point Reyes, Bird Island, Farallon Islands, and

Point Montara. As we have previously noted, accurate bearings cannot be taken when the radio wave is received over land. Consequently, for each radio compass station, there is a blind angle or sector in which reliable readings cannot be taken. The shaded sectors of the four compass roses shown in Figure 3 represent the blind angles for the different stations in the vicinity of San Francisco. It will be seen how the topographical situation affects the conditions at each station, the blind angle cords roughly following the coast line. Since the Farallon station is located on the east side of the island, the sheltering hills to the seaward side cause the blind sector to be to the west.

The three stations on the mainland will ultimately be connected by telegraph wire to the office of the radio compass officer, who will be stationed at the naval radio station on Yerba Buena Island. The procedure will be as follows: Let us suppose a vessel is at the point A, marked on the chart in Figure 3. The master desires to know his position. The radio operator calls the San Francisco station and gives the three-letter conventional signal signifying that he desires radio bearings taken. The key at the radio station is then switched to the compass officer, who takes control of the station's transmitter. He signals the three compass stations on the mainland by telegraph and the Farallon station by radio to take readings on the vessel, and signals the vessel by radio to send test signals The operator then sends test signals for several minutes while all four stations take bearings. In the present case, the Farallon operator will obtain a bearing of approximately 332 degrees, which, being in his shaded sector, will not be reported. The other three stations, reading from north to south, will report by telegraph to the compass officer bearings of 249 degrees, 286 degrees, and 310 degrees, respectively.

The compass officer will be supplied with a chart similar to that shown in Figure 3, covered with glass. Over the location of each compass station is engraved a compass rose, similar to the four in Figure 3. In the center of each rose is a small hole, through which is brought a thread, weighted at one end and fastened at the other end to a felt-covered weight which can be moved over the surface of the glass to any position.

The officer lays out the three threads on the respective compass roses according to the bearings telegraphed to him by the compass stations, and the ship's position is given by their intersection. As shown in the figure, however, the threads seldom exactly intersect, due to errors in observation and inherent errors in the compasses. The ship's position is accordingly taken as the center of the triangle formed by the three threads, and the position is read directly from the chart, in this case—Lat. 37° 58′ 45″ N., Long. 123° 11′ 30″ W. This position is signaled to the vessel by radio by the compass officer, who then relinquishes control of the San Francisco radio station, leaving it free to handle its normal traffic.

While this procedure, which is now in operation on the Atlantic Coast, will eventually be in effect on the Pacific after the system has had a thorough "shaking down" and additional money is available for building the necessary telegraph lines to connect the compass stations with the control stations, the system for the present will be slightly different. At San Francisco, for example, the compass officer will be located at the Farallon Island station and bearings from the three mainland stations will be signaled him by radio, instead of by telegraph. The ship's position will then be plotted at the Farallon station and in all other respects the procedure will be as outlined above.

It may be interesting to note that in the calibration of radio compass stations, the deviation must be determined for all bearings, just as the deviation of a ship's magnetic compass must be plotted for all headings of the vessel. In the case of the radio compass, however, the deviation is not magnetic but electrical, being due to distortions caused by metallic rigging, trees in the vicinity, metallic deposits in the earth, and other natural and artificial causes. The deviation is determined by sending a destroyer on a circular course through the unshaded sector around each station. Radio signals are transmitted from the destroyer and pelorus and radio bearings are simultaneously taken at the compass station. The deviation is, of course, the difference between the visual and electrical observations. If the deviation is constant for all bearings, the zero point of the compass scale may be shifted by the necessary amount from true north to compensate for it; in other cases, the deviation must be plotted.

The present status of the enlisted personnel situation in the Navy will serve to delay the inauguration of this valuable service, but as soon as Congress has passed the necessary legislation providing for increased pay for all hands, the scarcity of trained radio electricians should be relieved. The Navy Department hopes to be able to provide the required personnel by July of the present year, when piloting by radio on the Pacific will become an established fact.

PROGRAM OF SHIP CONSTRUCTION BY UNITED STATES SHIPPING BOARD, AS OF JANARY 31, 1920

Of vessels delivered, under construction and to be constructed (keel not laid), including steel cargo, steel tanker, steel refrigerator, steel passenger and troop, steel tug, wooden cargo, wooden tanker and wooden tug vessels, the construction program comprises 1946 vessels, representing 11,720,352 deadweight tons.

In respect of the ships to be constructed suspensions are not included.

Of vessels constructed, there are 1448, representing 8,123,995 tons, after deducting re-conveyances, sales and losses.

Of vessels under construction, there are 459, representing 3,218,057 tons. Of vessels to be constructed, assuming that the entire program will be executed, there are 39, representing 378,300 tons.

Of steel vessels of 6000 tons deadweight and over constructed, omitting 47 tankers and 12 refrigerators, there are 504, representing 4,326,454 deadweight tons; under construction, omitting 33 passenger and troop, 40 tankers and 1 refrigerator, 218, representing 1,908,717 deadweight tons; of vessels not yet constructed it is contemplated there will be 24, omitting 7 passenger and troop and 8 tankers, representing 217,300 deadweight tons.

The total number of steel cargo vessels of 6000 tons and over is 746, representing 6,452,471 tons.

A Warning to Aviators

THE USE OF MERCATOR'S MAP A POSITIVE MENACE TO FLYING MEN

By B. J. S. Cahill, F. R. G. S.

AN awful example of how not to make a map for aviators is printed in the December number of "Flying." Strange to say, however, the map is published in the very best of good faith and most deliberately dedicated to the very purpose for which, if taken literally and used as directed, might easily cause a catastrophe and loss of valuable lives. The title printed under this dangerous document reads as follows: "Map—prepared to facilitate planning aerial tours on the American continent. The map shows the distance in miles and degrees. One set of circles using New York as a center and measuring distances from there, and the other using Miami, Florida, for a center. Each small circle represents a distance of 100 miles from the center of their respective circles. The degrees of latitude and longitude are also given, so that an aviator by using this map can, at any time, estimate the flying distance from any given point in North and South America to those two important centers."

The map referred to is reproduced here (Figure I); the heavy lines and lettering I have superimposed, but the small and heavier circles alluded to can easily be seen, one set concentric around Miami, the other set around New York. For simplicity we shall discuss the Miami set of circles only, although what is here set forth applies with equal validity to the New York circles. Let us suppose "a party planning an aerial tour" from Miami to Valparaiso, which is on the 3000-mile line according to the map made for this purpose; and let us assume that some bad weather or other unforeseen delays should cause the party to use up their surplus supplies, they might still feel encouraged, knowing that the distance they had to go was still provided for. Now let us suppose that when they got to the 2000-mile line on the map they realized that they had actually come 3000 miles and their supplies were diminished accordingly, they would be in a horrible plight and might easily perish on account of this mistake alone.

Yet this is actually what would happen as regards the distance if judged by this very false map. Valparaiso is over 4000 miles from Miami and not 3000 as the map indicates. The correct 3000-mile limit curve from Miami is shown on this map in double lines. The false 3000-mile circle, which is here emphasized by a heavy line, is only correct at two points—the tip of Greenland (Cape Farewell) and the Great Slave Lake in Northwestern Canada. Between these two points, where the true 3000-mile curve from Miami intersects the false 3000-mile circle from the same spot, there is a region where the map errs on the safe side—that is to say, the actual scale distance from the 3000-mile circle is less than 3000 miles. But as one follows the false 3000-mile circle southward on the east or on the west, it gradually becomes more and more erroneous until due south in the neighborhood of San Juan Fernandez Island, this circle, professing to be only 3000 miles from Miami, is

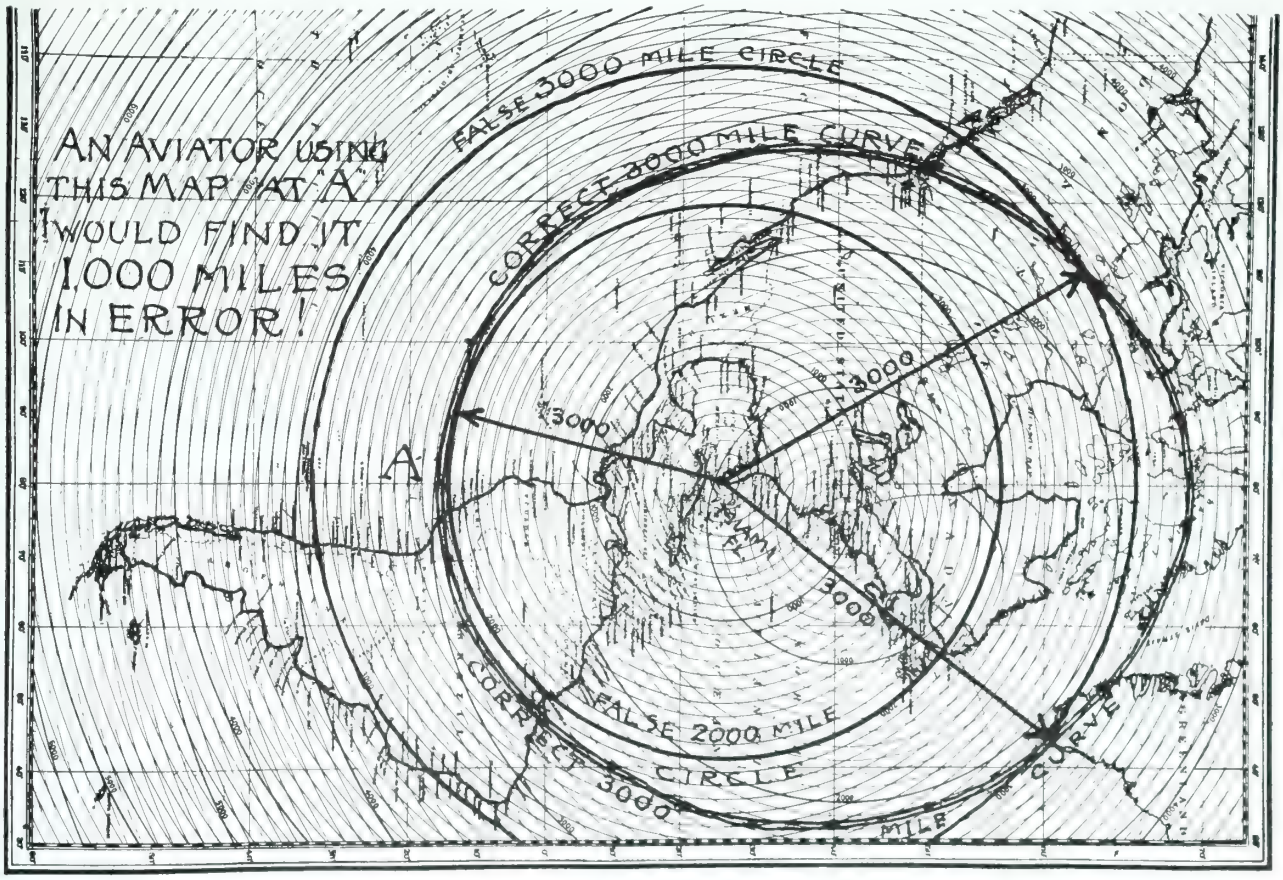


Figure 1. Map on Mercator's Projection published in "Flying" for the express purpose of indicating Distance by Graduated Concentric Circles from Miami and New York. The misleading and Erroneous Character of this Map is Explained both on the Map Itself and in the Text

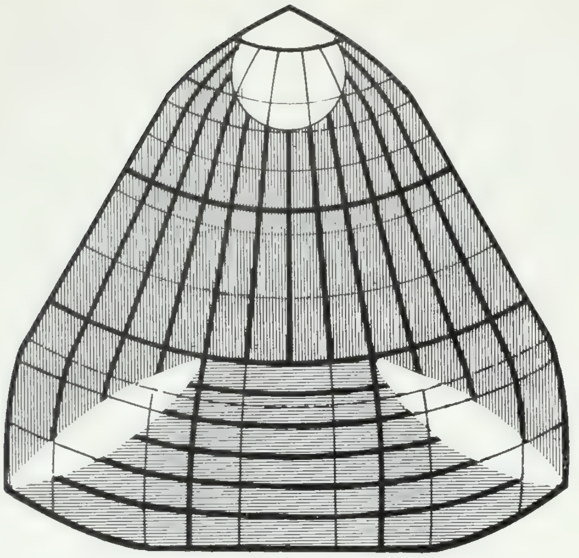


Figure 2. One Octant of the Butterfly Map showing (a) Areas where all Meridians are Absolutely true to Scale—vertical shading; (b) Areas where all Parallels are Absolutely true to Scale—horizontal shading; (c) Single Lines of Latitude without error crossing Areas of Correct Meridians; (d) Single Lines of Longitude without error Crossing Areas of Correct Parallels.

actually over 4200 miles away. Meantime the correct 3000-mile curve from Miami approaches nearer in linear measurement on the map until when due south at "A" it actually touches the 2000-mile false circle, thus showing that in South America the so-called 2000-mile radius from Miami is actually 3000 miles, while the 3000-mile false circle touches a latitude which in reality is over four thousand miles from Miami.

Therefore it is perfectly plain that this map with its elaborate system of distance circles is not only all wrong and perfectly useless for the designated purpose, but it is positively misleading and dangerous.

If the reader is inclined to be sceptical, let him take a small globe and measure the scale distance from Miami to Cape Farewell. It will be found to come close to 3000 miles. Let him then describe a circle on this globe with Miami as center running through Cape Farewell, and then let him transfer this circle from the globe to this map and the curve plotted will coincide with the heavy double line touching the three arrow points on the map. It is an extremely simple matter to demonstrate and yet such is the faith we place in a printed published document that outside professional navigators and a few map experts, this absolutely false distance map would pass unchallenged. But it bears out what I have been teaching and preaching for the past ten years—that the old-time German-made world maps, like Mercator's and Möllweider's, are misleading monstrosities and should for general use be shelved absolutely.

On the whole of Mercator's map there is only one line, and that a strictly Euclidian line (length without any breadth whatsoever), which is true to scale. No scrap of area anywhere is true to scale either in latitude or longitude on this chart, and yet a very high-class, admirably-edited magazine devoted to aviation deliberately publishes it to illustrate with minute detail scale directions over two continents "for the use of those planning aerial tours." This is all the more remarkable, seeing that on the staff of that publication, or closely affiliated with its staff, are, or were until recently, such doughty navigators as Admiral Peary and Captain Bartlett.

And this calls to mind the fact that there are map projections especially designed to show equal distances to scale from any given point. The two points on the globe that most readily lend themselves to this kind of map are obviously the poles. Seeing that all meridians radiate from the poles, an equidistant map from either of them can be made with great ease by simply radiating the meridians in straight lines and marking off the parallels in concentric circles true to scale from these centers. If each map is curved to the equator we shall have two discs, each a polar hemisphere in which distances from anywhere straight to either pole will be absolutely true to scale. But on these maps the distances east and west will become progressively exaggerated until the Equator will measure not four times its distance from the pole but twice that distance multiplied by 3.1416 or 6.28 times, a very considerable distortion. For problems of polar exploration, such equal distance maps are very valuable, because in such matters the pole is not only a point but it is the central point of interest as well as the point from which the meridians radiate and on which parallels revolve.

To make a map in which all distances would be

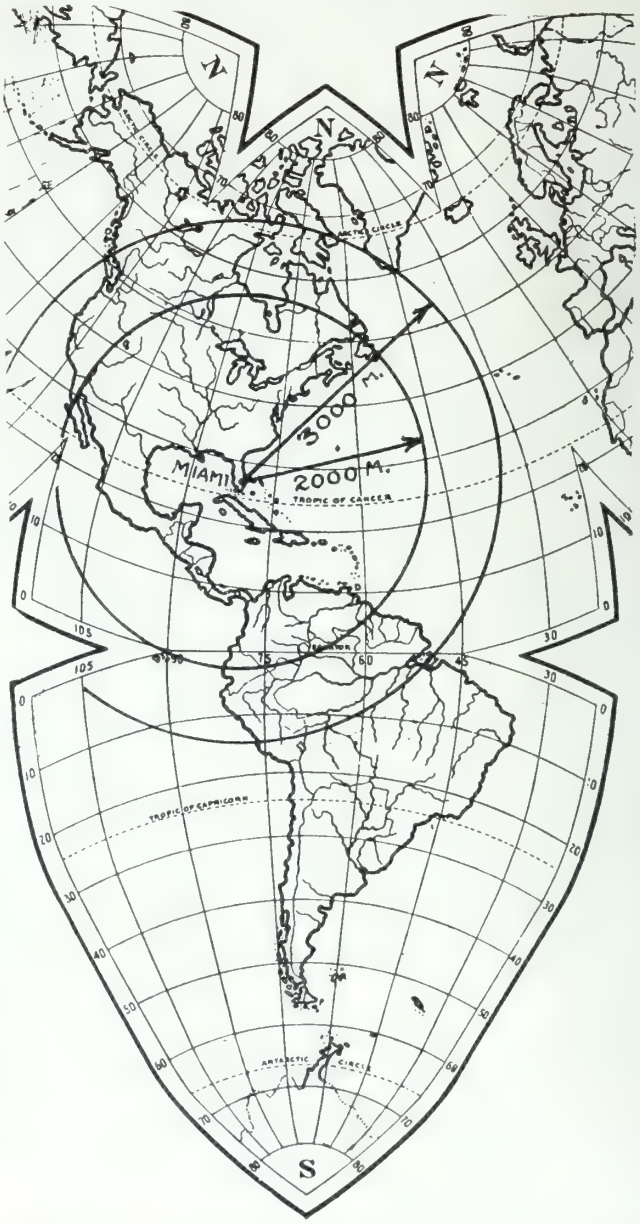


Figure 3. Concentric 2000 mile and 3000 mile Rings Drawn from Miami on the Butterfly Map coinciding with the same Circles Drawn on Globe.

correct from Miami would call for a special projection in which the lines of latitude and longitude would assume strange and difficult curves and the outlying regions would be much distorted in shape. To make a map in which distance from New York would be correct would necessitate still another set of lines and an entirely different map, and so on for every center chosen. Clearly this would be impracticable except in a few instances and for very particular purposes, such as a giant radio station, etc.

One such purpose can be mentioned. Mecca is the center of the Mohammedan world, which extends more or less from and beyond Calcutta, Zanzibar and Timbuctu. A map with Mecca in the center on an equidistant projection from that point has actually been prepared by the Survey of India, if I am not mistaken, for the special use of pilgrims, many of whom travel enormous distances for the soul-saving privilege of prostrating themselves before the Kaaba.

All these special types of maps have the fatal drawback of being difficult and expensive to make, and, when made and printed, of being of no use for any other purpose. Moreover, any one map showing the whole world from one center would necessarily be a disc whose radius was the semicircumference of the globe. Such a map would, of course, in its outlying portions be a worse monstrosity than Mercator's, the exaggeration of which is rectilinear, symmetrical and simple in comparison.

The construction of a separate projection, therefore, to illustrate every aerial event of importance, is obviously out of the question. To use Mercator's chart is utterly misleading anyway, and positively criminal if marked off as in the example herewith illustrated.

At present any proposed aerial tour of great extent, such as Captain Ross Smith's flight from London to Port Darwin, would be plotted first from a globe, to get the great circle shortest route; then it would be decided what regions on this path were impracticable and what points near the ideal short route would be desirable for depots, refitting, supply and rest stations, etc. Then detailed regional maps of various scales would be consulted, and no doubt special hand-made route charts drawn from the data available and put into a series of one-scale maps for the pilot's immediate use.

But the time will soon be here when long, spectacular flights like Captain Smith's will be everyday occurrences. Similar trips will be repeated in all quarters of the globe, so that the plotted paths of these flights would cause our old planet, in the words of Shakespeare, to be "slashed up and down like an apple tart."

In spite of the errors of this map from "Flying," the fact that it was made and printed at considerable trouble and expense shows that there is now and will be an ever increasing demand for some map of large scope in which various aerial tracks can be illustrated and in such a way that one can estimate distance with reasonable accuracy and indicate the right direction to reach various points also with reasonable accuracy. A third condition would be that any map fulfilling these requirements should be standardized so that one imprint would serve all needs of all possible routes all over the world; and that the map so evolved should also show the whole world without distortion of its outlines and without special favor to any one region or country as against any other region or country.

In other words, the ideal requirements of a map to illustrate aerial travel should show the best possible conditions as to—

(1) Accuracy of scale along meridians or parallels.
(2) Accuracy of direction between any two points.
(3) Simplicity of construction to suit all purposes in one diagram.
(4) Accuracy of form distributed equally over the map.

The accuracy of area is not specified, for two reasons: First, because in maps of movement—i. e., for travel purposes—the scale is more important than area. And secondly, because, with a maximum of scale and form accuracy, good area values follow as a matter of necessity. On the other hand, absolute accuracy of area is always obtained at a sacrifice of scale, direction and form combined.

The Butterfly projection meets these four requirements much more nearly than any other.

Accuracy of scale is shown on Figure 2, a diagram of one octant. All the shaded area shows those parts of the octant where the scale is mathematically exact either along meridians (vertical hatching) or along parallels (horizontal hatching). The single heavy lines of latitude or longitude crossing group lines of longitude or latitude are also true to scale in a rigorous mathematical sense.

As a test on the actual map, the 3000-mile radius drawn on a globe from Miami, Florida, which we have seen passes through Cape Farewell, the mouth of the Amazon, close to Lake Titicaca, through Vancouver Island and Great Slave Lake, when drawn on the Butterfly Map, with Miami as center and Cape Farewell as radius, also passes these points, as can be seen by an examination of Figure 3. On Mercator's map this 3000-mile curve is oval with Miami decidedly off the center.

On a globe the 2000-mile circle from Miami passes through Hudson Bay, above James Bay, through Labrador and Newfoundland, thence through British Guiana, touches Ecuador, goes through Lower California and thence by Salt Lake to Lake Winnepeg. On the Butterfly map this arc takes practically the same course. See Figure 3.

The question of direction, etc., together with a detailed discussion of aerial world routes, will be taken up in the next number of Pacific Marine Review.

WESTINGHOUSE IN THE ORIENT

MR. E. M. HERR, president of the Westinghouse Electric & Manufacturing Company, accompanied by Mr. Loyall A. Osborne, president of the Western Improvement Company and vice-president of the Westinghouse Electric & Manufacturing Company, is at present touring the Orient, investigating conditions there with a view to a largely increased export trade in the products of the Westinghouse Company. During the last two years the sales of these products in China and Japan have been very large and the present trip of the executives is for the purpose of determining whether it is advisable at this time to establish additional branch agencies or possibly branch manufacturing plants of the Westinghouse Electric & Manufacturing Company at central locations in Japan and China.

The Outlook in International Trade

By John Clausen

Vice-President of the Union National Bank of Seattle

THERE are but few countries so situated with regard to their natural resources of soil and climate as to be independent of other countries for the supply of products which have become necessary to the comfort and well-being of their inhabitants. The United States, strictly speaking, is not one of that group and international commerce is therefore a matter of necessity and eminently conducive to our prosperity.

We have a country nearly as large in area, and in natural wealth almost as great, as Europe; but in spite of steadily increasing riches and expansion in trade, we are particularly liable to suffer unless we realize some of the economic difficulties which are before us, necessitating firm and original methods of treatment.

We must face conditions as they now appear and recognize that of vital concern are the broader international problems of industrial co-operation and efficiency. The European nations especially are going to make as active an effort for overseas trade as their resources and financial conditions will allow. In England there is found actively engaged a "Reconstruction Committee," and in Canada a Corps of Trade Commissioners has been appointed whose duties are to advise the Board of Trade promptly of all opportunities which may arise for the extension of British commerce; to report in regard to contracts open for tender and, as occasion requires, on the nature and extent of foreign competition with British merchandise, with the furnishing of periodical lists of probable buyers of British goods.

For the purpose of promoting closer relations with our neighbors in the Southern Hemisphere, a Latin-American Chamber of Commerce has been formed in Great Britain to promote their trade with South and Central America, Mexico and the West Indies. The association is a non-trading and non-political body with the management in the hands of a council elected by the members, special sections having been formed for each of the important trades and industries in Britain to co-operate with like committees established by that association in the various republics of Latin-America more effectively to carry out the object of the move.

Similar activities are being promulgated in other countries with visions of activities towards a transformed future in all lines of human endeavor. In this regard our commercial organizations have grown up without much system and it is time we depart from the old practice by adopting real activities along new and improved lines. Everything that will add to the ability of this country to hold its rightful position in foreign trade should be encouraged and developed to the utmost.

What, then, is to be the future of our foreign trade? The Committee on Foreign Trade of the American Economic Association sums the situation up very comprehensively in the statement that, "during the early stages of lending, the theoretical analysis indicated that a country has an excess of exports. After this process has continued for [illegible] the lending country has an excess of imports."

Our present position has been attained not as a result of the slow process of economic development, but as a result of the sudden shifting of trade during the war. However, our readjustment cannot be as sudden. It will take years. Europe took our exports and gave us promissory notes in payment. She cannot liquidate her debt in gold. Because of the development of American facilities for financing trade and because of the creation of the American merchant marine, Europe will not be able to pay us with these services even to as great an extent as before the war. Securities with which to pay us are either not available or else will not be sold by Europe because of the commercial prestige which attaches to foreign investments.

Ultimately, Europe must pay us in goods. A mortgage on her fixed assets is not feasible politically, because of the anti-alien laws of Europe and the fear of economic penetration. Europe will therefore eventually have to pay in merchandise. The annually accruing interest on the debt to the United States will depress the exchange rate of the debtor country and thus stimulate exports and restrict imports. On the other hand, the annual credit to the United States for interest will tend to raise our exchange above par, to stimulate imports and to restrict exports. Ultimately our excess of exports must decline and change to an excess of imports. Immediately, Europe may be unable to pay in goods. Her need of additional goods will need to be financed in some way. Loans by us would make possible a continuation of our exports until the productive capacity of Europe is restored sufficiently to permit the resumption of exports by Europe. The annual investment of a sum equal to our excess of imports and the reinvestment of the interest on loans, both outstanding and to be placed, will, if compounded, reach a huge figure in a generation. Our balance of trade must thereafter be an excess of imports.

In the present unsettled state of Europe there are many factors which would qualify these conclusions. If Europe falls into chaos, exports from the United States will be greatly reduced. If the principal and interest of our present loans is thus wiped out, the conditions which would call for an ultimate excess of imports will cease to exist.

To insure her existing heavy commitments in Europe and to help rehabilitate her best customers, America should aid in the restoration of normal conditions in Europe.

WESTINGHOUSE TO ENLARGE ITS TURBINE PLANT

The Westinghouse Electric & Manufacturing Company announces that it has awarded the Westinghouse, Church, Kerr Company the contract to erect four new buildings at its South Philadelphia plant, Lester, Pennsylvania, which is devoted to the manufacture of land and marine turbines.

These new buildings, which will be made of terra cotta and steel, will be of the highest grade of construction throughout and will consist of a shop for building small turbines, a new machine shop, an addition to the erecting shop, and a new warehouse.

New York Shipbuilding Corporation

View of the Riverfront of the New York Shipbuilding Corporation Ship yard at Camden, New Jersey

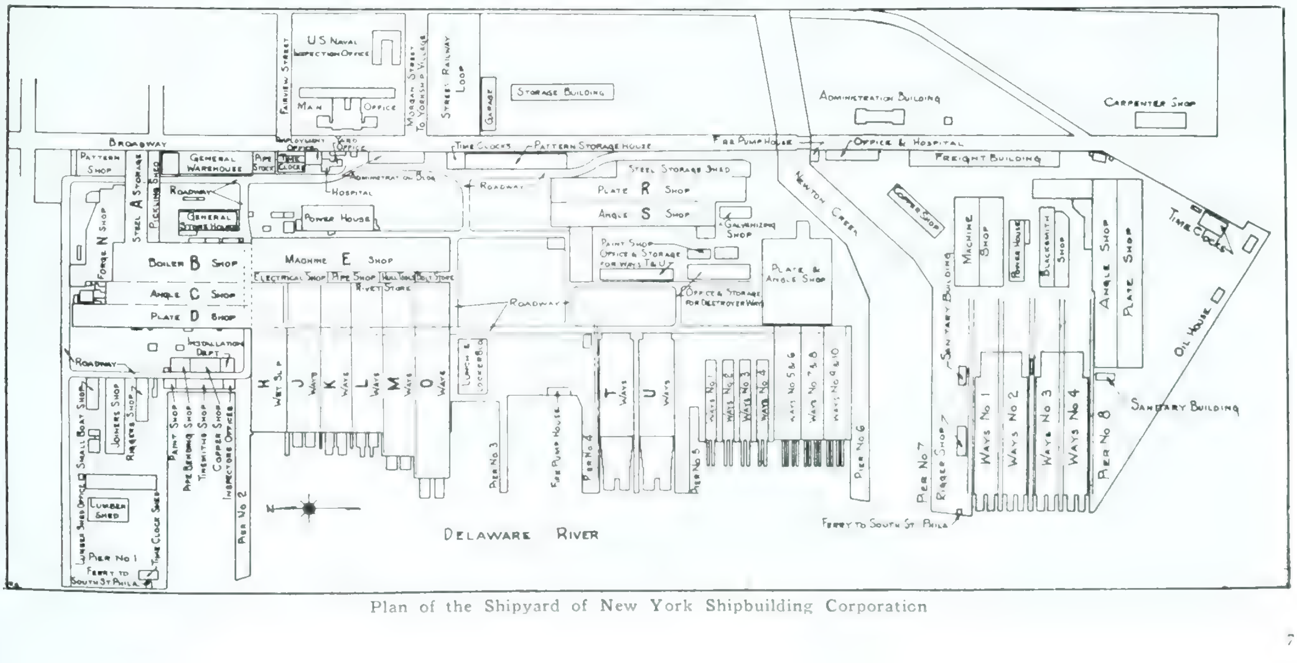
STEAMING up the Delaware River one is impressed with the remarkable growth in the industry of shipbuilding during the last few years. After having passed the splendid ship fabricating plant at Hog Island on the Pennsylvania shore and after having noted the magnificent improvements installed during the war at the Navy Yard on League Island at the mouth of the Schuylkill, the shipbuilder turns to the New Jersey shore, and, passing the new yards of the Pusey & Jones Company, described in detail elsewhere in this issue, begins to take a real interest as he comes to the magnificent shipbuilding establishment of the New York Shipbuilding Corporation, because here at all times are to be found under construction many different types of merchant and war vessels and here is a plant capable within its own limits of completing every detail of a modern freighter, passenger steamer or naval vessel.

The New York Shipbuilding Company was formed in 1899 by the late Henry G. Morse and the first ship was launched from the yard in May, 1901. The original plant was laid out with the idea of applying, as far as possible, modern manufacturing methods to the construction of a ship. With this end in view the shops were arranged together very compactly and practically under one roof.

The original installation comprised the northern portion of the plant, as shown on the plan reproduced herewith, and ended with the building ways marked "M." All these ways are practically under one roof with shops at the shore end and are built with steel framing supporting overhead electric cranes.

Raw structural material, such as plates and angles, is received for these ways in the steel storage building marked "A," through which it is handled by a gantry crane overrun by ordinary traveling cranes in the buildings "B," "C," "D" and "N," where it is shaped and fabricated for the jobs in hand. Running from these shops along the heads of the building ways are low gantries supported by movable steel girders. These gantries handle the fabricated material, carrying it to a point where it may be picked up by the overhead cranes in the building ways and the outfitting basin or wet slip "H." An overhead crane of 100 tons' capacity, which is normally located in the wet slip "H," can be moved by means of a transfer table to any one of the building slips "J," "K," "L" and "M," so that any exceptionally heavy machinery parts can be handled directly on to the ship on the building ways and, except in the case of large war vessels, where launching weights would be prohibitive, the ships built on these ways can be finished complete before launching.

This entirely covered working area makes it possible for the New York Shipbuilding Corporation largely to offset the disadvantage of the hot summers and cold winters, as all these buildings are provided with ventilating and heating systems



Plan of the Shipyard of New York Shipbuilding Corporation

Upper view: Interior of the Machine Shop in the North Yard. Left: Launch of Torpedo Boat Destroyer Overton. Right: Interior of Machine Shop in the South Yard. Note ventilating and heating ducts. Lower: View of Riverfront from the South New York Shipbuilding Corporation Plant, Camden, New Jersey.

which make them very comfortable for workmen at all times of the year.

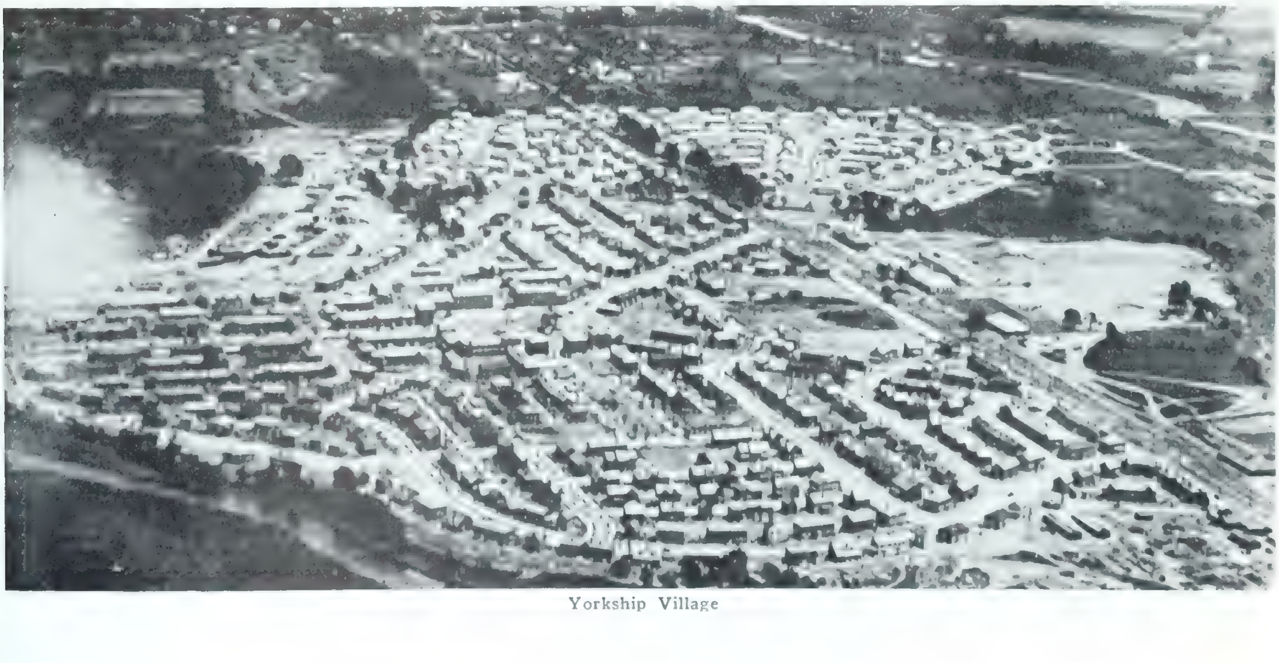
Since the original installation the New York Shipbuilding Corporation, as shown on the diagrammatic plan, has very largely expanded its plant, which now covers a frontage of nearly a mile on the New Jersey shore of the Delaware, occupying both sides of Newton Creek and operating twenty-one building ways.

The machine shops of both the south and north yards are very completely equipped with modern tools to take care of any size or variety of machine work necessary for the building and equipping of the largest passenger liners or warships. The south yard was designed and laid out especially for the construction of modern cargo vessels and forms a complete unit, independent entirely of the older establishments on the north side of Newton Creek. At this yard there are four ways built with skeleton steel framework supporting traveling and revolving gantry jib cranes. The plate storage yard is served by two overhead traveling electric cranes with the outside track mounted on a steel trestle and the inside track on brackets on the side of the plate shop. From the plate shop and angle shop the fabricated parts are taken across the head of the ways on low gantries to points where they can be handled by the gantry jib cranes mentioned above.

The old yard of the New York Shipbuilding Corporation will always be of great interest to shipping men on the Pacific Coast on account of the fact that so many of the well-known coast and trans-Pacific ships were built there. Among others may be mentioned the Texan, the Nevadan, the Nebraskan, freighters of the American-Hawaiian Company; the Mongolia and Manchuria of the Pacific Mail Company; the President, Governor and Congress of the Pacific Coast Steamship Company, and the hulls of several of the Southern Pacific trans-bay ferries. Many of the largest warships in the United States Navy were built and finished at this yard and during the war they have been turning out destroyers with almost clock-like regularity. The destroyers have been launched so quickly that there has been considerable difficulty attending the outfitting of these boats at the piers and the company has recently come to the decision that it will finish the rest of the destroyers on the open ways ready for the dock trials when launched. This will practically enable them to obviate the danger to the light destroyer hulls when kept in the river. To carry out this plan an additional gantry crane, capable of lifting condensers and boilers into position, has been installed on the open ways and is now in use. This crane is of forty tons capacity and can be skidded from one set of ways to the others, so that it is expected that this spring launchings from these ways will take place with the torpedo boat destroyers 99.44 per cent complete.

Exterior view of Machine Shop in the North Yard

Philadephia is, of course, the chief source of


Yorkship Village

Launch of Steamship Old North State, and Miss Magoun, daughter of Vice-President Magoun of the New York Shipbuilding Corporation, Sponsor.

labor supply for the New York Shipbuilding Corporation and both of the yards described are connected by ferry to the foot of South street, practically at the center of the Delaware River front of the Quaker city. In order to provide housing for the large emergency body of workmen necessary to carry out the war program, a block of land was obtained about a quarter of a mile east of the boundary frontage of the plant and a model town site laid out with hotels, recreation rooms and a number of modern cottages of various sizes. This new town has been called Yorkship Village and is proving a great attraction to the men, many of whom have settled there and purchased their own homes, so as to live within easy walking distance of their work.

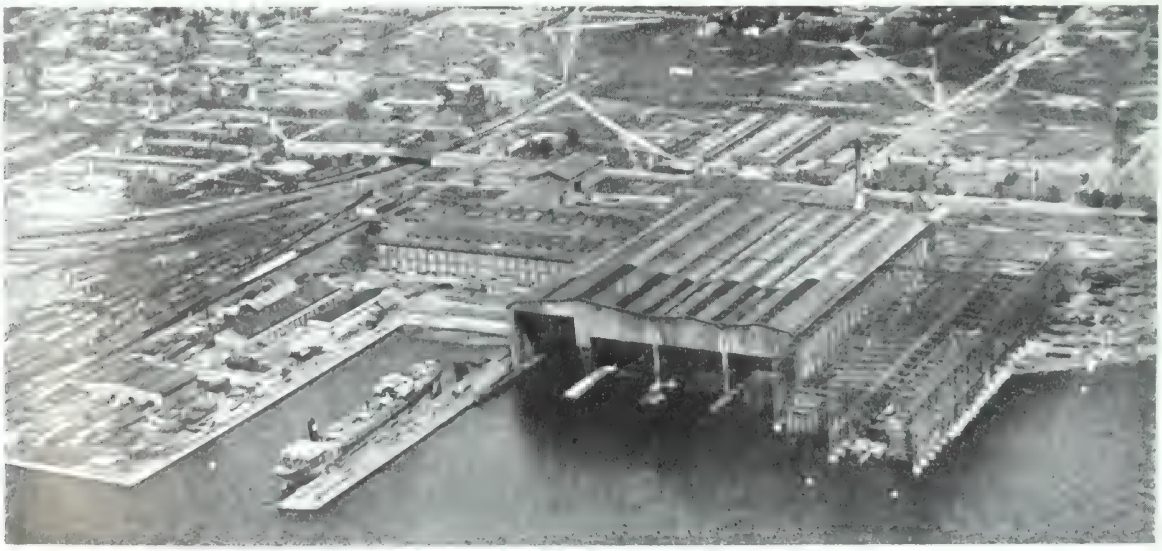
During the year 1919 the New York Shipbuilding Corporation has been engaged very largely in naval and army work for the Federal government and a cursory glance at their record of deliveries indicates the versatility and capacity of their plant. One 33,000-ton battleship was delivered to the United States Navy, ten torpedo boat destroyers of 1300 tons each, one oil tanker of 6795 gross tons, two troop transports of 5280 gross tons each, and three freighters of 7770 gross tons each.

Former Pacific Mail Steamship Mongolia built by New York Shipbuilding Corporation

During this same period this yard launched three torpedo boat destroyers of 1300 tons each, ten torpedo boat destroyers of 1350 tons each, three passenger liners of 13,340 gross tons each, three freighters of 7770 tons each and one tanker of 6795 gross tons.

In addition to all of this new construction there was carried on during this period a large amount of repair and re-conditioning work.

At the present time, in addition to the government work still unfinished, the New York Shipbuilding Corporation has on hand orders for several tankers and freighters for private account and undoubtedly will have many more such orders when the ways are free to take them, as this company is in a very excellent position to guarantee deliveries.



An Aeroplane View of the Plant of the New York Shipbuilding Corporation taken during 1915

Fuel Relation to Rivet Scale, Bad Rivets, Poor Riveting and Excessive Costs

By Letson Balliet, M. E., and C. E.
Construction Engineer, 1508 Hobart Building, San Francisco

SUMMARY

In this article Mr. Balliet gives a very masterly analysis of the causes of waste and high costs in riveting as carried on in shipyards.

He shows conclusively that one of the largest factors in the elimination of this waste and the reduction of this high cost lies in the proper selection and skillful use of fuel for the heating of the rivets. Summarizing the results of his investigation and taking into consideration all the elements which enter into riveting costs he shows that the comparative cost per forge per eight-hour shift would be for oil fuel $13.98, for coke fuel $7.75, for gas $1.85. These figures are taken from actual results of tests on fifteen stationary rivet heating furnaces.

IN the manufacture and heating of rivets, for use in shipbuilding and structural steel work, there is a prevailing ignorance as to the true value of the various fuels, and the application of the heat with reference to the condition of the finished rivet. Neither the temperature beyond that necessary to bring the steel to the proper condition for working, nor the b. t. u. value of the fuel producing this excess temperature is of any value. It is not only a positive waste, but often (if not always) a serious detriment in obtaining results, frequently entailing large financial losses.

At first blush it would seem that rivet making is a very simple thing. There is nothing to do but heat a rod in a long furnace, start the end of it into a machine, which upsets a head, and cuts off the rivet of the required length, and then repeats automatically until the whole rod is cut into rivets and another rod is started. Simple, isn't it?

Any blacksmith who ever put a head on a bolt can tell when the rod is at the proper heat, and his helper can start the rod. But that is just the trouble—it is so simple that they do not need an engineer who understands the metallurgy of iron and steel, and that is the reason there are so few really good rivets in the market.

Without going too deeply into the metallurgy of the subject, it is easy to point out that the rod furnaces and rivet forges are not "reducing fires" but are "oxidizing fires," which are oxidizing or scaling the outside of your rods and rivets. The scale is caused by too much air coming in contact with the hot rods and rivets. The blacksmith would say "it's a burnt rivet," the rivet heater would say "it's scaled," and the metallurgist would say "it's oxidized."

You, who have had opportunity to observe rivets being heated for either structural work or for ship construction, will recall that often a hot rivet will be taken from the fire which in every respect is a perfect rivet, but for some reason it is laid down and not driven.

After it has cooled, if you will look at the rivet, you will find it badly scaled. The reason is this, that the rivet is oxidizing from its own heat all the time that it is cooling. Tons of rivets have been wasted in every shipyard by heating too many at a time. Cleaning fires result in dozens of rivets being taken out and allowed to cool, and scale.

Manifestly the open forge fire, burning coke, coal or charcoal, fed with high-pressure air or by the blower, must be very carefully handled not to be a severe oxidizing fire.

Fuel oils sprayed with compressed air are powerful oxidizing fires, as commonly used in the open rivet forges and rod furnaces. Where rapid riveting is advantageous, some mechanics have suggested "preheating" to a partial heat, so that the final heat may be obtained quicker. This may be arranged to give speed to the riveting, but quite certainly offers no benefit in the prevention of burning or scaling, unless the preheating can be accomplished in the heated burnt gases without oxygen coming in contact with the rivets.

Much controversy has resulted from the choice of fuels and has gone all the way down the line from the management and cost department to the man who drives the rivets. The purchasing department and management are prone to see the mere cost of the fuel, while the mechanical department and the riveter foremen and bosses are prone to see the greatest number of rivets that can be driven, or the shortest time required for heating, and the man who drives the rivets is prone to see the greatest ease with which he can get along until the whistle blows, and on top of this the chemist will talk b. t. u. per unit or per dollar. The fallacy of allowing any one of these departments to decide the question, without synchronizing it with the other departments and all the rest of the work, is extremely likely to run the finished cost into high figures. I will cite, as an example, three fuels, as delivered:

Coke has 1,604,000 b. t. u. in one dollar's worth at actual cost.

Crude oil has 3,456,000 b. t. u. in one dollar's worth at actual cost.

City gas has 777,700 b. t. u. in one dollar's worth at actual cost.

On the face of these figures, probably the management, the purchasing department and the chemist would select the crude oil as the best fuel, perhaps some riveter of the "class of 1918" (war emergency riveter) who had never used anything else would say, "It is the best I have ever seen," but here is the actual result of fifteen oil forges located on the ground—stationary—where assembly work could be brought to them. They were heavy and portability was not considered. The average of the fifteen forges over a year was thirty-three gallons of California crude oil every eight-hour shift, exclusive of leakage and wastage.

Figuring the cost of fuel oil at four cents a gal lon, the mere fuel cost was $1.32 an eight-hour shift. The delivery of this crude oil, measuring, handling, filling the tanks under the forges, required two men whose wages aggregated $9.28, which added 62 cents a forge. Of course, these two delivery men were under a foreman and the oil supply was in charge of some one, and there was always a slight leakage or waste in filling tanks; in fact, I have seen occasions when a whole tank in transit from the oil supply to a forge was spilled.

COMPARATIVE COSTS OF RIVET HEATING FORGES WITH VARIOUS FUELS

	Oil	Coke	Gas
Fuel cost delivered at the plant, per burner	$ 1.32	$ .99	$1.12
Intra yard distribution of fuel (labor only)	.62	.81	None
Auto truck or wagon, hauling fuel (operation only)	.20	.36	None
Motor power compressed air (air metered at forge)	1.42	.60	None
Fuel boxes and attendance, delivery, etc	None	.15	None
Forge or furnace upkeep and repair, and replacem't	.86	.11	.16
Clean-up of ashes, oil waste, burnt rivets, etc	2.10	.52	.03
Getting and delivery of kindling for fires	None	.30	None
*Rivet gang's lost time start'g fires (at $2.56 an hr,)	.64	1.28	.32
Burnt, oxidized or scaled rivets	7.00	1.40	.14
Destroyed coke sacks (burnt, cut or lost)	None	.30	None
Operation gas plant distributing system	None	None	.08
Auto truck and labor hauling ashes to dump	None	.06	None
Time of ship cranes handling coke and coke trays	None	.07	None
Time of ship cranes handling ashes and ash bbls	None	.09	None
Labor time pick'g bolts, nuts, rivets, etc., from ashes	None	.05	None
Paint barrels, rope handles for handling ashes	None	.02	None
Lost bolts, nuts, rivets, reamers, etc., in ashes	None	?	None
Lost time cleaning fires, rekindling, etc. (¼ hr.)	None	.64	None
	$13.98	$7.75	$1.85

NOTE. Gas forges that replaced coke forges had but one burner, and gas forges that replaced oil forges were supplied with two gas burners. Add $1.12 for gas used by second burner, and the gas is still $11 cheaper than oil.

* "Starting fires" means from the whistle to the first rivet. Even if an oil forge averaged 1000 pounds of rivets, heated to 1800 degrees Fahrenheit (with the specific heat of iron at .125), it requires 225,000 b. t. u. to be imparted into the rivets during the eight-hour shift. There are, however, about 4,750,000 b. t. u. in thirty-three gallons of fuel oil, which makes a showing of about 5 per cent efficiency for the oil fire. Likewise, if a coke fire could be handled to heat 500 pounds of rivets in a day (1000 to 1500 average rivets), its efficiency would not be more than 7 per cent. With the gas forge, and its more perfect control, 1000 cubic feet of gas will deliver 550,000 b. t. u., which, on the same basis as the coke forge, heats 500 pounds of rivets to 1800 degrees Fahrenheit, imparts 112,500 b. t. u. to the rivets, gives an efficiency of almost 20 per cent of its b. t. u. value

Imperfect rivets that have to be burnt out with the oxy-acetylene torches and replaced (often after the assembled part was in place), run into lots of money and delay or impede work in other departments. I have heard the foremen of the welding and cutting departments in various shipyards say: "Fifty per cent of the expense of this department is chargeable to mistakes in other departments, and carelessness of piece workers." If this is true, it is evident that better rivets will reduce the expenses of this department. But it is the burnt or oxidized rivets that we wish to discuss in this paragraph. From one oil forge in the case cited above I saw gathered up a heaping basketful of three-quarter-inch and seven-eighth-inch rivets after one shift's work, which were sent to the scales to be weighed, and found it to weigh 328 pounds. Many times I have seen somewhat similar quantities which I did not have weighed, but as all the oil forges were heating for hull riveters that were driving from 1500 to 3000 rivets a day on piece work, I am perfectly safe in estimating the oxidized rivet loss per oil forge to be between 100 and 200 pounds daily. To save argument, we will assume it to be 100 pounds at seven cents a pound. Many of these big rivets weigh over a half pound each, and many times I have seen a forge full of white hot rivets dumped out because the riveter wanted to change the size of the rivet he was driving and then he filled the forge with the newly required size. Piece workers did not stop to count the rivets they lost—their pay was based on the rivets driven, not on the rivets heated—therefore they opened up all the air and oil they could burn, and made a tremendously hot fire, heated as fast as possible and always made sure that they "had plenty" in the fire, as it was better for them that they scrape out ten or twenty pounds than to wait five minutes for a few extra. Under these conditions, the forges became powerful oxidizers of the mild steel rivets, and the riveter and the rivet boss insist that the oil was a good fire because it heated quickly.

Though the b. t. u. value of the fuel oils varies and a definite determination is necessary with each oil, it will be safe for these figures to state that practically eighteen cubic feet of air is required in the combustion chamber for each pound of oil, to obtain anything like an efficient combustion. How can this be guaranteed, with a fluctuating air pressure, different viscosities of oils, different humidities and temperatures? Surely the operator cannot reach this result with any valve control.

While these figures show that nine cubic feet of air a minute are necessary with the fuel oil fires that were in use, it is also true that much more than this actually was delivered into the combustion chamber, through ignorance on the part of the heater boy. In addition to this a piece of three-quarter-inch pipe three feet long extended across the front of the forge. This pipe was perforated with one - sixty - fourth - inch holes throughout its length, to blow jets of cold air on the face of the operator, that he might get close enough to the fire to get rivets therefrom without discomfort.

There is practically no way in which air supplied can be determined in any oil-burning forge, except by flue gas analysis, which is, of course, impractical for the mechanic or riveter. Moreover, the air pressure on long pipe lines from which there are other branches is never very constant, and the valves are always open to furnish excess air.

Oxidized rivets do not make a good finished job, as the brittle scale prevents the head coming down tight, and the neck of the rivet is held too high in the hole; and even if the rivet is not "loose" it is often not tight all around on account of scale at some point around the rivet. From this standpoint alone the oil forge as used in common practice should be condemned.

The coke forges are lighter and are made to be portable, but they are attended with considerable expense, from all sources. Coke forges used 110 pounds of coke in eight hours, taken from an average between 200 and 300 forges, over a year's time. Coke in the coke-shed ready to be distributed costs $18 a ton of 2000 pounds, making an average fuel cost a day of coke $.99 a forge. A series of tests were made to ascertain the amount of compressed air used in each forge, which developed the fact that when the rivet heater knew the test was being made, and the experimenter was governing the valve, the air consumption went as low as twenty-eight cubic feet a minute and as high as thirty-three feet a minute. When the heater did not know the test was being made and the experiment was unknown to the heater, the air consumption per forge ran forty to forty-five and as high as sixty cubic feet a minute. All such tests were made with tight air hose, within fifty feet of the forge and on different days. This did not assume any portion of the pipe line leaks, or have any bearing on the mechanical efficiencies of the compressors, but we are certainly giving the cost much the best of it, if we assume four cubic feet a minute per motor horsepower. Thus we are perfectly safe in assuming ten motor horsepower per coke forge. Figuring mechanical losses, transmission losses, etc., it was more likely twenty motor horsepower at the compressors per forge. It must be remembered that portable compressors, such as are ordinarily used by contractors in steel construction, are seldom very efficiently figured. The shipyard was built and enlarged in an emergency, and pipe lines were simply extended as branches to existing or hastily laid lines without any figuring at all. Branches, elbows and valves were added any old time and place, and if the compressors did not hold the pressure, more compressors were added, and thousands of feet of air were forced through pipe lines hardly capable of carrying one-third the volume. Water pockets and traps were ignored, receiver capacity never considered, and power bills were enormous.

However, from the standpoint of an oxidizing fire, even thirty or forty cubic feet of air a minute through the fuel burns or scales the rivets rapidly, nor is it evenly distributed throughout the coke or coal. At this point I call your attention to the old village blacksmith, when you were a boy. No doubt you found a chance to grab the bellows handle and begin pumping at it some time in your life. No doubt you thought you would help him by pumping, but were deeply mystified when he yelled at you, "Don't do that, you'll burn it." You thought that smouldering fire was not doing much good, and you thought iron wouldn't burn, and that the 'smith was a crank. I admit that I did. But the blacksmith had learned one point in metallurgy without being aware of it, that too much air burned his metal—it oxidized it. No one ever saw a blacksmith work steel rods with one hundred pounds of compressed air turned into his fuel, nor with the flames shooting two or three feet above the forge. He never draws a white hot steel rod or bar from the fire that is "spitting," that he does not cut it off and heat it again. If you ask him why, he will tell you "it's burned."

Now, why should anyone expect to get a good rivet or a good finished job of riveting when excess air has been used in the fires? For the benefit of the cost accountant, if these coke fires require but ten motor horsepower at seven and a half cents an hour, the power cost is sixty cents for eight hours. If it requires twenty horsepower, the cost is double. There are certain expenses incidental to oil and coke fires to which a cash value cannot be assigned, but nevertheless are very important features in the operation of a plant. These are principally in connection with making the work safe, pleasant and convenient for employes, keeping surroundings clean and eliminating the fire hazard.

Occasionally an inferior lot of coke will be received, full of slate and dirt. Not only is the purchase price lost, but when the coke is distributed, heaters struggle with fires, rivets are not heated right, sack after sack is dumped on the decks and in the way, heaters lose time trying to pick out good pieces of coke, and work is delayed. I have seen twenty gangs of piece workers quit work in one day because the coke was poor. Day workers struggled with it and accomplished little or nothing, but remained to draw their pay. Cleaning up this dirt was double the ordinary clean-up expense, and the bolts and rivets lost in the dirt cost doubtless more. I have seen a week's work handicapped by a condition like this, and in a year's time I have seen five or six carloads lost in this manner and used for filling in some mudhole around the yard. Neither oil nor gas is subject to this loss, but to the receiving clerk "coke is coke" when it comes along in the weekly deliveries of a contract. Two carloads of such coke would doubtless cost the company around $1500, and with 250 gangs of riveters working at $20 a gang day, makes a $5000-a-day payroll. There is also a waste and excess of air used in trying to burn it, heater bosses kick and call for more coke, it makes extra work in delivery of the fuel and for the clean-up laborers, and delays every other part of the construction work. Indirectly, two carloads of such coke, getting distributed all over the works before it is discovered, would doubtless mean a loss of over $20,000 from all sources.

On watching oil furnaces and forges, one notices clouds of black, strangling smoke emanating from the doors and openings, with tongues of flame licking out into the faces of operators. There are puffs and explosions on lighting burners, while the blinding glare of the oil fires often makes it necessary for operators to wear smoked glasses. Moreover, there is a lack of control in oil furnaces, and imperfect combustion is rather the rule than the exception, thereby creating large amounts of poisonous and obnoxious gases, which permeate the atmosphere of the shops and ships and decrease the working efficiency of all other employes. Another thing to which a money value cannot be definitely assigned is the "turn over of men." Heaters, once they have become familiar with gas fires, will not go elsewhere to work. The good air in close places, and the better working conditions around the fire, keep heaters, riveters and other workmen longer at their work. Not only do they lose less time getting out in the air to breathe, and work better in good air, but they stay longer in the company's employ.

With the exceptions of the explosions and puffs in lighting fires, coke fires have a somewhat similar disadvantage, creating large quantities of strangling, poisonous, obnoxious gases, which render it impossible for any workman to stay in close places where these fires are burning.

With city gas fuel, one cubic foot of San Francisco gas mixed with about five cubic feet of air furnishes a completely combustible gas mixture. Such a mixture will burn in a bottle under water, or in the pipes or in the forges without any access to the outside air. More than five cubic feet of air per foot of gas furnishes an excess of air which is not consumed and leaves the oxygen of the air free to combine with the metal, which forms the scale or oxide. Less than five feet of air will not give a complete combustion to the gas and is wasteful unless outside air is supplied. If ten or twenty cubic feet of air is supplied in the open fire, the gas uses only the oxygen of five feet, the balance of the air being wasteful, and the fire becomes a powerful oxidizing fire.

The mechanism of the gas equipment as used in the shipyards mixes about 1.6 to 1.7 cubic feet of air with each cubic foot of gas and distributes this mixture of gas and air to the forges, at about sixty inches water-column pressure. This mixture is non-explosive in the distribution pipes. On each forge is a Bunsen burner, designed to admit 3.4 cubic feet of air, while 2.6 feet of the mixed gas is passing. If this design is correct, the interior of the forge will have one cubic foot of gas and five of air, under the predetermined pressure. This gives a reducing flame that is practically non-oxidizing. If the ratio of the mixture is correctly established, the size of the burners, combustion chamber and valve control will govern the pounds of rivets a minute that can be heated. Manifestly, it would be impossible to heat a hundred pounds of rivets a minute in the same flame that would heat one rivet, and it is equally evident that a furnace and fire that would heat a hundred pounds a minute would be wasteful if it was required to heat but a single rivet a minute. It will be understood now that the amount of gas used per forge will vary with the work it does and the skill of the operator in controlling his fire to his work. With 300 forges in operation, with unskilled operators, the gas consumption varies from eighty cents to $1.30 per forge an eight-hour shift.

One big advantage of gas fuel in rivet heating is found in the fact that riveters drive from 20 to 30 per cent more rivets in eight hours than with either oil or coke. This, we find, is mainly due to three things: First, the riveter does not have to stop to sweep a lot of ashes away from the place where he wants to work; his working place is always clean, and no time is lost in cleaning it. Second, the rivets are heated continuously and come steadily to him, while with the oil fires and coke they frequently come in bunches and a pause is required to heat another bunch or clean out dirty fire. Third, the scale-free rivets do not have to be set with a hammer—they slip into the holes freely, they go down to the head perfectly, and are softer and easier to drive, and give less die wear, and save time of regrinding dies. In one shipyard with eighteen to twenty boats under construction, twenty-six men handling coke and oil were laid off, and 100 cleaners with whisk brooms were laid off when gas rivet heating was installed, who had previously been employed (five men to a boat) sweeping coke ashes out of corners and away from working places. In all, 126 men were laid off. In addition to this, the indirect savings were enormous. Delivery of material in all departments was facilitated. The delivery conveyances formerly used to carry coke around the yard were laid off and out of the way, or used to facilitate other deliveries. Crane time that was used for swinging coke aboard and ashes overboard is used to speed construction. Bolts, nuts, washers and tools that before were lost in the ashes are saved because there are no ashes. The completely combustible gas permits of forges being taken closer to the work, thereby eliminating extra rivet passers, as there is no danger or poisonous gas from the forges when taken to the very bottom of tanks, or to closed places.

In addition to all the foregoing, the oxy-acetylene burning force was greatly reduced, due to the more perfect riveting with fewer defective rivets to be burned out. Also there is less caulking of rivets necessary. It is estimated that each gas forge makes an average saving of something over $6 a day, compared with the expenses of either oil or coke. Three hundred forges on this basis make a saving of over $1800 a day. In addition to all other disadvantages, there is no question but that the application of crude oil firing is attended with still other drawbacks, such as stoppage of the burners, failure of the oil supply, failure of the compressed air, regulation of burners, and time lost in starting fires. A recapitulation of this time lost from actual progress of the work will show that practically one-half hour a day is lost at each forge. This aggregates three hours a week, and for fifteen oil forges would aggregate forty-five hours, or one hour more than the "forty-four-hour week." Four men were affected by this loss of time on each forge. Fifteen oil forges resulted in waste time equal to a whole week's work for a riveting gang of four. In the case of large oil furnaces, like those in the blacksmith shop, the angle-bending shop and at the pipe-bending blocks, it has often been found necessary to maintain additional employes, who are sometimes known as "fire bosses," "heater bosses" or "heater instructors," for the purpose of regulating the burners and controlling the fires.

I have seen bull riveters completely ruin the bull dies in a few hours with the scale from the rivet head when heating with oil fires. I have seen the same machine and the same operators run for two and three weeks without damaging the die when using gas-heated rivets.

Cargo Steamer Abraham Lincoln built at the Gloucester City Yards of the Pusey & Jones Company

The Shipyards of the Pusey & Jones Company

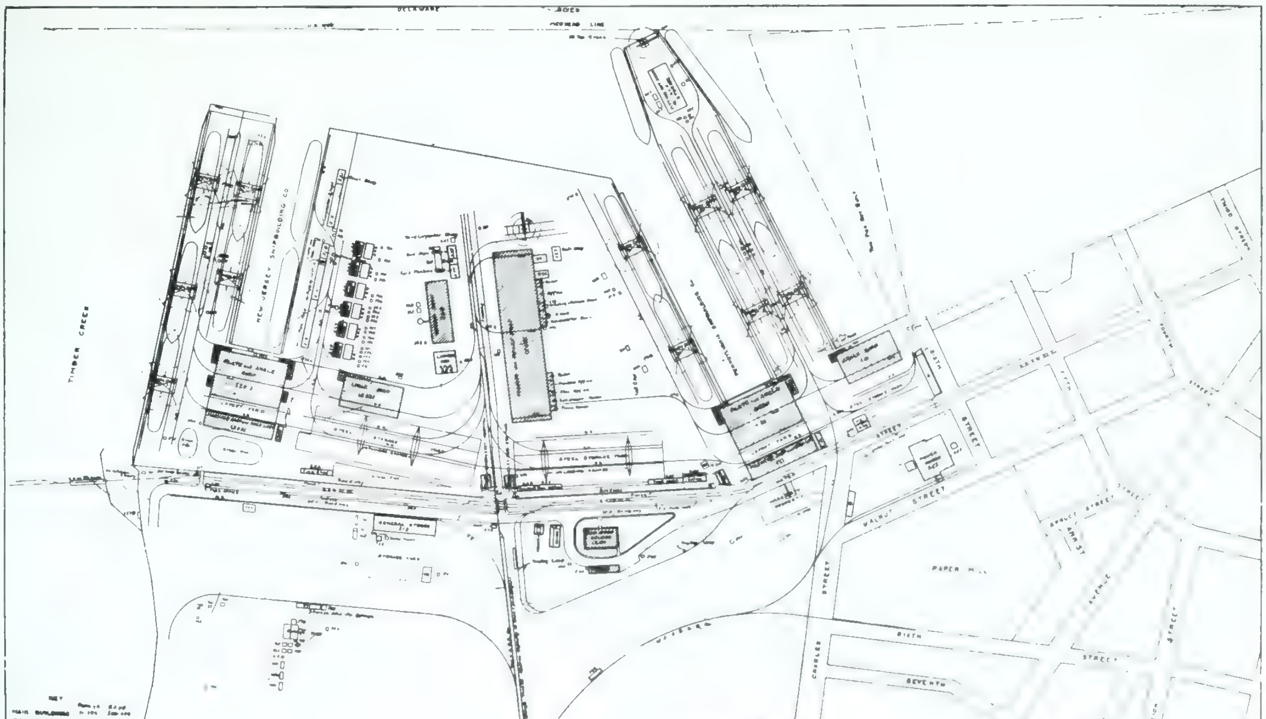
Panoramic View from Inshore Side of the Pusey & Jones Shipyards at Gloucester, New Jersey

THE Pusey & Jones Company, incorporated in 1879, has two shipyards located along the Delaware River, one at Wilmington, Delaware, and the other at Gloucester City, New Jersey. The plant at Wilmington has four ways with a capacity of 5000 deadweight tons, launching end wise, together with fabricating shop, machine shop and foundry, etc., of sufficient capacity to take care of the ships as well as marine engines. The plant at Gloucester City, New Jersey, has eleven ways, of a capacity up to 16,000 deadweight tons, together with fabricating shops, machine shop, etc., for handling all classes of work in connection with such ships with the exception of engines and boilers. Mr. W. Griscome Coxe is vice-president and general manager and Mr. Lawrence Leonard treasurer of the Pusey & Jones Company.

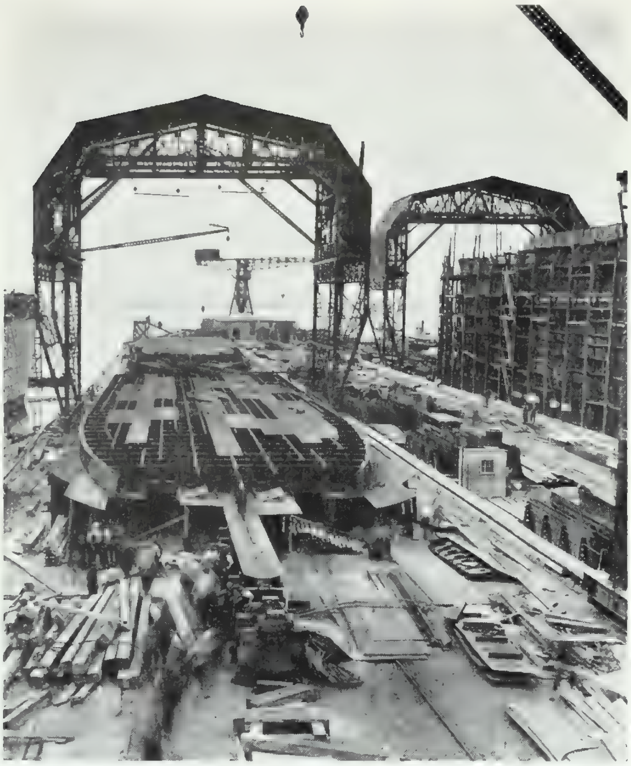
Yards at Gloucester City, New Jersey

The plant at Gloucester City, New Jersey, covering 186 acres of land with about 200 buildings and a water frontage of 11,600 feet, is divided into two yards, the Pennsylvania and New Jersey yards, originally laid out as independent shipyards, each having its own mold loft, storage facilities, plate shop and angle shop, situated for economic work in connection with the shipways in each yard. Connecting the two yards are the shops to care for the machine, forge and boiler work of the two ship construction yards, as well as all the outfitting.

The plans for the boats are prepared in the general office building, Figure 3, two stories of concrete and brick construction, 104 feet by 67 feet. The top floor of this building is devoted to drafting rooms and engineering offices, where requisitions and bills of material are prepared. The requisitions are taken care of by the Purchasing Department on the first floor, where all material is ordered and the general business of the company carried on. The drawings and bills of material prepared by the Drafting Department go to the mold loft, two stories of steel and brick construction, 50 by 215 feet, in either yard, where the tem-



Plan of the Shipyards of Pusey & Jones, Gloucester, New Jersey



Side Launching Way showing Traveling Hooded Gantries which form Portable Roofs over the Building Operations

plates are made and stored in the lower floor of the same building. The routing of the material through the shops is determined by the superintendent of the yard, who, through his production division, orders the proper material from the stores and the corresponding templates to the layout yard, which adjoins the template storage, and is served by overhead crane. The material after being laid out moves through large doors directly to the punch tables in the adjoining plate shop, the furnace work being sent over to the angle bending shop. In the plate shop, one story of brick and steel construction 150 feet by 215 feet, the material passes to the battery of four double-ended punches of 75 and 150-ton capacity, and one 300-ton multiple punch, fed by means of the Lysholm operating tables. These were designed by Henry Lysholm, the first general manager of the plant, who had charge of the entire original lay-out. From the punches the material is handled by 3-ton overhead cranes in each bay to the countersinking floor and from there to the shears and planers as required. The finished material is assembled in the south bay of the plate shop, or stored outside of the plate shop along the building ways in racks, according to the rotation of erection. As much of the assembling and riveting as possible, especially all the bulkheads, is done on the ground and erected as a unit.

The angle bending shop, one story of brick and steel, 100 feet by 192 feet, contains an oil-burning plate furnace 12 feet by 23 feet 6 inches, an angle furnace 8 feet by 56 feet of sufficient capacity to handle the largest material necessary, and is provided with the requisite straightening machines, shears and adequate overhead crane facilities.

There are six ways in the Pennsylvania yard in series of two endwise, constructed for launching ships sidewise. This enables the boat to be built on an even keel, and facilitates regulating and erection in general. Each shipway is provided with a covered gantry crane (Figure 4), self-propelled on rails, straddling the boat under construction. Each crane has four 15-ton hoists which can be operated parallel by means of balance beams to lift a maximum load of thirty tons on each side of the crane. They are also provided with four 3-ton corner booms for handling material from the storage racks or railroad cars alongside the ways. The hoisting mechanism is all electrically operated. Having all shipways laid out in pairs, located end for end, it is possible to concentrate two gantries on one ship under construction.

Upon launching, the boats are taken to the end of Pier 2 under the 50-ton Heyl and Patterson revolving tower crane, where all heavy machinery is put aboard and the boat is then fitted out and completed at the fitting-out pier in the lower yard.

The plan of the New Jersey yard is in general the same as that of the Pennsylvania yard—in fact, all the buildings are exactly the same in con-

Launch of Cargo Steamer Daniel Webster

5000-ton Cargo Steamer Caste Point built at the Pusey & Jones Shipyards

struction, layout and location. Of course, the work must pass through in the same general rotation. The five shipways, however, are laid out somewhat differently, there being a series of three ways, end for end, each with its own gantry crane and a series of two on the other side of the same pier. The maximum capacity of these ways is about 5000 deadweight tons. The gantries are of the same general construction but somewhat smaller in size. In this yard is also located an outfitting pier which will be served by a 15-ton traveling tower crane with revolving boom of 60 feet span, electrically operated and propelled. Along the pier are situated various small shops to handle work in connection with outfitting the vessels, such as a pipe shop, machine shop, paint shop, riggers' loft, carpenter shop, etc. This outfitting pier serves both yards and is flanked by a series of twelve 24-foot by 48-foot ship store houses, containing the pumps, valves and general outfit of the boats. Ample trackage is provided to reach the storehouses and the pier, the outfitting crane spanning a track and having sufficient clearance for box cars. The various fittings and appliances are first received by the ship stores and at the proper time delivered to the shops for finishing and returned to the ship stores, from where they are taken to the ships as required. In the rear of the storehouses is the joiner shop, where all the woodwork is prepared as far as possible in advance and taken from there direct to the ship for installation.

The general stores building, 50 feet by 200 feet, is situated outside of the yards proper and is surrounded by store yards of the various classes of material. Railroad tracks skirt loading and unloading platforms, and at the Receiving Department, platform space is also provided for teams. All incoming material passes through the Receiving Department either physically or, in the case of ship steel and large machines, by record, an actual check being made by a receiving clerk sent to the point of unloading.

The machine, forge and boiler shops are housed in a one-story, saw-tooth roofed, steel and brick building (Figure 6), 150 feet wide by 540 feet long, arranged longitudinally in two central bays traversed by one 30-ton and three 10-ton cranes and flanked on each side by an outer bay, one of which contains a gallery the full length.

In the machine shop section, all the heavy work is handled in the central bays where are located the large machines, such as lathes 42 inches by 42 feet, 36 inches by 36 feet, 48 inches by 18 feet, etc.; planers up to a 72-inch open side in size; radial drills up to 6 feet, etc. All the light machinery is located in the south outer bay, which also contains the tool room; the office, tool repair room and storeroom are on the gallery. The north outer bay houses the electrical construction shop and provides the necessary space for bench and floor work.

The forge shop is provided with Nazel hammers up to No. 6 in size, all air operated and motor

Machine, Forge and Boiler Shop of the Gloucester yards, Pusey & Jones Company driven, together with the necessary furnaces and an Ajax tapering machine for liners.

The balance of the building is devoted to light plate and boiler work, the largest machine being a 435-ton flanging press with gas-operated furnace. The pipe shop is located on the gallery and contains an 85-ton pipe bending press, handling up to 10-inch diameter; a No. 4 Underwood pipe-bending machine, and pipe-threading machines up to 12-inch, etc.

Track facilities are provided transversely at each end and at the middle of the building. The building also contains its own air compressor plant, consisting of four electrically driven, belted Ingersoll-Rand air compressors with a capacity of 300 cubic feet a minute each, as well as its own heating plant.

The joiner shop, a separate two-story brick and steel structure, 70 feet by 200 feet, contains on the first floor machinery for working the heavy timbers, and on the second floor the lighter machinery for preparing the joiner work as well as work benches, etc. The whole building is served by a central exhaust system, piped directly to each individual machine and discharging through a main into a receiving tank to the south of the building, elevated sufficiently to permit the driving of teams under the delivery spout. Adjacent to the joiner shop proper is a building containing, on the first floor, storage space for the better class of lumber and a dry kiln, steam operated; the second floor is devoted to the varnishing and painting of all joiner work in advance of installation on the boat, whenever possible.

Electric energy is supplied to all the buildings from a 5000-kilowatt capacity power house at 2300 volts through a sub-station centrally located, where the voltage is reduced and distributed to transformers around the plant. The energy is generated by two 1000-kilowatt Westinghouse generators driven by direct connected Westinghouse turbines and one 3000-kilowatt Allis-Chalmer generator driven by an Allis - Chalmer Curtiss turbine direct connected. Steam is supplied to the turbines at 200 pounds' pressure by a series of five Stirling 415-horsepower boilers equipped with Taylor mechanical stokers, the smoke being carried off through a 200-foot brick stack. Coal is dumped from railroad cars into a hopper, crushed to the required size, and carried by a conveyor system to overhead bunkers of a capacity of 125 tons and from there through individual chutes to the stokers of the five boilers. The conveyor system is so arranged as to handle the cinders and carry them overhead to be dumped into cars. With the power house running at full capacity, the coal consumption is approximately 120 tons a day, which is handled to bunkers in three hours. The operating force consists of but five men: an engineer, an oiler, a stoker fireman, a water tender and a switchboard operator, all watches being under a chief engineer.

The compressed air system throughout the yards is divided into three separate units, one in each of the shipbuilding groups and one in the machine shop building.

The air system in the Pennsylvania yard consists of [illegible] cubic foot and four 1300 cubic foot Ingersoll-Rand air compressors with after-coolers, belt-driven by motors, and the requisite distributing pipe with reservoirs and water traps. In the New Jersey yard there are eight 600 cubic foot and four 1300 cubic foot Ingersoll-Rand air compressors of the same type. The machine, forge and boiler shop building has its independent air system.

At the middle gate is located the Emergency Hospital, with a physician or first-aid men in constant attendance. The Safety Department, operated in conjunction with the hospital, has been able greatly to reduce the number of accidents by having safety appliances and guards installed throughout the plant and through an active "Safety First" campaign. For serious cases, an ambulance is provided.

The transportation facilities of the three yards are under one head and comprise an equipment consisting of a locomotive, eight locomotive traveling cranes, sixteen flat cars, four electric locomotives and a number of hand cars.

A Salvage Department is maintained which collects all salvable material from the three yards, reclaims the same and disposes of all scrap.

The Wilmington yard of the Pusey & Jones Company will be described in a future article.

MOORE'S TO BUILD HUGE FREIGHTER

A CONTRACT to build the largest cargo-carrying vessel ever constructed on the Pacific Coast was awarded the Moore Shipbuilding Company of Oakland on Thursday, March 11, by the Southern Pacific Company. The vessel is to be a tanker of 16,340 tons deadweight carrying capacity and will be operated in the oil trade on the Atlantic Coast. Notification of the contract award was received by George A. Armes, president and general manager of the Moore Shipbuilding Company, from C. W. Jungen, general manager of the Southern Pacific Company's Atlantic steamship service.

This gigantic vessel will be 536 feet over-all, or 500 feet between perpendiculars. It will have a beam of 71 feet, 39 feet depth and 23,000 tons displacement. The tanker will be equipped with reciprocating engines of 3500 horsepower, Scotch marine boilers, and will have a speed of 11 knots an hour. To build this tanker will require 6000 tons of steel and when completed the tanker will carry 125,000 barrels of crude oil.

A vessel the size of the new tanker would not have been attempted on the Pacific Coast before the war. Since then shipbuilding has so advanced in this district that the moore Shipbuilding Company is now in a position to construct a vessel of its size. Its keel will be laid on one of the building ways recently enlarged to accommodate the two 14,000-ton freighters to be built at the Moore shipyard for the Matson Navigation Company of San Francisco.

The contract is the outgrowth of the visit of Joseph A. Moore, vice-president and general superintendent of the Moore Shipbuilding Company, to New York last October. He learned when in New York that the Southern Pacific Company was contemplating the building of such a vessel for their Atlantic service. Moore called on General Manager Jungen and satisfied him that the Moore shipyard was equipped to build a vessel the size of the tanker his company intended building. Some time after Moore returned his company was notified by Jungen that the tanker was to be built and a bid was asked for. The bid was submitted and notification that the Moore Shipbuilding Company was the successful bidder was received by telegraph late in the afternoon of the date named above.

A Pacific Fruit Line

By Andrew Farrell

TO go from San Francisco to Honolulu or Papeete is not merely to cross a few miles of intervening sea: it is, in both general and particular aspects, to go from an old world to a new. Despite the semi-tropical flora of Southern California, the traveler arriving in either of the South Sea ports immediately observes the change, unless he is deceived by superficialities. In no single particular, perhaps, will he discover so much that is new as in the strange foods set before him—foods that may please his palate mightily; that may affront it; but at least for the most part novel, except for the familiar banana and pineapple. And whether his palate be pleased or affronted, he is certain to depart from the Islands with a wider gastronomical horizon; and at times he may yearn for some of those foods left behind in the tropics.

In the States this hypothetical traveler never has made the acquaintance of the breadfruit, papaya, alligator pear, mango, poha berry, or green cocoanut. Some few individuals may have tasted one or more of them at odd times; but the number of persons is so few indeed that, speaking roughly, these fruits are all unknown to the people of the Pacific Coast.

And one properly may ask the question: Why, in the days of 22-knot steamships on the Pacific, are Los Angeles, San Francisco, Portland and Seattle ignorant of this wealth of tropical fruits that lies within such neighborly distance? And the reply is easily made: Because there is no fruit line on the Pacific comparable to the United Fruit Line of the Atlantic and Caribbean.

But because no such line exists is no valid reason why it should not be established, with a consequent tickling of the Californian and Oregonian palate. Perhaps I say that so confidently because my own taste is catholic enough for every fruit of the Islands, the durian alone excepted; and for that amazingly odorous thing Java, and not Hawaii, is to blame. And, from the Island standpoint, the establishment of a fruit line would mean prosperity even greater, because more lasting, than has come in the wake of 13-cent sugar.

Let us consider the banana first; because it was, I believe, the earliest of the strictly tropical fruits to make its way into the North. Time was, not so long ago, when the red banana was seen seldom except on circus day; but the red banana has passed with the dodo bird and dinosaur; and in its stead has come the yellow banana—come to stay, for it is a commonplace in every corner grocery store between the Atlantic and Pacific Oceans. Into the ports of the Atlantic, particularly into New Orleans, pours a perpetual stream of bananas from the West Indies. Into San Francisco pours a smaller stream from Hawaii—a stream, however, not so steady and smoothly flowing as that of the other ocean.

No criticism of existing steamship companies is implied in the statement that facilities on the Pacific are inadequate. Two years ago, in the winter of 1917-1918, "Buy a bunch of bananas" was a cry as familiar to Honolulans as "Buy a bale of cotton" was to Southerners when war first disorganized that export trade. Bananas were sold at ridiculously low prices, because there was no means of shipping the crop to San Francisco. And there was a consequent loss of money to Island producers; and, to the people of the Pacific Coast, of a palatable and nourishing food.

Even today, when shipping facilities have improved immensely, much remains to be done. For example, the Island of Hawaii, the largest of the group, with an area greater than that of the remainder of the archipelago, produces virtually no bananas for export, although it might produce thousands or tens of thousands of bunches a month. Despite the possibilities, Hawaii does little (it raises scarcely enough for its own use), because it is out of the track of steamship lines, one vessel only plying directly and regularly between Hilo and San Francisco. Much the same condition obtains on the Island of Maui, the second in size of the Hawaiian group. Establishing a regular fruit line would give a stimulus truly remarkable to banana growing on these islands. For the States, the result would be a more adequate supply.

Only a few years ago, the people of the States, when they had pineapple at all, ate the fresh fruit. Today, the pineapple canning industry in the Hawiian Islands is second to sugar in magnitude; and the fresh fruit has a relatively unimportant place. Tropical countries the world over are taking a leaf from Hawaii's book and are canning pineapple; even in Japan one sees tins of Formosan fruit on the shelves of the shops. The tin can has made possible quantity production on a scale undreamed of a few years ago; has plowed the great fields that cover the lowlands and creep up the mountain foothills; has brought about what may not inaptly be described as a miracle of business.

No, canned pineapple has come to remain; it is a staple food the world over, wherever civilized man has tasted it and liked it; but the great canneries do not shut out the fresh fruit from the cities that are within close transporting distance of San Francisco. Moreover, fresh fruit, if there were no retail profiteering (a premise of doubtful validity) should be considerably cheaper than the canned. That is quite self-evident.

And so I designate pineapple as the second compelling reason why a fruit line should be plying out of San Francisco today.

Let us go farther into the groves of Hawaii. That tree bearing the green, globular fruit and the broad, deeply incised leaves is the breadfruit. Its name has caught the world's fancy (the name and various fantastic legends that have grown up about it) until the ideal existence of the hard-pressed dweller in the North is to lie under a breadfruit tree and gaze toward Mandalay. The jest aside, America might know of the breadfruit to its delight. More than a hundred years ago Great Britain's wise colonial administrators wished to stock the West Indies with breadfruit; and, in fact, the famed warship Bounty was engaged in transporting young trees from the Pacific to the Atlantic when her crew mutinied and founded the quaint settlement on Pitcairn Island.

A sweet potato of a delectable taste is the breadfruit. That comparison does an injustice (not to the sweet potato), but perhaps it is the most accurate. The breadfruit is palatable and nourishing and could be raised in enormous quantities if there were a demand.

Unfortunately, breadfruit and all other fruits except cocoanuts, bananas and pineapples, are tabu in the United States because of the presence in the Islands of that pestiferous insect, the Mediterranean fruit fly. But it is not too much to hope that the day is near at hand when the fly will have been exterminated. And, when that day comes, California may smack its lips over breadfruit with plenty of butter—provided that this fruit line of mine is established.

Now and then one sees in San Francisco a pear-like object, with a green and black skin, which is remotely like the hide of an alligator—whence the name: alligator pear. At the stalls one is called upon to pay 75 cents or so for each pear; and what a portion costs in the better hotels is not a pleasant subject of speculation. The pears that one sees in San Francisco must have come from the mainland of North America, because, in common with breadfruit, their exportation from the Islands is forbidden because of the fruit fly.

The pear insinuates itself into one's taste easily; although the liking for it may be said to be "acquired," as the stock saying goes regarding the olive. At first one may have the impression that he is eating so much yellow soap; that passes; and the devotees of the avocado never forget their love. As the basis of a salad, the pear has few equals. Granted, again, that the Mediterranean fly can be exterminated and importation of avocadoes into the States from the Islands permitted, a demand of great proportions should follow the introduction of the fruit in large quantities for sale at reasonable prices.

Those persons in the States who think that cocoanut is too well known to need further introduction, may sniff scornfully when I add it to the list of Island products that well might be used to enrich the diet of the American table; nevertheless, I do add it. Without exception, the cocoanuts that I have seen on the mainland were mature, appetizing only because of their novelty; and the dried and shredded meat, with which the American kitchen is stocked, is as nothing compared with the fresh meat of a green nut. Nothing would be necessary to prepare it for shipment and to place it in readiness for the consumer except the removal of the outer husk, which would reduce the bulk of the nut greatly.

If a taste for the avocado must be acquired, what shall I say of that for the mango? Yet, though a pronounced turpentine flavor does repel at first, and though every child knows that the mango "must be eaten in a bathtub," because of juice that oozes forth when the skin is broken, there are few fruits more palatable, that lead one from one bite to another until a mango debauch is the most slippery of the descents to Avernus. Regarding the mango I have some little doubt, because it is not a lasting fruit, as the cocoanut pre-eminently is; but cold storage on steamers might solve this problem quite satisfactorily, as refrigerator cars have solved more perplexing problems in the States.

Poha berries are little enough known in the Islands, not to speak of the mainland, where they are never heard of, where the name would do nothing more than arouse the newspaper paragraphers; yet they might appeal, as a substitute for cranberries if for no other reason. Whether they could be grown in commercial quantities in the Islands I do not pretend to know.

My first and sweetest love is still to come—the papaya. As a supplement to, not as a substitute for, canteloupes and the winter melons of Imperial Valley, I know of nothing that could even pretend to vie with it. Papaya could be grown in the Islands by the tens of thousands (by the millions, if necessary), for the trees bear nine or ten months after planting, and their fecundity is inexhaustible. Immediately beneath the frond-like burst of leaves at the top of the trunk, fruit always clusters in varying stages of growth, from wee new globules to yellow, ripening melon. If one only has a piece of lemon or lime to squeeze on papaya he need seek no farther for a breakfast dish. And the fruit has, besides, most remarkable properties: it will make tender meat of tough, merely by being rubbed over the surface; and, in fact, one of the principal chemical manufacturing companies of America is producing a successful digestion tablet with papaya as its base.

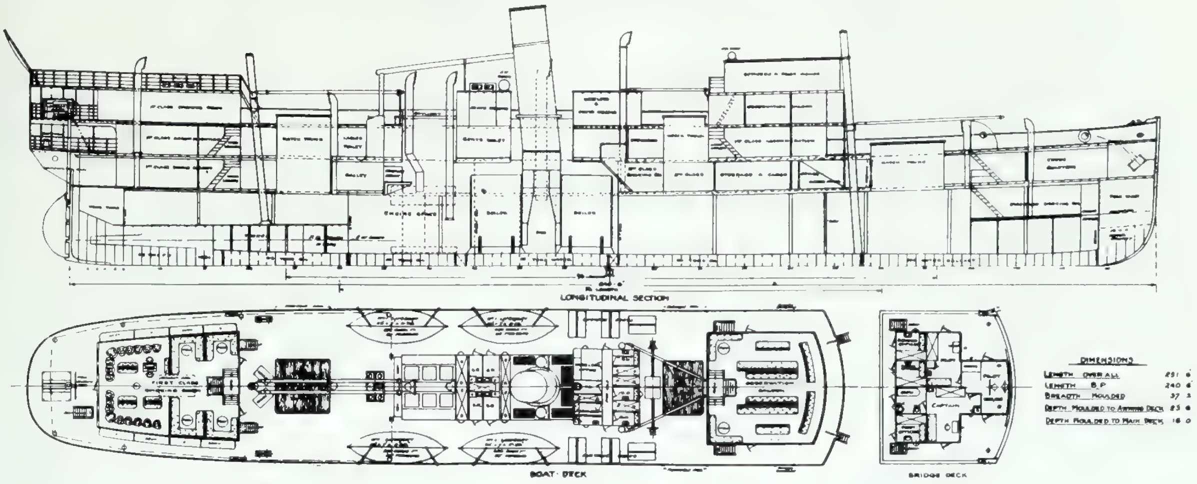
Papaya, too, I fancy, would require refrigeration.

So much for Hawaii. Tahiti and the Marquesas are only a little farther removed from San Francisco than is Hawaii, and flourishing trades with these archipelagoes doubtless could be built up. Built up, I say advisedly, because their development cannot compare with that of Hawaii; but if the products of the Islands be taken at remunerative prices, the native himself will be an eager purchaser of the white man's goods. One might go beyond, to Fiji and Samoa, if it were practicable to transport fruit from these groups as well—in any event, bananas certainly could be obtained.

Let us assume that fast, comfortable steamships, especially designed for the fruit trade, with easily ventilated 'tween-decks and refrigeration rooms, are placed in the service that I have outlined. Give them accommodations for a hundred or so passengers each. Let one vessel steam from San Francisco for Papeete and perhaps a port in the Marquesas as well; on to Suva and Apia or Pago Pago, to return to San Francisco by way of Honolulu and Hilo. Let another call at the same ports in reverse order, at Hilo first and last at Papeete. If the vessels were of 22-knots' speed (as they should be), such a cruise could be completed in about a month. That might be too long for the preservation of the fruit that would be gathered; but shorten the voyage, to include only Papeete, Honolulu, Kahului or Lahaina, Maui, and Hilo, and the cruise might truthfully be described as ideal. Maintain steamships in both directions on this route, one sailing having Papeete as the first port of call; the other, Hilo. The itinerary would be alluring: a day at Hilo, which would afford opportunity to see the Volcano of Kilauea; another day at Lahaina or Kahului, with an ascent of Haleakala, which in the minds of some surpasses, in its dead majesty, even the living Kilauea; a week or two stopover in Honolulu, and thence home by way of Papeete, with the thrill of crossing the equator and of meeting Neptune as he climbs up the Jacob's ladder.

There are, of course, intensely pointed objections to meet in presenting any plan such as this. Not one objection is likely to be insuperable. Much preliminary work would be necessary: banana growers in the Islands must be stimulated, but the offer of fair contracts by a responsible corporation should be quite sufficient.

Canadian Coasting Steamer



Inboard Profile and Boat Deck Plan of proposed Coasting Steamer for the Union Steamship Company of British Columbia

THE Union Steamship Company of British Columbia, Ltd., with main offices at Vancouver, B. C., has had designed for service on the northern coast route between Vancouver and Prince Rupert a first-class, medium-sized passenger and freight steamer. The vessel is to be built with cellular double bottom to British Corporation rules for the highest class, in accordance with specifications and plans designed by Henry Darling, consulting engineer and naval architect, of Vancouver, B. C., and will have the following dimensions:

Length over all, 251 feet 6 inches.
Length B. P., 240 feet 6 inches.
Breadth molded, 37 feet 3 inches.
Depth molded, 16 feet.
Depth to awning deck, 23 feet 6 inches.
Mean draft loaded, 13 feet.

Accommodation will be provided for ninety-eight first-class and thirty-two second-class passengers; also 200 steerage passengers in portable standee berths. The galley is well arranged and is capable of handling 150 passengers at one sitting.

Special provision has been made for all sanitary fittings throughout; hot and cold water to all accommodations; ample and separate lavatories and baths for all classes of passengers, officers and crew. There will be large cold storage capacity and special attention has been given to the steam heating and ventilation. Electric light, with powerful searchlight, and wireless telegraph, are to be installed; also electric bells and fans.

Large and commodious quarters for the captain and deck officers are to be located upon the bridge. Separate compartments on the boat deck will contain the first-class smoking room and the observation saloon. On this deck also will be located the wireless office, the stateroom for the wireless operators, and several first-class passenger staterooms, the remainder of the first-class staterooms being on the awning deck. All dining rooms and second-class passenger staterooms are on the main deck, as shown on the plans herewith.

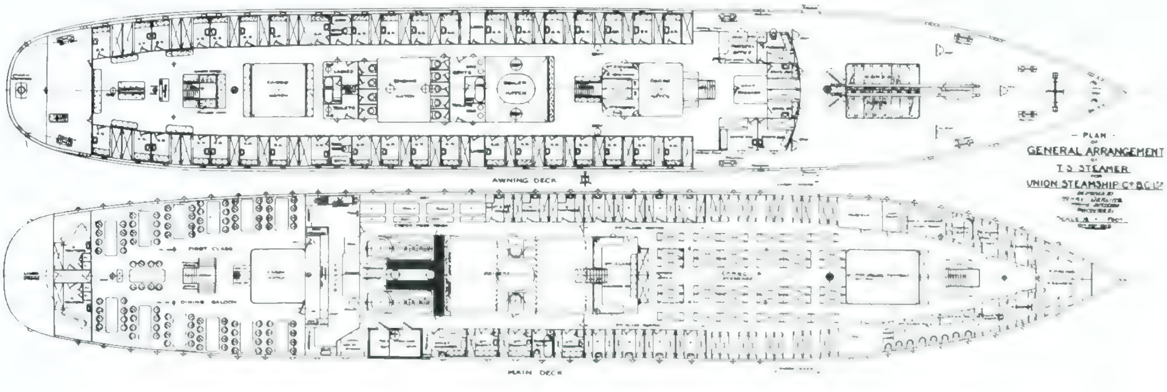
Three cargo hatches are provided and the specifications call for five steam winches and derricks capable of lifting weights up to three tons.

The main power plant of the ship is to consist of either twin-screw, triple-expansion reciprocating marine engines or double reduction gear turbines and is to be capable of developing 2800 i. h. p. and of driving the hull at a speed of 16 knots on the endurance trial.

The steam for these engines will be supplied by two Scotch marine boilers, each of them 16 feet in diameter by 11 feet 6 inches long, to be fitted with four Morrison's suspension type furnaces. The boilers are to be designed and constructed for 185 pounds' working pressure. They will be oil burning, using the Coen system with Howden's heated forced draft.

The usual engine room auxiliaries are to be provided, and two 40-kilowatt 110-volt electric generating sets take care of the electric lighting.

This vessel undoubtedly will prove a valuable addition to the British Columbia coast fleet.



British Marine Developments

Exclusive Correspondence of Pacific Marine Review

A VIGOROUS attack upon state control in regard to all industries, and particularly with reference to shipping, was the feature of the report of the committee of the Liverpool Steamship Owners' Association, which was adopted by the annual meeting of the association held on February 9.

It is postulated that the use to its utmost capacity of sea-carrying power lies at the root of the reconstruction of the nation's prosperity. Progress has been made during the year toward the restoration of the British mercantile marine, but neither the nation nor its shipowners have obtained the full benefit of the new tonnage built and of the old tonnage released from war service. There has been, in fact, a disastrous waste of ship-carrying power.

To state control over essential imports are ascribed not only the extraordinary fluctuations in the arrival of imports, but also the holding of abnormal stocks in the ports. Congestion of the ports, it is stated, has already increased and thereby the carrying power of the individual ship has decreased until its efficiency has been reduced below pre-war standards by at least 30 per cent. It is clear that so long as these conditions remain, nothing can be gained by forcing more ships into the United Kingdom trades, and also that the overseas supplies of the United Kingdom cannot be increased until a free and regular flow of traffic through its ports has been re-established.

State control over railways is a contributory cause to congestion of the ports, but another cause is the reduction of the hours of labor. The problem of how to get through the ports the same volume of traffic in a shorter time must be solved before the nation can receive adequate oversea supplies, and if men cannot work harder in the shorter hours, then better results may be obtained by employing more machinery, but this will take time. The interference by the state in shipping matters, it is alleged, substantially reduced the total sea-carrying power under all flags that might have been at the disposal of the nation. This country, as a result, has been forced to continue her borrowings in foreign countries, and has been unable to make any real progress towards the restoration of the rates of exchange with the United States.

Delays at Ports

At the annual meeting of the Houlder Line, the chairman, Frank Henry Houlder, dealt with other troubles of modern British steamship owners. The following extract is interesting: "Perhaps the most [illegible] we have to contend with at the present time, apart from the coal question, is the terrible delay which our vessels are now regularly experiencing, particularly in United Kingdom ports. Prior to the [illegible] our express refrigerator boats operated on a schedule of seventy days for the round voyage, and this time-table allowed a margin of time necessary to deal with voyage repairs, etc. I have had a return taken out of the actual time occupied in completing a round voyage by the Express meat steamers for the whole of 1919. After excluding the serious delays resulting from the [illegible] prevalent in South America in the early part of 1919, the return gives an average time of no less than ninety-nine days, and apart from the very serious wastage of tonnage thereby involved of over 40 per cent, you will appreciate the enormously increased cost of round-voyage expenses, when every item of operating costs is so seriously increased as compared with pre-war expenses. Even if these delays are eliminated and we are able to revert to our old schedules—as I hope we may be able to do when the country generally gets back into its stride again—it is perfectly obvious that we can never hope to return to anything approaching our pre-war level of freight rates, either for the conveyance of general cargo, refrigerated produce, or passengers."

Cost of New Steamer

A very interesting remark by Mr. Houlder was the following: "The acquisition of three steamers for the maintenance and development of the company's trade entails an additional expenditure over normal pre-war costs of not less and probably more than $3,500,000, which is more than 50 per cent in excess of the total gross trading profits earned by the company's fleet during the five years from 1915 to 1919, inclusive. When it is remembered that this position arises from the acquisition of only three new steamers for the company, one can better realize the very serious burden imposed upon those shipping companies which are striving to retain their pre-war position in maintaining and developing 'overseas' trade, on which the future of this country is so dependent."

Shipping Controller's Action

The seriousness to the nation of the waste of tonnage dealt with by all our shipping chairmen is apparently now being recognized by all shipping authorities. A letter in the following terms has been addressed on behalf of the shipping controller to the owners of British vessels of 3000 tons deadweight and more:

"I am directed by the shipping controller to state that he has had under consideration the delay which is occasioned to vessels chartered to load coal cargoes in this country for ports abroad. He is of opinion that all charter parties should include a clause to the effect that if three days before the steamer is expected ready to load the indications are that cargoes will not be available when ready, or at latest within four days after actual readiness, owners should have the power to cancel and negotiate other employment. The shipping controller is exceedingly anxious to avoid interference with any trading arrangements made by owners, but it is a necessity that the country get greater advantages out of its shipping than at present. It has been found that some owners have allowed their ships to lie for several weeks waiting for cargoes, which is contrary to national interests. It is therefore desired that all owners make their charters and act as above indicated."

The letter concludes with the statement that the principle applies to ships either on time or voyage charter.

Seamen and the Eight-Hour Day

It has been suggested that the Hours of Employment Bill shortly to be reintroduced into the House of Commons should be made to apply to employment on board sea-going ships, so as to provide for the limitation of the hours of labor on board ship to eight a day, or fifty-six a week. In reply to this demand the Shipowners' Parliamentary Committee has, I understand, drawn up a memorandum embodying its objections to the proposal. These objections may be summarized as follows:

The bill is not designed to meet the circumstances of work at sea, and is inapplicable to the conditions of sea life, which differ fundamentally from those on land. The application of the bill to employment on the sea would not confer any real advantage upon any class or portion of the merchant service, still less upon the service as a whole, since when everything is taken into account the sailor already possesses the advantages aimed at in the bill in the matter of working hours and recreation. The inevitable result of the inclusion of seamen in the bill would be that the numbers employed in the merchant service would have to be increased. The necessary increase in personnel would mean a corresponding decrease in carrying capacity, and also, of course, in earning capacity on the part of the industry as a whole. The cost to the country of an increase of personnel required for a fifty-six-hour week, without reckoning the additional expense of providing and maintaining additional crew-carrying capacity, loss of cargo space, etc., will be considerable. So much for the shipowners' statement. As a matter of fact, since it was issued, the government has told the Labor party point blank that the seamen are not to be included in the eight-hour day provisions of the above bill, although that limitation is to apply to every other trade in the country now except domestic service. What the next move of labor, and especially of organized seamen, will be, remains to be seen.

Shipbuilding Amalgamations

There is nothing new about the announcement that is given so breathlessly by the London papers of the amalgamation of the Northumberland Shipbuilding Company and Workman, Clark & Company of Belfast, for it had already been reported, and, indeed, had taken place before the Northumberland Company acquired those National shipyards at Chepstow in South Wales which were built by the government during the war and first offered to the shipbuilding trade unions to operate and later sold for private exploitation. The same group also acquired the Doxford plant at Sunderland. The announcement brings to notice the fact, however, that the shipbuilding interests in the north of England are being taken over by big London financial groups in the same way as Lancashire cotton industries are so rapidly passing into London financial control.

English Control on the Clyde

Many of the Clyde (Scotland) shipbuilding yards are still in the hands of descendants of the original owners, as, for instance, Dennys of Dumbarton, who built the first steamboat that was seen on the Thames, but a good many have come under outside control or have alliances with the big English shipbuilding, engineering or armament concerns. The Northumberland Company owns the Fairfield Shipbuilding & Engineering Company, perhaps the most famous shipbuilders in the world for warships and liners. They built the warship Renown and many of the big Cunard record breakers, although the Aquitania and Mauretania, it is true, were built elsewhere. D. & W. Henderson, who build nearly all the Anchor liners, and Inglis of Pointhouse, who first designed the triple expansion engines, are still separate companies, but they have a working alliance with Harland & Wolff. The Clydebank Shipbuilding Company, originally Thompsons, which ranks with Fairfield in its world reputation, was, I think, the first big Clyde shipyard to pass under English control, being acquired about eighteen years ago by John Brown & Company of Sheffield. Beardmore's yard has an alliance with Vickers, and indeed the web of alliances between shipbuilders, armament firms, steel makers and coal mines is being steadily woven over the whole of the shipbuilding industry.

Safety in Oil-Burning Ships

The announcement that a British Board of Trade committee has been appointed to inquire into the question of fire dangers attending the use of oil fuel in ships must not be taken to indicate that there is any doubt about conditions in liners burning oil fuel. It simply means that the use of oil is now spreading so quickly, owning to the high price of coal, that other ships besides the carefully constructed, well-equipped passenger liners will soon be using oil, and that a complete system of regulations has to be formulated. As regards the ships with Diesel engines, there is no danger of fire through the escape of oil, but of course they are only a small number. Oil is used on the liners for firing boilers, and the only danger is in leakage into crank pits or the like, but that has been carefully guarded against.

Adverse Exchange and Shipping

The cost of exchange is killing a great amount of trade between this country and abroad. Ship brokers have had ample evidence lately of the ill effects of adverse exchange. The process is really quite simple and effective. The merchant in Europe who proposes to buy commodities from abroad has to take into account four main considerations. These are the price at which he can buy the commodity in the producing country, the cost of transport and insurance, the cost of exchange, and the price at which he can sell the commodity in Europe. If the cost of the commodity, coupled with the cost of transport, insurance and exchange, is less than the price at which he can sell the commodity, then he will proceed with the transaction and earn his profit. If, together, the items of expenditure exceed the price at which he can sell the commodity, as at present, then he will not proceed with the transaction, because it would cause him a loss. Incidentally, the rise in the price of dollars in Europe is regarded here as proving a very bad thing for the new American mercantile marine. When the cost of dollar exchange was not so high, European countries were willing to charter American tonnage, paying on a dollar basis; but many cannot afford to do so now. As a little practical illustration, quite a short time ago a pound sterling in London would buy about $4 in New York, so that a rate of freight for American tonnage of $40 a ton from the United States to Europe would represent a payment of about two hundred shillings. But now, with the pound sterling only buying about $3.40, the cost in sterling for the same rate of freight of $40 has made the cost of American tonnage practically prohibitive. The cost of remitting a freight of $40 would now be two hundred and thirty five shillings.

Japanese Marine Notes

Exclusive Correspondence Pacific Marine Review

LAST month brought announcement of three new shipping lines to be inaugurated between Japan and Europe, all with European vessels. One line will bring back to Pacific waters a number of steamers formerly well known in Japanese ports, but flying a new flag as the result of the war. This is to be a service maintained by Portuguese interests with twelve of the forty-eight German steamers seized in Portuguese ports in 1916, six passenger liners and six freighters. The boats will maintain a fortnightly service between Japan and Portugal, with the Portuguese South African ports to be visited en route. The passenger and freight steamers will alternate. Kobe is to be the Japanese terminal port for the present. Among the steamers to be placed in this new run are several which had been used as British transports and later returned to Portugal, including the Bulow, 9000 tons; Prinz Heinrich, 7000 tons; Mark, 7000 tons, and the Koenig Albert, 11,000. Already some extensive freight contracts have been entered into by the promoters of this new line and in connection with this extension of Portuguese shipping trade east of Macao, branches of the National Overseas Bank of Lisbon are to be established in Hongkong, Shanghai and possibly Kobe.

The Holland-American Line proposes a new Dutch-Japan service via Suez and a representative of this company, Mynheer A. Gips, is now in Japan arranging for terminal facilities and looking into the prospects. The Holland-American has heretofore confined its activities to the Atlantic, but Holland is pushing its trade opportunities in Japan and China with the greatest determination and the proposed steamship service, which is to be in cooperation with the Rotterdam Lloyd, the Netherland Lloyd and the Java-China-Japan Line, is a part of the general policy of the Dutch government. Mr. Gips, who is a director of the Holland-American, states that his company has a total of 225,000 tons of new ships, with 150,000 tons more under construction, for the Oriental service, to be inaugurated between Rotterdam and Yokohama, with a possible weekly ship. Baron d'Asbeck, the Dutch minister at Tokyo, has been specializing during the past year in re-establishing some of the old links that bound early Japan to Holland and through his efforts the Netherland Society in Japan has had a great revival, with an exhibition at Nagasaki of the relics and documents of the seventeenth century Dutch colonizations, while the Dutch government has opened a press service to Japan and the secretary of the Amsterdam Corn Exchange has been making an extensive tour of Japan and its colonies. The inauguration of a direct Japan-Holland steamship service is thus a part of a general trade campaign excellently carried out.

The third European line announced during January is one being promoted by the Sino-Italian Bank, to run between Shanghai and Italian ports, with connections with Kobe. This company has Italian capital but a Chinese president and Chinese headquarters at Peking. Its announced capitalization is three million Chinese dollars.

Both the Toyo Kisen Kaisha and the Osaka Shosen Kaisha formally adopted extensive building programs at their general meetings in January. The former will lay down eleven keels, three combination passenger and freight ships of 8500 tons for their South American service, to augment the three now running, with the other eight large freighters, three of 15,000 tons and five of 8600. Orders for the three combination ships have been placed, one with Mitsubishi at $236 a ton and two with Asano at $208. All the freighters will be built at the Asano yards, the 15,000-tonners at a contract price of $124 a ton and the smaller bottoms at $150, these figures counting the yen at fifty cents. According to expectation, all these ships will be launched during 1920, the new construction representing an outlay of $16,000,000, of which $5,000,000 will be secured through the issuance of debentures and the balance through calling up part of the unpaid capital of the company. The Yasuda Bank will underwrite the debentures, which will bear eight per cent interest.

The Osaka Shosen Kaisha shareholders have authorized the doubling of the corporation's capitalization to $50,000,000 and endorsed the building program, which provides for twelve new ships this year, of a total of 106,000 tons, and a tonnage of 25,000 in 1921, with further plans for the laying down of a possible 120,000 tons the last of this year for 1921 delivery. To provide officers for this new fleet, the Osaka Shosen Kaisha is to establish a seamen's training institute of its own this year, where courses in both deck and engine room training will be given.

For the Singapore-New York-San Francisco freight service via Panama, which the O. S. K. has announced, the Hague Maru has just been launched at the Osaka Iron Works, where work is being pushed on another 9000-tonner of the Hague Maru type, also for this service.

The Nippon Yusen Kaisha, under a promised subsidy, is building two fast, shallow-draft, combination passenger and cargo ships for the new Nagasaki-Shanghai service, the boats to have a speed of eighteen knots and so constructed as to be able to navigate the waters near Woosung at any stage of the tide. This company has also just inaugurated a new South Sea service, with biweekly sailings from Yokohama, touching at every important point in the former German islands now under Japanese mandatory rule. The Yoshino Maru and the Matsuyama Maru are in this work. It is reported that this company has decided to abandon its immigrant service from Japan to South America, the increased prosperity of Japan and the high wages now prevailing having robbed emigration of its former attractions, with the result that few emigrants are now applying for accommodations.

The Indian run of the N. Y. K. is proving most lucrative, on the other hand, and more and more bottoms have to be added to the fleet in this service. The company has cotton freightage for Japan that has necessitated the addition of four steamers — the Taisho Maru, Wakamatsu Maru, Suki Maru and Shinyo Maru — already, with six more to be called for during February. During the period from November to January, the N. Y. K. brought 189,000 bales of raw cotton to Japan and its contracts provide for the transportation of 360,000 more by the end of this month. The company proposes to use as extra ships the Seikai Maru, Gensan Maru, Nichiyo Maru, Vancouver Maru, Somedono Maru and Kotsu Maru.

A betterment in the passenger service between Japan and Dairen and Formosa is promised by the Osaka Kisen Kaisha, which will place its new steamer of the Harbin Maru type, recently launched, on that run and will increase the passenger accommodations on the Hongkong Maru and America Maru, now in the service to Formosa. The Korea Mail is also to extend its operations and has placed orders with the Osaka Iron Works for two steamers of 3000 tons for its Chemulpo-Vladivostok-Tsuruga-Osaka service, while it will also inaugurate a new service, under government subsidy, between the west coast of Korea and Yokohama. The proposed subsidized service along the coast of China is to be undertaken by the Nisshin Kisen Kaisha, with two 5000-ton steamers, now under construction at the Uraga Dockyard. This run will extend from Shanghai to Hongkong, via Foochow, with Canton a port of call.

The last of the United States Shipping Board ships to be built in Japan under the war contracts will be launched next month, thus completing a unique shipbuilding program, and while the yard owners will doubtless regret the ending of a profitable bit of work, the Japanese shipowners will be glad to see the last of these thirty vessels churning its way eastward for delivery. Each Shipping Board addition has come into the freight market as a competitor able to cut prices on American freights and their presence in the eastward carrying trade has been one of the upsetting factors. During January eleven of these ships sailed for America, the Yokohama, Asano and Mitsubishi yards completing two each and the Uchida, Ishikawajima, Kawasaki, Osaka Iron Works and Harima yards one each. This leaves thirteen of the total of thirty ships contracted for still building in Japan, all nearing completion. These thirteen represent a total of 103,800 tons. The last launching, which is now set for March 21, will be of the Eastern Soldier, 11,000 tons, building in the Harima Dock Yard near Kobe.

It is noteworthy that new bottoms are being laid down as fast as launchings make room and continued business for the Japanese yards for some time to come is predicted by Dr. Junichiro Imaoka, managing director of the Uraga Dockyard Company, one of the foremost builders in Japan. Dr. Imaoka bases his prediction on the acceptance by the Diet of the Japanese naval program for the early completion of the "eight battleship and six battle-cruiser unit" for the main Japanese fleet. When the naval budget passes, as it is certain to do, the main Japanese yards will be ordered to build battleships, battle-cruisers, light cruisers, destroyers and auxiliaries, which will reduce the capacity for building merchantmen by about one-half and more than make up for the completion of the American contracts. The war rush was for freighters and the building of passenger liners and fishing boats was neglected, with the result that orders for many of these are to be expected. Dr. Imaoka looks for no falling off in tonnage production in the United States or Great Britain, but even with increased activities in foreign yards he does not believe that the demand for tonnage will be overtaken.

Mr. Utaro Noda, Japanese minister of communications, takes a similar view, pointing out that, although the world's tonnage today is 47,000,000 as compared to the total of 45,400,000 before the war, the increase is more in figures than in actual efficiency, so many of the war-period ships having been hastily built and all shipping having been used to the straining point, with the result that much of it now has to be replaced. In all this Japan is now in a position to profit, the war development of her shipyards having been phenomenal. In 1914, of vessels over 1000 tons, the Japanese yards turned out a tonnage of only 78,000, while in 1919 Japanese yards launched a total of 600,000 tons of ships of 1000 tons and over, nearly nine times as much as five years before.

"But it should not be forgotten," says the minister of communications in his statement, "that the labor disputes in various countries are seriously interfering with the natural restoration of trade and industry, and are delaying loading and unloading, with the result that the movements of mercantile crafts are being hindered. The countries which learned during the war what it was to have little tonnage may take special steps to conserve and reinforce their merchant fleets, and it is clear that the competition of foreign steamers will become keener. All those in Japan interested in shipping should keep their eye on the world situation and take all necessary steps to improve their own position. They should enter the commercial war with great determination and develop the power which they cultivated during the war of iron and fire that has just ended."

One of the difficulties facing Japanese shipowners at present is that in some important directions trade is one-sided. The most glaring example of this is on the Shanghai run, where the cargo from Japan to China is so small that the regular liners can handle it all, while from Shanghai to Japan extra steamers are required. This is a striking example of the effect of the Chinese boycott of Japan. From America to Japan there are also large freight offerings for the Japanese ships, while from Japan to America, thanks to the competition of the Shipping Board's new ships, there is a scramble for enough freight to trim ship. Japanese exports of lumber, sulphur and general cargo to Australia have slumped, while Japanese imports of wheat, wool, flour and ore are growing. The natural result is a drop in the outgoing rates, that from Japan to America having come down from $5 to $4 since the New Year, while from America to Japan there has been a general rise of $2, the rate now quoted being from $13 to $14.

The freight situation has had its effect on the charter market, although the unusual demand which has come for bottoms for transport use, to repatriate the Czech army from Siberia and carry home German prisoners of war from Japan, has steadied charter prices somewhat, four steamers which had been tied up in Kobe having been taken for this work. These are the England Maru and France Maru, each of 9100 tons, chartered by the Czechs, and the Hudson Maru and Kifuku Maru, also of 9100 tons each, chartered by the German government. The rate for all these ships is $11 a ton for a single voyage, with the Czechs having an option of rechartering for a second trip at $9 for the round trip. These prices are about 30 per cent higher than the general market, the use of a vessel for transport purposes necessitating many alterations that justify the higher charge.

The general tone of the freight and charter market can be gauged from the following sample transactions reported during the last week of January:

Charter Transactions

Port Said Maru, 9100 tons, for round trip to Chile, at $6.

Meichi Maru, 5029 tons, for round trip to India, at $5.25.

Nankai Maru, 7850 tons, for round trip to Germany, at $8.25.

Eidai Maru, 4350 tons, for round trip to Australia, at $4.75.

Ireland Maru, 9100 tons, single voyage to Europe, at $11.

Freight Contracts

Hirao Maru, Rojo Maru and Seiho Maru, for coal, Wakamatsu to Yokohama, at $2 a ton.

Maijo Maru, for pig iron, Shanghai to Osaka, at $3 a ton.

Sanryu Maru, Wakamatsu to Darien, for coal, at 90 cents a ton.

From Dairen to Europe the rate has dropped from 60 to 70 shillings, standing now at 180 to 200 shillings.

January was a month of many marine casualties in Japanese waters, heavy storms costing a number of lives and hitting the marine underwriters hard. During a storm that raged with exceptional violence on January 13 and 14, many wrecks were reported, principally of small craft. The heaviest loss was that of the Sancho Maru, of 1140 tons, off Yagi, the ship foundering with only four of the thirty-seven of her crew being saved. She was out of Muroran for Yokohama with 2000 tons of coal. Vessel and cargo were valued at $500,000. The same storm wrecked nineteen small sailing vessels in the Shimonoseki Straits, while in the neighborhood of Moji the loss of the small steamer Hayabusha Maru and a number of sailing crafts was reported. For a time it was feared that the government-owned ferry boat Kaiun Maru, 998 tons, plying between Aomori and Hakodate, had been lost, but she was later reported safe. The Goto Island fishing fleet suffered heavily, some forty sampans and nearly 300 fishermen being lost. Torpedo boats were sent out by the government from Sasebo, but no trace of the missing sampans has been reported.

On January 24 another storm resulted in the loss of a sailing ship off Kinkazan, with eleven out of a crew of fifteen drowned. The same storm drove the Shinten Maru, 1250 tons, ashore off Ayukawa, Miyagi prefecture.

One result of the winter's experience has been to get the marine insurance companies together for a general increasing of rate for ships using the Hokkaido routes, the most dangerous of Japanese waters, while an increase in the rates for shipments and ships in Korean and Kyushu waters is under discussion. Competition among the Japanese marine insurance companies is growing keener, with the rates generally dropping. The result predicted by Mr. Kagami, managing director of the Tokyo Marine Insurance Company, is that the insurance business will be generally depressed during the next four or five years.

There are reports of a general change in prospect for the head officials of the Nippon Yusen Kaisha, due to the announced intention of Dr. Suda, vice-president, to retire, and the recent removals by death of the company's managers at Yokohama and Shanghai. So far these changes have not materialized, with the exception that Mr. Tomekichi Kawaguchi, manager of the Bombay office, has been appointed for Yokohama, to succeed the late Mr. Fukano.

An unusual case is now before the courts at Moji, where some of the officers and several of the members of the crew of the steamer Heijin Maru, owned by the Iwati Skokai of Kokura, are charged with attempting to scuttle the ship. The men are reported to have been dissatisfied with the share of the profits of the ship being given them as a bonus and the charge specifies that they left the seacocks open when the vessel was at anchor at Shanghai, with the object of sinking her.

The Yokohama Dock Company has sold its extensive warehouse business at a figure given as $2,000,000, which amount is to be used for the extension of its shipbuilding yard. Among other things planned by this company is an additional drydock.

To overcome the shortage of seamen, the government has amended the Seamen's Act, cutting down the prescribed examinations which seamen must pass to secure certificates.

DISTRIBUTORS OF MARINE SECURITIES

THE Marine Corporation, whose announcement appears in another section of this issue of Pacific Marine Review, has established offices in Seattle, where it will negotiate the purchase and sale of marine securities, and under an entirely new plan will undertake to finance the further development of the American merchant marine through the distribution of certificates of equitable ownership in merchant ships in commission. Under the plan the holders of these certificates enjoy the combined protection and advantages usually afforded to the holders of bonds or registered stock with the added advantage that they will participate in the full net earnings of the vessel against which the certificates are issued.

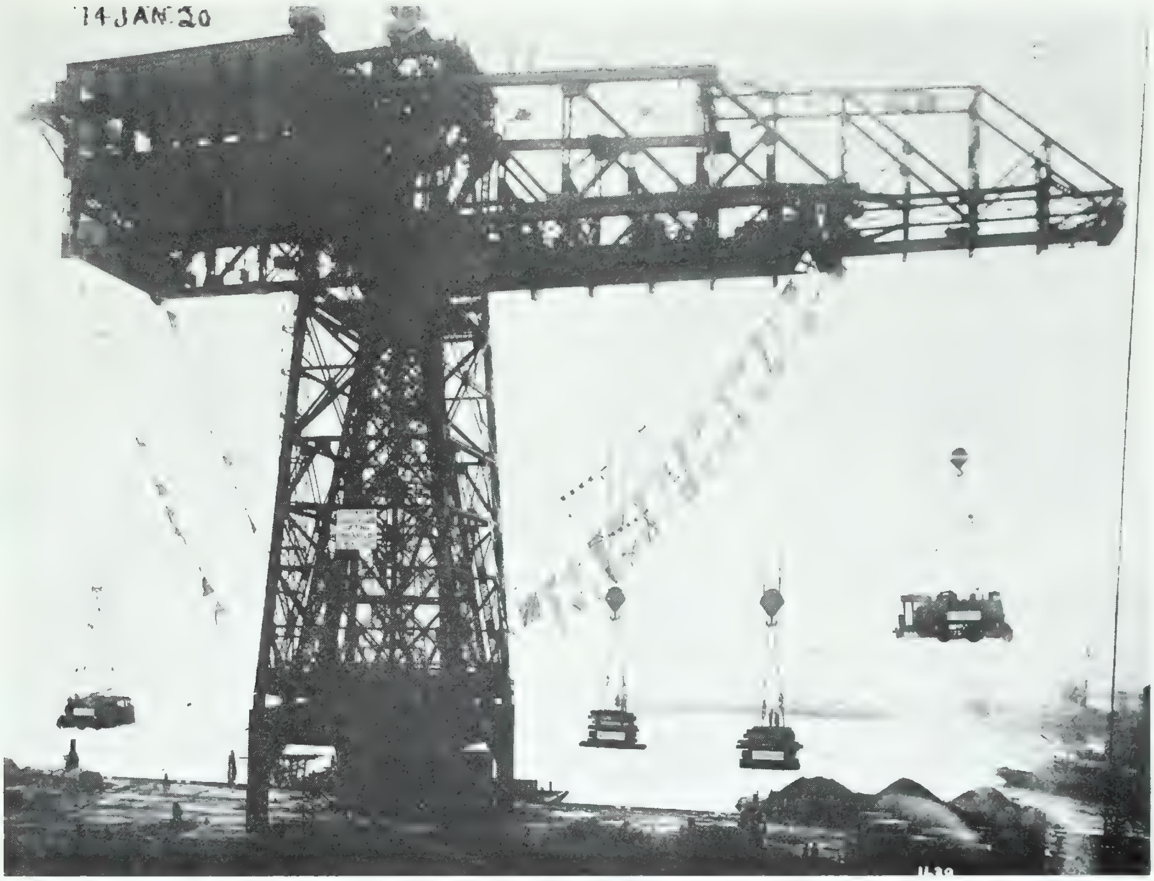
These certificates may pass from hand to hand between citizens of the United States only and are registered and certified by a trust company or bank.

The corporation will confine its operations to steel merchant ships and invites correspondence with responsible ship owners who desire to add to their merchant tonnage either through the issuance of first mortgage bonds or shares.

The above concern has connections throughout the East and Middle West which enable it to distribute this class of investment security to the best advantage.

The personnel includes men of wide experience in finance as well as shipbuilding and operation, and their advent into the field of investment banking is an added evidence of the increasing interest in and growing popularity of marine securities, as well as the importance of the expansion of an American merchant marine.

America's Largest Crane



The Naval outfitting Crane, "League Island"

We are glad to be able to publish herewith a good picture of the largest crane in America. This monster material handling machine is named the League Island and is located at the outfitting wharf of the League Island Navy Yard at Philadelphia.

The structure consists of a fixed portal 56 feet square supporting an octagonal tower 56 feet wide at the bottom and tapering to a 5-foot circle at the top, 201 feet above the deck of the pier. The circle at the top of this tower forms a pintle bearing which takes the vertical load of the revolving structure and the weights handled. The revolving structure consists of a cantilever boom 300 feet long, rigidly attached to a skeleton petticoat framework surrounding the octagonal tower and having at its lowest point a circular rim girder carrying wheel bearings which run on a circular track carried on the base of the tower. These wheels and track take the bulk of the lateral strain.

The cantilever on one side of the petticoat carries the three runways for the trolleys which support the blocks, falls and hooks for lifting the loads. The cantilever on the other side of the petticoat carries the counter weight and the house containing the machinery and drums for hoisting and lowering and racking.

The machinery for revolving the jib is located at the top of the square portal and power is transmitted through a 64-foot diameter rack on the circular rim of the petticoat. Access to the machinery house is provided by means of a steel stairway inside the tower and an electric elevator mounted on the outside of the petticoat.

The two main hoisting motors and one auxiliary hoisting motor are of 87 horsepower each. The two main racking motors and one auxiliary racking motor are 27 horsepower each, and the sluing mechanism at the top of the portal is driven by an 87-horsepower motor. A very vivid idea of the size of this structure is given by considering the dimensions of the machinery house, which in itself is a large building 80 feet long, 43 feet wide and 32 feet high. A 10-story building could be placed under the jib of this crane, and its over-all height is above 245 feet, or about that of a 17-story building.

Under test, as shown in the photograph, this crane lifted a total load of 1,010,000 pounds, consisting of a locomotive weighing fifty tons on the auxiliary hoist, a load of steel billets weighing 416,000 pounds on each of the main hoists, and a locomotive weighing 78,000 pounds on the machinery house crane.

The foundations for the structure are incorporated in the outfitting pier, which is 100 feet wide and 1000 feet long, with deep water on each side so that vessels may be served on each side of the pier and smaller portable cranes run on tracks on each side of the large crane for the expeditious handling of the lighter weights in outfitting ships.

The installation of the structural work and machinery was made by the McMyler Interstate Company at a cost of $875,000.

Good Riveting Records

THE Schaw-Batcher Shipyards at South San Francisco are reporting very satisfactory progress. This yard subsequent to the armistice had for a number of months been consolidating and systematizing its methods of fabrication and assembling of hulls and had been able to effect a very substantial saving in construction costs. It is, therefore, very interesting to note on the attached schedules of riveting that the daily average of rivets per gang driven in January, 1920, shows a very considerable increase over the figures for January, 1919.

January, 1919

Without Bull Machine

Total rivets driven	570,213
Total hours consumed	24,934½
Total eight-hour gangs	3,123
Average rivets per day	23,759
Average gangs per day	130
Average rivets per gang	183

With Bull Machine

Total rivets driven	632,615
Total hours consumed	25,268
Total eight-hour gangs	3,158
Average rivets per day	26,359
Average gangs per day	131½
Average rivets per gang	200

January, 1920

Without Bull Machine

Total rivets driven	189,630
Total hours consumed	5,954½
Total eight-hour gangs	744
Average rivets per day	8,291
Average gangs per day	32
Average rivets per gang	254

With Bull Machine

Total rivets driven	203,371
Total hours consumed	6,002
Total eight-hour gangs	750
Average rivets per day	8,654
Average gangs per day	32
Average rivets per gang	271

In order that a fuller comparison may be made, the figures for April, July and September of 1919 are also given, and while in the two latter months there is a more favorable showing, neither of them approaches the fine record of 1920.

Double Riveting as Practiced at the Schaw-Batcher Company Shipworks

April, 1919

Without Bull Machine

Total rivets driven	463,035
Total hours consumed	21,911
Total eight-hour gangs	2,739
Average rivets per day	19,704
Average gangs per day	116
Average rivets per gang	169

With Bull Machine

Total rivets driven	485,924
Total hours consumed	22,017
Total eight-hour gangs	2,752
Average rivets per day	20,678
Average gangs per day	118
Average rivets per gang	177

July, 1919

Without Bull Machine

Total rivets driven	566,080
Total hours consumed	21,226
Total eight-hour gangs	2,653
Average rivets per day	24,089
Average gangs per day	113
Average rivets per gang	213

With Bull Machine

Total rivets driven	593,940
Total hours consumed	21,318
Total eight-hour gangs	2,665
Average rivets per day	25,274
Average gangs per day	114
Average rivets per gang	223

September, 1919

Without Bull Machine

Total rivets driven	476,912
Total hours consumed	16,689
Total eight-hour gangs	2,086
Average rivets per day	20,294
Average gangs per day	89
Average rivets per gang	229

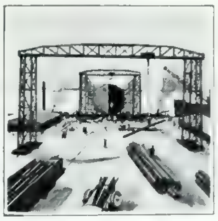
With Bull Machine

Total rivets driven	505,257
Total hours consumed	16,781
Total eight-hour gangs	2,098
Average rivets per day	21,500
Average gangs per day	90
Average rivets per gang	241

The method used in riveting at the Schaw-Batcher Shipyard is what is known as double riveting, both the holder-on and the riveter using a gun. With the standard rivets the holder-on uses the snap die, leaving a round head on the rivet and assuring a tight job. With countersunk head rivets a saucer die is used which also makes a nice, neat, water-tight job and eliminates the necessity of caulking the heads. It has been found in practice that with this method of riveting the number of defective rivets is greatly reduced. Approximately one-fifteenth of one per cent of the total rivets driven in a ship have to be burned out and re-driven, aand even this small proportion is steadily being reduced under the present system.

This condition not only benefits the employers, but also the workmen, as the average rivets per gang are increased and a very much greater proportion of the rivets are tight and pass inspection. Another decided advantage of this method is that the holder-on receives a thorough training in the use of the riveting gun and in a short time becomes a proficient riveter and may be advanced to the higher grade and salary.

Material Handling



Warehouse and Terminal Operating Problems[*]

By George B. Green

Manager, East Waterway Dock & Warehouse Company, Seattle, Washington

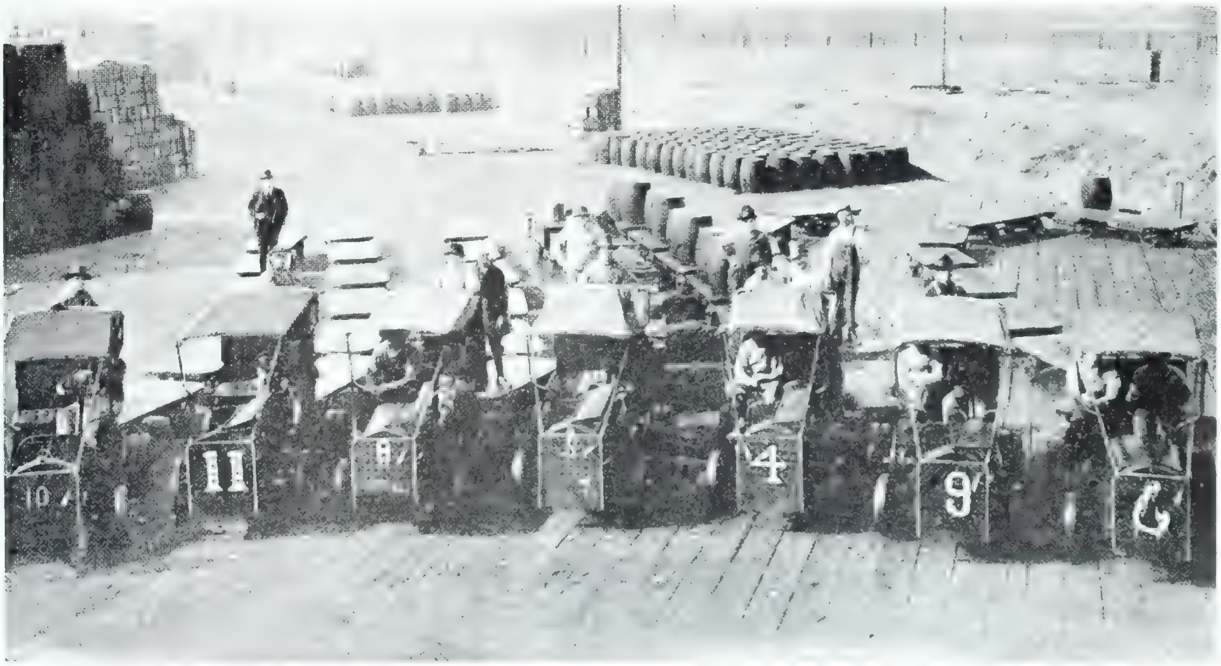
OUR company has the distinction of operating the largest privately-owned terminal on the Pacific Coast, and the largest vegetable oil terminal in the world. We are at present handling about 80,000 tons of general merchandise and vegetable oils through our terminal each month. We have three transit sheds which will house about 20,000 tons at one time. They are filled to capacity and emptied about three times each month, about 25 per cent of the shipments being handled outside. We are therefore vitally interested in any mechanical device that will save labor.

The construction of docks on Puget Sound is entirely different from those of New York. Our docks are all provided with an open platform about twenty-five feet wide along the side, upon which a vessel's cargo is discharged or taken on, as the case may be. This platform is also supplied with one or two railroad tracks, so that cargoes can be received or delivered direct to ships without additional handling. It is safe to say that 50 per cent of all export cargo is handled direct between car and vessel. There is very little lighterage business done in our harbor, except imported Oriental oil, which must be discharged off-shore unless vessels berth at oil terminals such as ours. This is done on account of extra fire hazard, and also because of the possibility of contaminating other cargoes.

New York docks are constructed with very little or no platform, which, to the writer's mind, is a decided drawback and partially accounts for your excessive terminal charges.

The scarcity of man power during the war, the inefficiency of the men who remained to perform the labor, and the excess wages we were compelled to pay, forced terminal operators to resort to mechanical appliances wherever possible in order to reduce terminal charges and leave a fair marginal profit on our investment.

At the beginning of the war, cargoes shipped to or from Oriental points on a through bill of lading were assessed about $2.15 a ton terminal charges; of this amount 35 cents was for wharfage, $1.50 for handling in and out, and 25 cents for sorting where there were several marks. As men became scarce the cost to the operator frequently exceeded this charge and private terminals often sustained a loss. The railroad docks were fortunate in having their linehaul to fall back on, and their terminals were operated more for convenience than for profit. At this time the railroads were absorbing $1 a ton terminal charges on through business, and made no additional charges where shipments passed over their own terminal. However, on account of the congestion of their docks, the greater por-



Battery of Trucks and Tractors at the Terminal of the East Waterway Dock & Warehouse Company, Seattle, Washington tion of the freight was handled by either private or public terminals of the Port of Seattle. As it was a physical impossibility to handle cargoes in and out for $1 a ton, the excess charges were billed back against the shipper, although the railroad made a flat rate from point of origin to destination. This excess charge, of which the shipper was not aware until billed, created great dissatisfaction, and was the direct means of diverting considerable business to other ports. This practice has since been modified, and we now have an agreement with the United States Railroad Administration and the various steamship companies whereby the railroad will absorb 65 cents a ton on through bills for loading or unloading cars, and the steamship companies will pay 65 cents a ton for receiving or delivering freight from or to ships' slings, so that the only charge to follow shipments now is 30 cents per two thousand pounds on export and 25 cents a ton weight or measurement on import cargo, making the entire cost on export $1.60 per 2000 pounds and $1.55 a ton weight or measurement on inbound shipments. This charge is uniform throughout the Puget Sound district. The importer or exporter now knows exactly what his Pacific terminal charges will be, regardless of the terminal which may handle it. He, of course, must pay additional charges for weighing, if required; also for reconditioning poorly packed packages.

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[*] Paper read before the Convention of the Material Handling Machinery Manufacturers' Association.

In order to keep costs within the limit allowed for handling, it is absolutely necessary to reduce our man power. Our first experience was the tractor, and by the use of one of these machines our oil gang, which formerly consisted of fifty men, was reduced to seventeen, a saving of thirty-three men, which was quite an item. We now have twelve gasoline and four electric tractors in constant use. Each tractor will handle about five tons, one ton on each of the five four-wheel trailer trucks. When the first tractor was placed in use, the men grumbled considerably, and we were alarmed for fear of a strike.

The facts are that longshoremen generally are not pleased with any mechanical labor-saving device. However, we "got away with it," and we now find that in consequence of our installing several labor-saving machines we are getting better efficiency from our men.

In order to handle our business offerings, we are compelled to pile freight quite high in our warehouses. This is very expensive when done with man power. Large cotton shipments, which would require endless space, must be piled to the roof in order to leave room for our requirements. Our mechanical engineer constructed a machine which will pile cotton in excellent shape, and at a very low cost. We now have two of these machines in constant operation.

In order to more efficiently discharge oil from scows, we purchased a twenty-ton locomotive crane. By its use a four-wheel truck is lowered to the scow and, when loaded, deposited on the dock platform. This requires but one handling. We are also able to pile barrels at a very low cost by the use of a portable elevator.

While we are able to receive and deliver certain cargoes to ships' slings with gasoline and electric tractors at a fairly low cost, we find that the cost is still too high for handling mixed imported cargoes. The manner in which the ship delivers it makes it hard to contrive a mechanical device which will answer any purpose, and we are still handling it by man power for this work. When the vessel is loaded, merchandise from several shippers is placed in the same hatch, and although stowed in layers in the vessel's hold according to marks and destination, when discharged the stevedores will invariably go down through the center first; as a result, each sling delivered will have several commodities and various marks which must be sorted out on the dock platform before it is trucked into the transit shed for piling. This prevents discharging directly to the tractors, and necessitates additional handling. Another feature which slows up the movement of merchandise piling is that a shipment of, say, 2000 bags of beans consigned to one shipper may be stowed in four hatches of the vessel, and may or may not be discharged at one time. It is not practical to attempt to truck this to one pile on the dock, so that four piles are necessary, and the amount in each is too small to admit moving piling machines. The loading out of this shipment would be more expensive, as it must be consolidated.

The problem of handling by mechanical appliances mixed cargoes which are received or delivered in small quantities is difficult, and will require considerable study. The present practice of trucking is entirely too expensive, and is a factor in diverting business to ports which are equipped with modern devices. Every terminal operator should be interested in reducing his cost where possible.

The writer came East with the idea that New York would be up-to-date in terminal handling, but after a brief inspection of harbor facilities, I believe it is safe to say that New York operators can gain considerable knowledge by visiting Puget Sound, where superior freight-handling systems are used.

The Power Schooner Wotoc, formerly Coast Guard Cutter Hartley

A STURDY POWER SCHOONER

FEW of our readers will recognize in this illustration their old friend in Pacific waters, the Coast Guard cutter Hartley.

The lines of the vessel have been materially changed. The steam power plant has been replaced by a 70-horsepower gas engine installation, and more than $6000 has been spent in converting the vessel, which is now operating as the Wotoc.

The Wotoc, during November of last year, made a splendid run to Seattle against driving gales and gave an excellent account of herself. She was used as a tender at the raising of the A. J. Fuller, which ship was run down by the Mexico Maru.

Motorizing Terminals*

By B. F. Fitch

President, Motor Terminals Company, New York and Cleveland

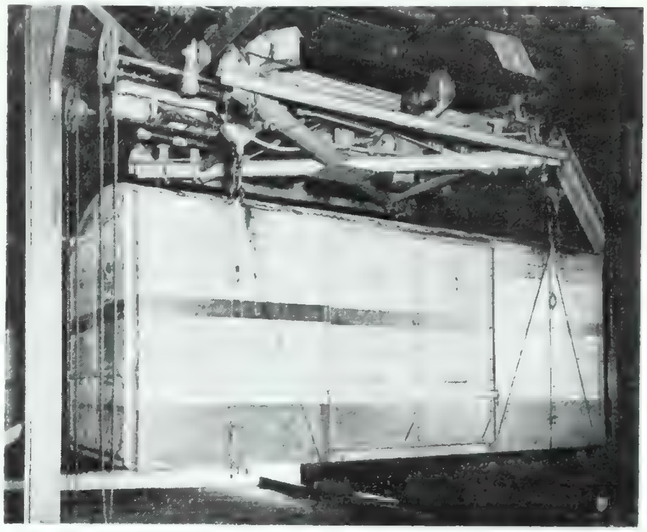
FOR years trucks have been proven valuable transportation mediums, but their adoption and scientific operation has been ignored by railroads whose business was primarily transportation. This was possibly due to the fear of competing service similar to the old theory a couple of decades ago that interurban lines would detract from railroad earnings.

The ingredients to be considered in transportation cost estimates are tons, miles and minutes, and, generally speaking, the greater number of tons and miles, crowded into the smallest number of minutes, the lower the transportation cost.

Every unit of transportation from wheel-barrows to gondolas is valuable when allotted exclusively to the service it is best fitted to discharge. A team can successfully haul 75-ton miles and a motor truck 500-ton miles in a ten-hour working day. Compare this with railroad performance in which the average box car movement is but 25 miles per day. If loaded with merchandise to but a 10-ton average, it discharges but 225-ton miles in a 24-hour day. It is, therefore, obvious that box cars suffer a handicap.

Freight house operating practice demands that box cars lie idle ten hours a day. If utilized exclusively for transportation and kept continuously moving the remainder fourteen hours, even at an average speed of but twenty miles an hour with 10-ton loads, the potential possibility of each freight car is 2800-ton miles daily.

There is practically no limit to what the rails will carry, if cars, when consolidated in trains, are at once started and kept continuously moving: therefore, it is logical to charge inadequate terminal facilities with the major portion of the box car's tonnage deficiencies. Inadequate terminals alone are not responsible for this, nor can either the railroads or the public be censured for illegitimately using box cars in lieu of other facilities for short-term storage. These are influences detrimental to box car efficiency, but, without terminals, necessary evils.

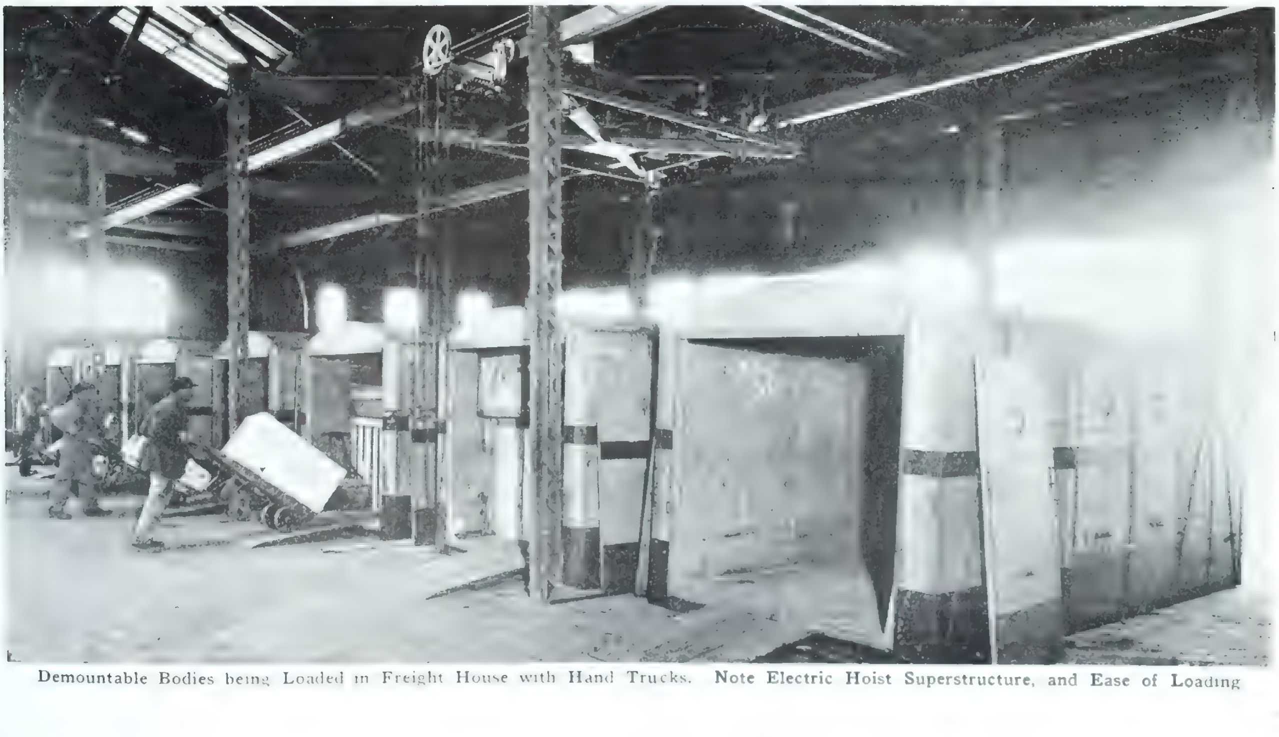


Demountable Body removed from Truck Chassis being Troilied to Position for Loading

The prime trouble is that, as an operating necessity, in absence of other facilities, box cars have been assigned to a service for which they were never originally intended, and make-shift usage has complicated switching interchanges at all terminal points to the detriment of high mileage efficiency of all cars.

Our national transportation practice and trade influences of the traffic do not permit of any radical terminal changes. Any revolutionary attempts along this line might embarrass our production resources as greatly as a change in the monetary basis. Therefore, evolutionary improvements only can be considered.

Refinements of present rail practice and addi-



Demountable Bodies being Loaded in Freight House with Hand Trucks. Note Electric Hoist Superstructure, and Ease of Loading tional facilities will occur, but rail transportation cannot be greatly improved because locomotives are now practically up to the safety limits of rails and bridges and without increasing weight of locomotives, draw bar efficiency cannot be increased, and without an increase in draw bar efficiency transportation costs cannot be lowered. Thus, obviously the field for improvement is terminals.

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* Read at the Convention of the Material Handling Machinery Manufacturers' Association at the Waldorf Astoria, New York City, on February 26, 1920.

To demonstrate the fact that railroad transportation has outgrown railroad terminals, it is interesting to note that from outer classification yards to pier station delivery at New York the cost to carrier is not less than $3.50 per ton and, similarly, at Philadephia not less than $2.50 per ton, or a joint terminal cost of $6 per ton. Whereas, the main line haul between these two terminals, if estimated at a maximum cost of six mills per ton mile, suggests a transportation cost of 60 cents versus terminal costs of $6. Chicago is no better off than Philadelphia and the haul is about ten times as long; hence, joint terminal cost is as great as the transportation or rail haul cost from Chicago to New York.

After five years of terminal studies, inspecting innumerable stations built over fifty years ago which are still the intakes and outlets of our great transportation systems, using the recognized best equipment in the world, no wonder the subject of terminals is a topic of nation-wide discussion, and, naturally, all with creative brains are offering solutions.

With unlimited financial resources the engineering talent of this country can quickly solve the problem. Ideal joint terminals at a cost of $50,000,000 to $500,000,000 are possible in all of our principal centers, but present chaotic conditions considered, who will assume the responsibility of such abnormal financing? Even if offered opportunity to avail themselves of such, the railroad would have to scrap present huge investments and the scrapping of these investments at an industrial center will disrupt realty values to possibly financial ruin of innumerable manufacturing plants built in suburban localities on the theory that the inducement which warranted the building would afford perpetual service.

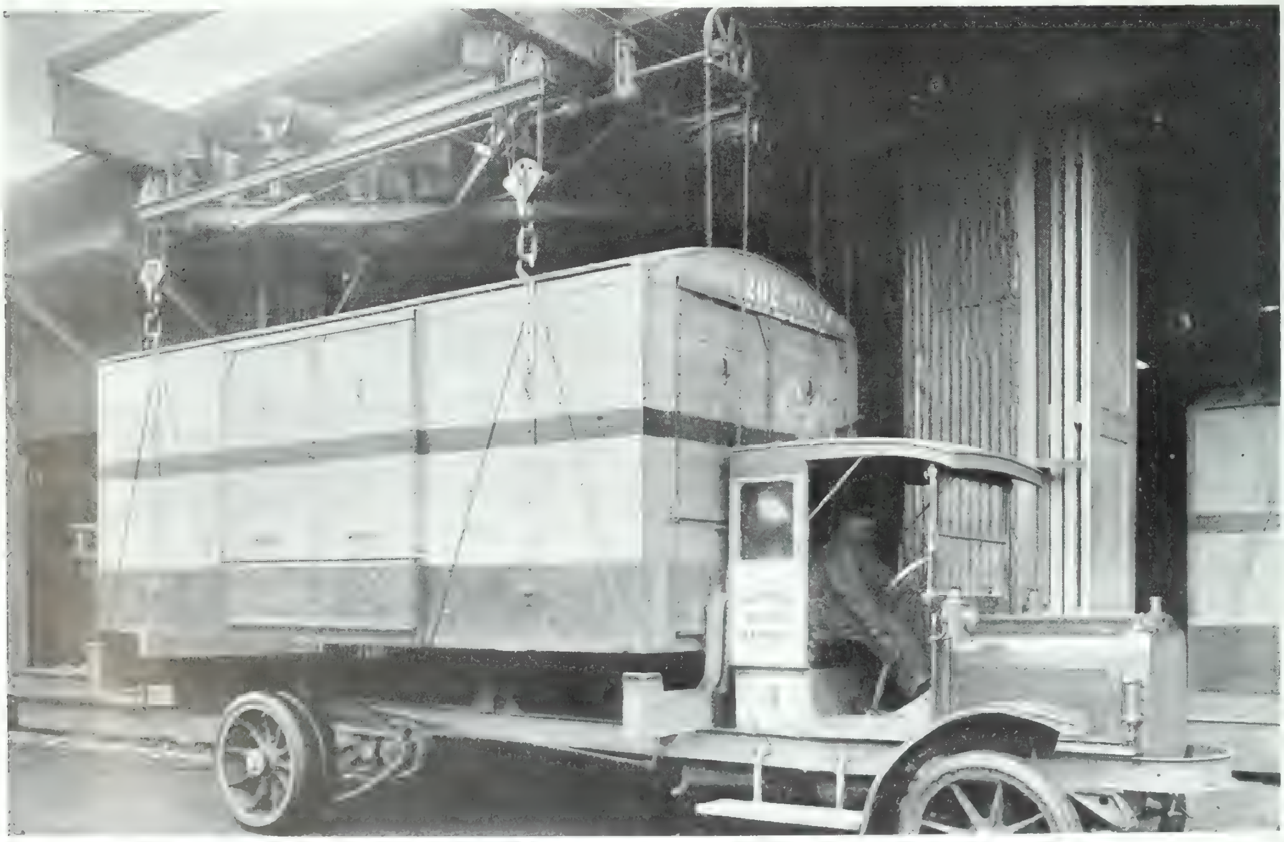
For this reason each present terminal layout must be continued substantially as at present. Conservatism recommends no radical changes, but demands evolutionary changes to better conditions for both carriers and shippers.

Every city in the country has its labyrinth of rails, team tracks, private sidings, obsolete main freight stations and sub-stations, between all of which box cars are shuffled or switched around, like cards in a solitaire deck, in the performance of a duty for which the cars were never designed.

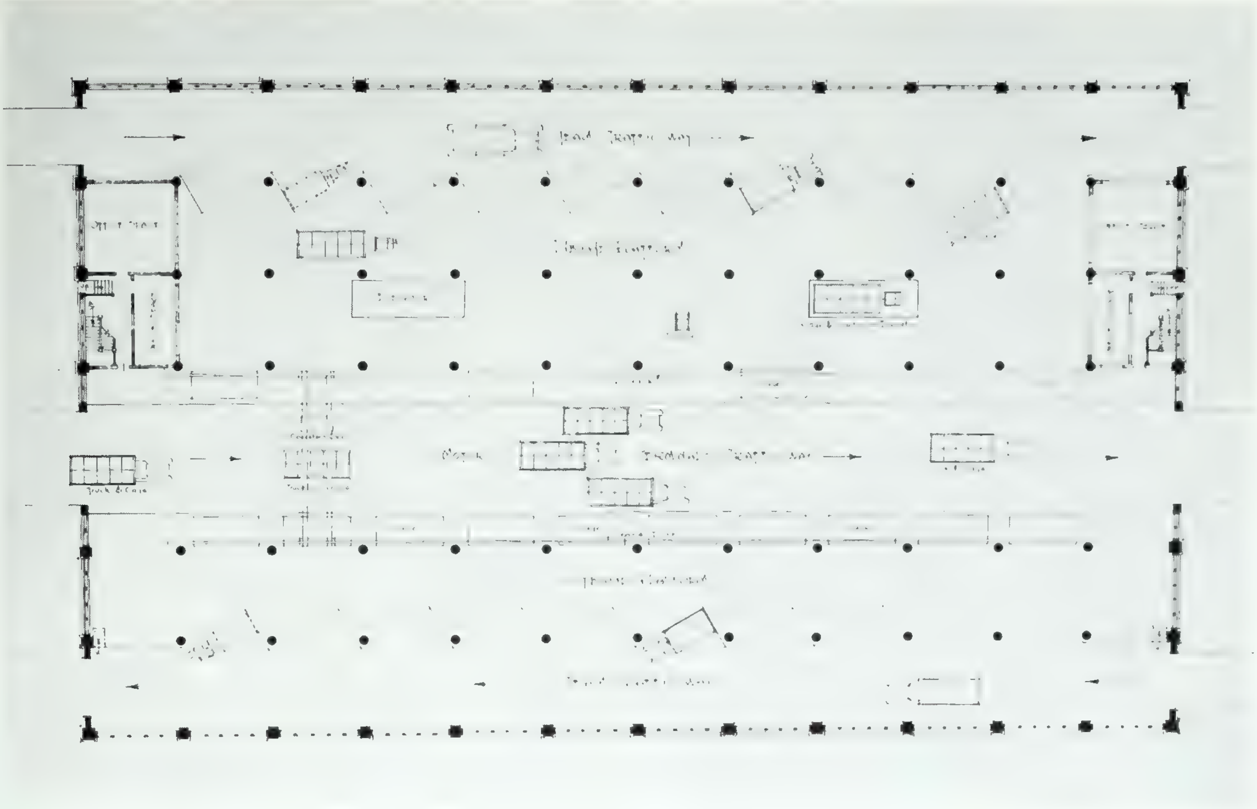
The innumerable switch cut movements of such cars confiscates capacity of the rails and the cost of handling these cars over rails, to detriment of through traffic, is primarily responsible for excessive terminal expense.

If every large city in the country could be furnished with a scientifically designed and mechanically operated freight house, there is no question of accruing economies both in terminal practice and transportation costs, because the railroads then would enjoy a one point make-up and a one point break of all freight cars. The result would be loading of cars to weight or displacement capacity for uninterrupted direct movement to other terminals. This consolidated loading would naturally decrease the number of cars now dispatched from a plurality of stations within any one city to the existing plurality of stations in all other cities.

Despite this opportunity, even if attainable, the industrial trap car and the intro-terminal trap car will apparently always complicate terminal inter-



Demountable Body being unloaded from Truck at the Baltimore & Ohio General Freight House, Cincinnati



Plan of the Motorized Warehouse of the Motor Terminals Company

changes to detriment of switching refinements. Terminal operating economies will be in direct ratio with the decrease in the number of interchange switching combinations. So apparently new freight stations at huge investment are no guarantee of great reductions in terminal expense, because freight station labor cost is but a small item as compared with total terminal expense.

Between all the widely distributed freight houses of the various railroads in each and every terminal box cars are used in transfer or connecting line service. When so used, they are in various sections termed "trap," "transfer" or "ferry" cars. For instance, in any city with seven non-competing railroads radiating to different sections, each line receives daily in its city cars some freight for each of the six connections. Numerically this means forty-two cars in transit to and forty-two cars in transit from, a total of eighty-four cars. But due to yard interchange delays these cars average a third day arrival instead of a second day arrival; hence, 252 cars are assigned daily to such service. Thus 75,600 car days are required annually.

Industrial expansion at any city with seven initial lines has, as a rule, outgrown station facilities and railroads for economy's sake have strategically established sub-stations along their rights-of-way as traffic influences for shipments from outlying districts. Since all the freight from these outlying districts has to be brought to main stations to be consolidated in cars for dispatch from such main stations to destination points, and since all of the freight for these sub-stations comes out of main station cars on arrival, trap cars are necessary in this main sub-station service for each line. The number of cars so used is a multiple of stations. If, as above stated, each of the seven lines has three stations, forty-two cars are required, movement delays to which are as great as connecting line cars; therefore the wasting of an additional 37,800 car days. This explains one of the reasons for car shortage and an operating abuse which has been made obsolete by the success of a motor terminals installation at Cincinnati, Ohio.

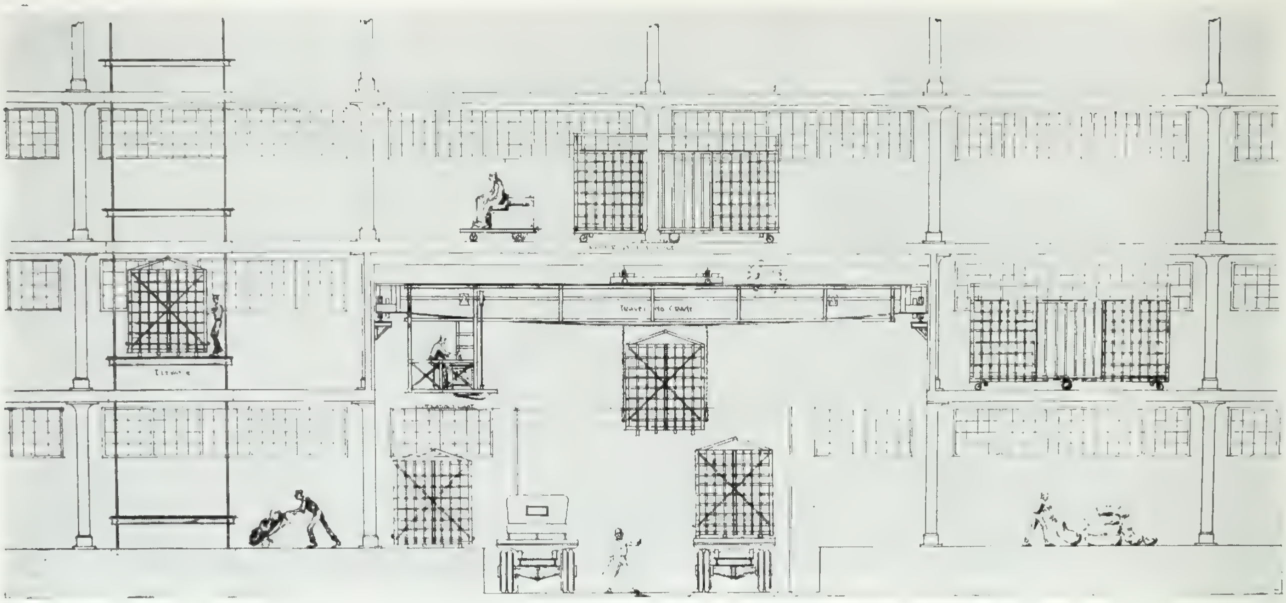
Briefly, this installation consists of overhead rails, electric cranes, electric hoists, motor trucks and a plurality of interchangeable motor truck bodies. The system of operation requires an empty body for each station movement demand of railroad on its inbound main station platform. At the larger stations there are several locations for such body settings, thereby decreasing the trucking distance for freight. As the freight comes from the cars it is trucked to the nearest location containing a body carded for any connection or any substation.

When loaded, these bodies are sealed and under telephone order of a joint dispatcher, employed by the railroads, mechanically loaded into trucks and thus routed over city's streets to connection.

On arrival at outbound platform of the connecting line, the body is mechanically removed and an empty body, previously unloaded, is similarly put onto motor truck chassis for delivery to inbound platform of that house, where the operation is repeated and another loaded body forwarded in the same manner to some other freight house.

If the load happens to be to a sub-station, it remains on platform until dispatcher is advised by agent at sub-station that return load is available. Then the loaded body of inbound freight to that sub-station is forwarded and the motor truck exchanges same for the previously reported load of outbound freight to be delivered at main station, where it is consolidated with other city freight in line cars made up daily to innumerable other destination points.

From the above it is evident that all freight, except possibly the portion arriving during the last hour of station operating day, whether between



Section to an Enlarged Scale Showing Traveling Crane above motor way, Tractor pulling Demountable Bodies on Car, and Elevator in the Motor Terminals Company's Warehouse

main and sub-stations or between main stations of the various railroads, is currently loaded and out of the terminal. Previously this freight by trap cars suffered an average three days' delay and the shuttle movement of these individual cars over terminal rails interfered with the group movement of complete cuts of station cars. Hence, the congestion which previously made Cincinnati notorious as a check-valve in rail routings.

In May, 1917, the Big Four Railroad permitted a test installation between its five main and sub-stations. The innovation was an early success, but the other roads were skeptical of its enduring efficiency. In the early months of 1918 a special committee was appointed to analyze the entire terminal and, based upon Big Four accomplishments, recommend what economies and benefits could be anticipated from completely motorizing Cincinnati's terminal.

The summary of this comparative report prophesied the following, and as a result contracts were negotiated:

Annual economy, $61,652.96.
Advance movement of freight, 52.4 hours.
Increase inbound platform floor area, 14.8 per cent.
Increase outbound platform floor area, in ratio with station operation.
Increase main station trackage, 21.4 per cent.
Increase main station realty, 122,660 square feet.
Release 66,862.5 cars for line service per annum.
Extension of present labor, 30.4 per cent.
Eliminating the rehandling of 86,976 tons of freight, lessens railroad's liability of loss and damage.

In 1919 equipment orders were entered and railroads commenced station changes and superstructure construction. The terminal is not fully equipped, for both the railroads and the Cincinnati Motor Terminals Company, which is operating this equipment on contract basis for the railroads, have suffered exasperating delays. However, in recent analysis of accomplishments it is proven that, due to increased operating costs of railroads, the prophesied 17.1 cents per ton economy is in practice actually a saving of 35.2 cents per ton, and, therefore, the annual economies will be $126,507.75 instead of $61,652.46.

This service has proven that all widely distributed station facilities can be laced up as a unit without investment cost to the railroads, thereby giving to each and every terminal the benefits of a union freight station. The rates paid for the service are less than what interest charges alone would be on the cost of constructing a consolidated terminal. The operating program of railroads and the established perquisites of shippers are in nowise disturbed, but the railroads at large, through the influence of this current versus their past interrupted movements, enjoy an increase of terminal rail, station rail, and station platform facilities. This increase can be perpetually extended at minimum investment in ratio with increasing tonnage demands, which naturally will accrue at any industrial city enjoying better shipping facilities.

Extensions are now possible in the form of rail sub-stations or off-track warehouse sub-stations by this system, and can be gradually provided when tonnage demands warrant. There is no necessity to finance elaborate facilities to take care of accruing demands which may not develop for fifty years.

What has been done at Cincinnati can be adapted to the varying demands of all principal terminal cities. In some the connecting line trap car predominates as the greatest detriment to successful terminal operation; in others the sub-station trap car.

The flexible possibilities of trucks are now clearly defined for industries whose transportation facilities are dependent upon rail extensions. Opportunities at each point are limited only to intelligent installations following detail analysis to establish the greatest terminal efficiencies of carrier to meet shipping demands of the public.

Accomplishments at Cincinnati warrant idealistic theories of the system as applied to the greatest terminal problem in the world. New York is that problem, for as the established principal port of this country our industrial expansion is restricted by New York's lack of port facilities, unless, as will ultimately happen, the nation at large refuses to longer suffer by reason of New York's conservatism and creates other trans-shipment ports.

At present the railroads monopolize approximately 30 per cent of Manhattan's piers for freight stations. To expand the port these piers are indispensable for coastwise and overseas steamers. Where not individually owned, the rental value of piers is out of all proportion with freight tariff returns.

A few blocks inland, realty enjoys but a fraction of bulkhead rental values. If inland joint stations in, say, twelve zones were constructed on this otherwise comparatively non-productive realty, the railroad piers could be released for shipping and station facilities be attained by the railroads at practically no cost, because of increased rentals possible from warehouses and industrial floors above joint freight terminals.

If all roads contributing this terminal had transfer stations at their rail bulkheads or a few blocks back from the Jersey, Staten Island and Bronx valuable waterfront, carload and less carload packake freight could be immediately transferred from cars to motor truck bodies, which would be designated for each of these inland stations, and the freight cars thereby released for immediate reloading of outbound freight. The number of bodies assigned each zone station would be sufficient to meet the tonnage demands.

These bodies when loaded on trucks would be routed over streets to nearest available Staten Island or Jersey slip for ferrying to Manhattan slip nearest inland station destination and vice versa on return movement. Until they were proven inadequate, public ferries could be used. Later, if necessary, possibly special ferries and special slips at a few of the innumerable pier points now occupied by railroads could be provided.

If we add to the generally admitted $3.50 terminal cost to carriers the established minimum cartage cost per ton to shippers, the joint terminal cost at New York is $6. Under normal conditions approximately 30,000 tons daily moves from Staten Island and Jersey to Manhattan and 20,000 tons daily from Manhattan to Staten Island and Jersey on outbound movement, a total of 50,000 tons daily, which at the above cited $6 joint cost is an item of $300,000 per day.

For the railroads alone at Cincinnati the interchange is furnished by the Cincinnati Motor Terminals Company between stations within a ten-mile zone at rates averaging less than $1 per ton. The minimum is 80 cents and the maximum $1.25. If trucks moved by short ferry routes (at no operating cost in ferry transit other than ferry tariffs) no hauls from rail bulkhead transfer platforms to inland stations could exceed ten miles.

It is impossible to prophesy what rates for this interchange can be established, but they would certainly not be over $2 per ton. Due to the short haul afforded shippers by these inland stations and the unlimited tail gate space which they would enjoy at such, the cost to shippers could not average over $1 per ton. Hence, it is logical to infer a joint net saving of $3 per ton is possible for 50,000 tons daily, an annual item of $45,000,000. This possible economy now wasted in present practice is reflected in the retail value of every commodity. No wonder the high cost of living on Manhattan! But one year's savings will more than cover the entire necessary outlay if the cost of inland stations is not considered.

MATERIAL HANDLING WASTE

FOUR hundred million dollars is wasted annually at our terminals. This sum, which, according to some Congressmen, would pay the annual cost of universal military training, is wasted because of our antiquated, unsystematic and inefficient methods of handling freight at terminals.

This charge of extravagance was made by Harwood Frost, president of the Brown Portable Conveying Machinery Company of Chicago, at an address delivered in February at a meeting of the Society of Terminal Engineers in New York.

Mr. Frost pointed out that the savings which could be effected by modern labor-saving freight-handling machinery would, in some instances, run as high as 80 per cent, and in other instances the saving that could be made would only be 10 per cent, but the average saving that could be made, estimated on a conservative basis, would be 40 per cent.

The wastage is now so great that should modern, efficient, labor-saving machinery be installed at our terminals, the cost would be repaid in fifteen months.

"Assuming there are one million men employed at marine terminals as longshoremen, freight-house laborers, lightermen and draymen," declared Mr. Frost, "and that they receive an average wage of three dollars a day for 300 days in a year, there is an approximate annual expenditure for labor of $900,000,000.

"If we include the men employed at rail terminals, the total spent for labor is $1,000,000,000. The installation of modern freight-handling machinery would reduce the average labor cost 40 per cent, or $400,000,000.

"Add to this reduction in labor cost the savings due to quick delivery of freight, and the quick release of cars and boats, the elimination of confusion of laborers, and the prevention of damage to packages and the waste of perishable freight, it is fair to say that these combined savings would pay for the efficient equipment of a great number of terminals within a year."

Mr. Frost declared that one reason for the neglect of the terminals was the skepticism of managers, foremen and contractors in charge of warehouses and terminal work.

"This skepticism can often be extended to embrace those in higher authority, especially where the terminals come under the influence of politics. In New York, authorities are planning to spend from $25,000,000 to $100,000,000 for new piers and harbor facilities with little or no regard to provisions for economy or speed in the handling of freight.

"The whole nation must suffer and pay for the lack of efficiency in New York's terminal facilities. The people of other cities must patiently pay an unjust tax on incoming and outgoing commodities on account of the antiquated methods in America's largest port.

"One of the most important problems involved in the process of transportation is the handling of the goods through the terminal ports, where several times as much expense is added to the ultimate price as is added by the actual rail or water transportation."

(Continued from page 56)

The apparatus consisted of a single pulley and a brake. The bag was fastened to one end of the line and lowered until it almost reached the truck below. The other end of the line was attached to another bag, and when the brake was released the jerk of the falling bag lifted the other bag so that it could be pushed off the edge of the sill, when it in turn was stopped by the brake just before it landed, when the operation just described was repeated.

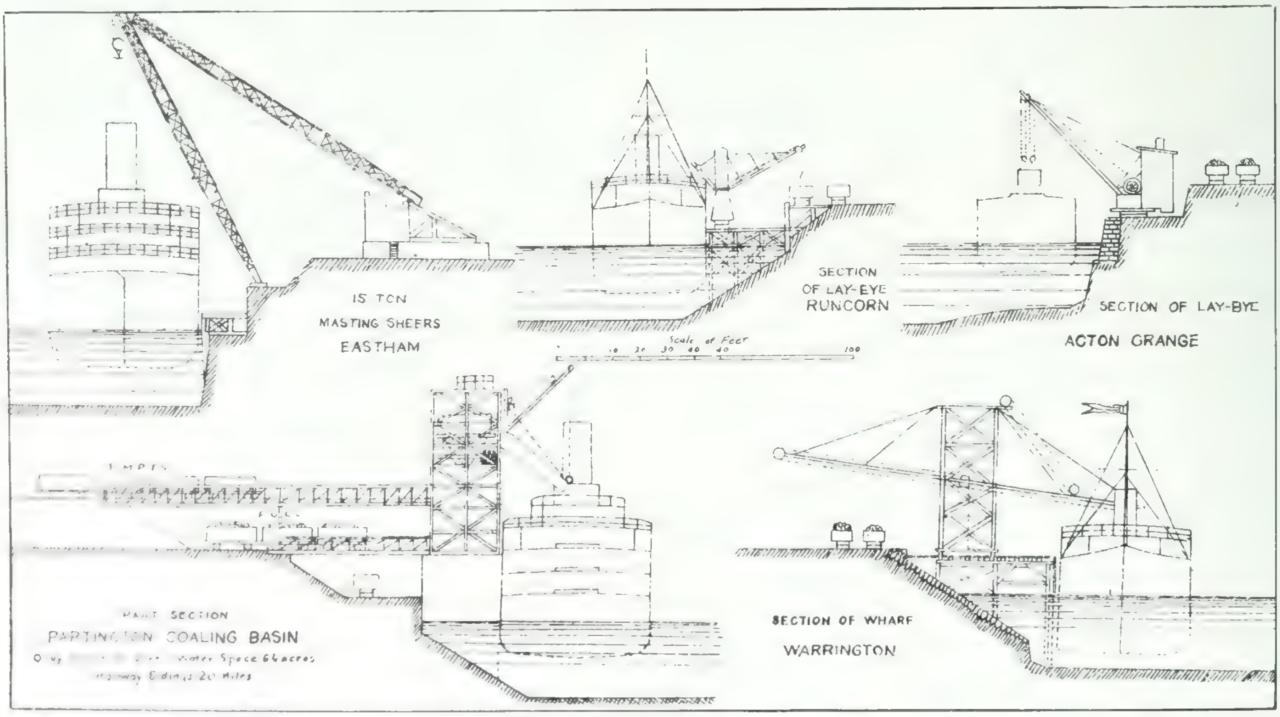
At Manchester most of the cranes travel on standard gauge tracks, but have a wider reach of base, which is stabilized by means of screw jacks.

Some interesting examples of mechanical handling are to be seen at the Trafford Park estates. This is a private enetrprise on the edge of the Manchester Ship Canal. It specializes in sites for works, and in warehousing. Many prominent concerns are located upon these estates, notably the British Westinghouse Company, Guinness, Son & Company, and the Ford Motor Company. The warehouses are very different from the transit sheds along the docks. The main ones are locally called "safes." They are 45 feet high, 36 feet wide and 165 feet long, and are equipped at the very top with traveling cranes extending the entire width. The trolleys with which these cranes are equipped travel on one rail, and are thus enabled, by means of a small turntable, to transfer to tracks at right angles to the axis of the storehouse, and to deliver goods along the entire face of the warehouses, or over the waterfront at the end thereof, or to transfer material from one safe to another. At the time of our visit there was considerable storage of Egyptian cotton in some of the safes. This was stored fifteen bales deep, these bales weighing from 750 to 800 pounds each. The manager of the estates based his design for these safes upon the cotton warehouses of New Orleans. Also he had installed a considerable amount of handling machinery in the shape of chain belt conveyors and stackers in others of his storehouses. In one of these houses belt conveyors with portable sections were being used end on for the entire length of the building, and were feeding bags of sugar to a stacker. We were informed that all this material was of American manufacture.

At Birkenhead Docks, Liverpool, a traveling crane was noted, which had an extension track upon which a trolley with a jib could be run out over a vessel, the jib enabling the crane to handle material flexibly over a good sized area.

At Hull there are not many transit sheds, but in some cases the arrangement and equipment are excellent. One set of sheds has two lines of track front and rear, besides the gantry crane track; also belt conveyors in a subway for grain. One basin has twelve cranes on each side, or a crane for each 100 feet of length. Some of the two-story transit sheds have cranes running on the roof at the rear, the roof being designed of sufficient strength to receive heavy freight. The gantry cranes in front handle material from ships to roof, and the roof cranes pick this material up and serve it into the cars at the rear of the building.

At Immingham, which is essentially a coal port, they have sidings for 170,000 tons of coal stored in cars, with capacity for 5500 empty cars in addition. The mineral quay at Immingham has cranes with a reach of seventy-five feet, serving four standard gauge railroad tracks. There are ten of these cranes, ranging in capacity from three to five tons, and although these are a modern installation, they are hydraulically operated, the engineer in charge preferring this type, although he admitted that they were not quite so speedy in action as those electrically operated. At the Royal dock, cranes are alternately of three and five tons' capacity. Also at Immingham, as at some other ports, small jib cranes were observed on the dock and inside the buildings. They are equipped with ordinary wheels, so that they can run anywhere. Here there is a chain belt bucket installation, feeding high level belts which carry grain to a neighboring granary. A fifty-ton crane at one of these



Typical British Quay Sections

basins for fitting out is also available for handling coal.

Avonmouth has a transit shed two-stories high, of concrete, with flat roof for heavy weights. There are two lines of rail front and rear, both under cover. Six thirty-hundredweight electric cranes have sufficient reach to plumb the hold of a vessel, with lighters between it and the quay, and to transfer the load to the roof, or into the transit shed building. The floor of this building slopes from quay level in front to height of car floors at the back. Another shed at Avonmouth has four lines of trolley rails supporting one-ton differential block trolleys. There are seven lines of railway in front of this shed, and it is explained that this is necessary on account of the classification of mixed cargo direct to cars, this cargo coming from Australian ports. Here, also, portable grain elevators of the chain belt bucket type were observed suspended from ships' booms.

At many of the English docks small, hydraulically-operated capstans are placed between the tracks on the waterfront, and used for shifting cars, thus doing away with shifting locomotives.

The Alexandra dock at Cardiff has sixteen electrically-operated, two-ton gantry cranes, and twelve more of these cranes are projected. There are four lines of track on the quay side and two at the rear. Cardiff is essentially a coal port, and on one quay of the Alexandra dock there are eight hydraulically-operated elevators, each capable of lifting an entire carload of coal and dumping it into a chute. These eight elevators are each equipped with a jib boom, which holds a bucket under the chute of the elevator, thus easing the fall of the coal and preventing breakage. There are also eight jib cranes on this same quay, which lift individual cars and dump them into the hold of a vessel. These two methods of handling coal are more or less common to all the coal ports. It should be borne in mind that the usual capacity of British cars is ten tons, with an occasional twenty-ton car. The capacity an hour by either method seldom exceeds 300 tons.

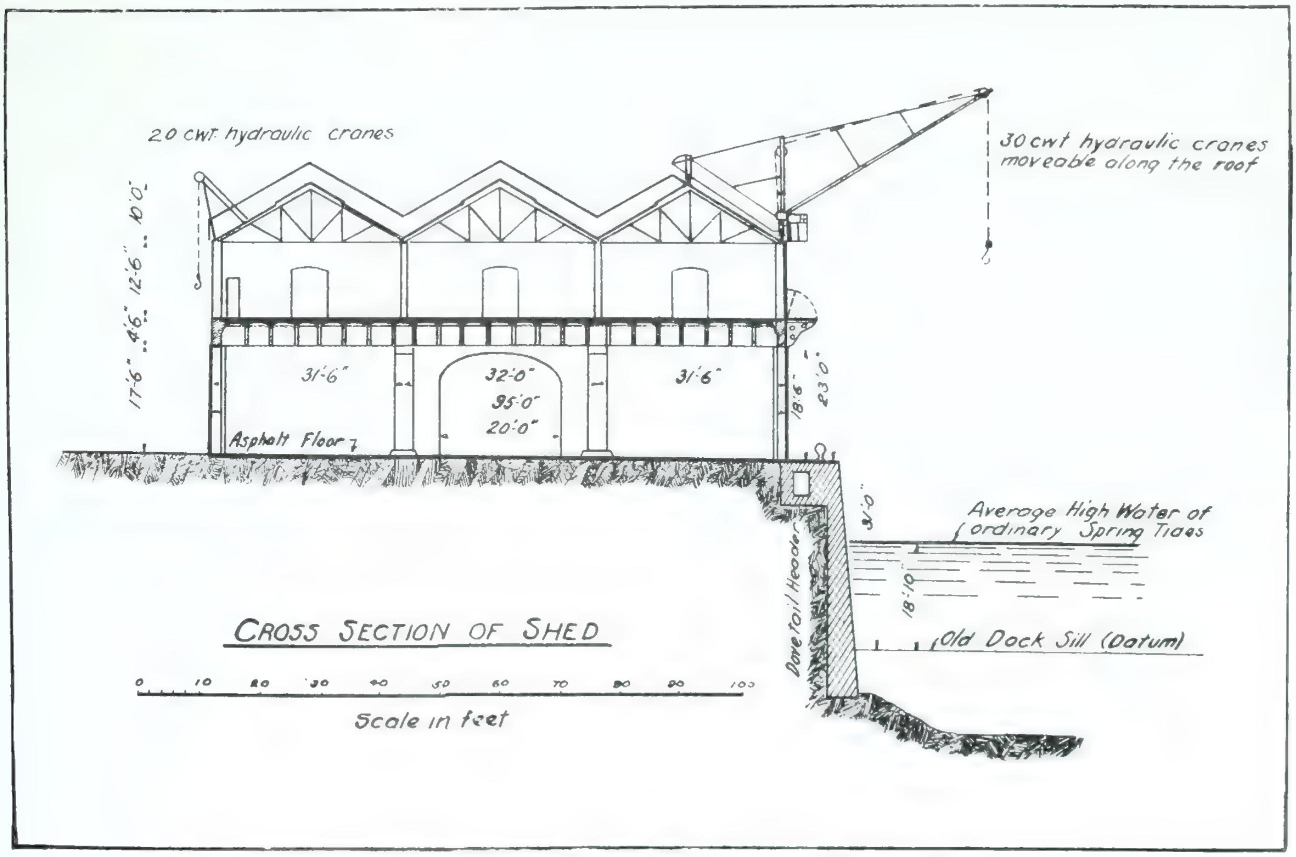
At Newcastle there were elevators capable of raising entire carloads of coal and dumping into a hopper. The towers of these elevators were not so high as some others noted, and the proper elevation of discharge of the coal was obtained by means of electrically-operated belts upon a swinging arm, capable of adjustment for various heights of vessels.

In all the English ports cargo is handled almost exclusively by hand trucks. Aside from the crane equipment on the waterfront, the better capacity of the transit sheds, and free access to the railways, our ports have little to learn from the English ports in the matter of handling methods.

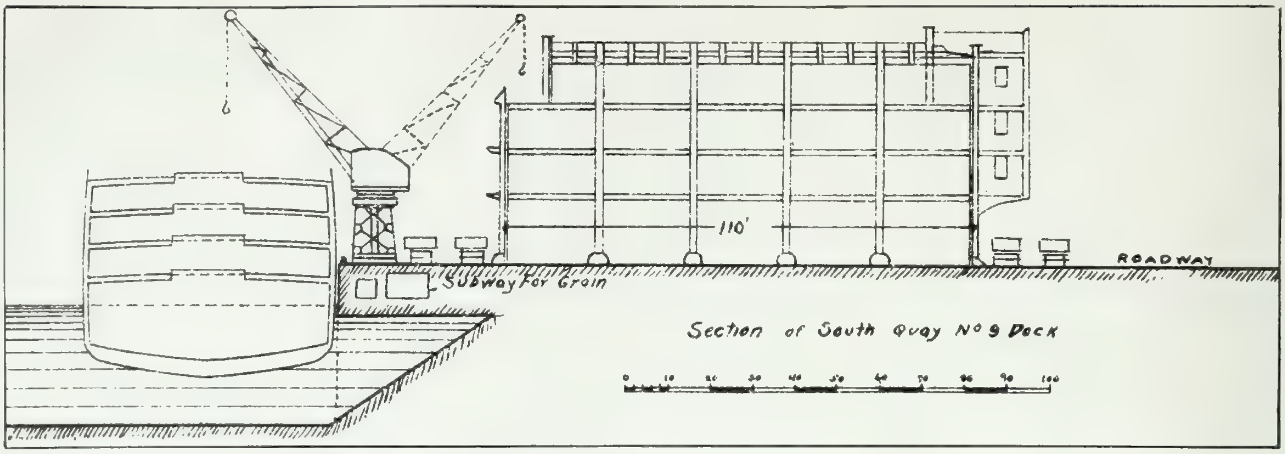
While the bunkering of ships is largely performed by hand in most of the English ports, Manchester is an exception to this rule. Here ships are bunkered as they pass down the canal, the appliances used being similar to those described for Cardiff for cargo coal handling.

I had an opportunity to view, in passing, the shipbuilding yards on the Clyde and on the Tyne. Only a few of the most modern ways are served by means of hammerhead tower cranes and cantilever cranes, electrically operated. The vast majority of ways are served by guyed masts with jib booms, hand operated, and many of these are of timber.

I have confined myself to English ports because at the time I went abroad the vice-chairman of the Port Facilities Commission was in France, and made a detailed study of its ports. While I also went to France, I did not, therefore, pay the same attention to the French ports which I had to the



Section of Transit Sheds at Liverpool. Note Hydraulic Cranes on Roof



Section through Four-Story Transit Shed Warehouse at Manchester

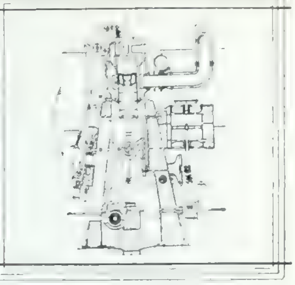
English, but from what I saw, there is very little difference in the equipment. Cranes were not so numerous in France as in England. I did, however, see some splendid wide transit sheds.

From my study of English ports, I conclude that the British, with their long shipping experience, would not continue to equip their docks with numerous expensive cranes if they could handle the material as quickly with ship's gear or portable winches. I failed, however, to develop any great expedition in turning ships around in the British ports, the average time per ship in port having been stated on several occasions as fourteen days, both during and before the war. I was impressed with the fact that, with a few exceptions, mechanical handling ceased with the cranes on the waterfront, and that hand trucks did practically all the transfer work between cranes and railway. I believe that our port engineers can learn a great deal from a study of the British quay system in comparison with our pier system. Given an area of undeveloped waterfront, underlaid by fairly good foundation material, I am satisfied that in every case a better layout can be made on the quay principle than on the pier principle.

Now, it seems to me that your society, together with others interested in ship terminals, should do missionary work among the influential people of our busiest ports, in order that they may fully understand the economics to be effected by means of terminals properly designed, with adequate mechanical handling appliances. Some time ago our commission set out to prove this argument by means of the analysis of the actual charges against a ship in New York harbor. We found it difficult to secure complete data for any one ship, and so had to do the best we could. The first ship's record which came to our hands was that of a coal-burning vessel of 6450 tons deadweight, which came into New York with some 2700 tons of miscellaneous cargo from Genoa, Italy, and went out with about 3800 tons of miscellaneous supplies for Archangel, Russia. I hope that the record of this ship is not typical, as the average rate of discharge of cargo was 4.75 tons a hatch hour, and the average rate of loading was 5½ tons a hatch hour. Inasmuch as we have information that sugar bags are unloaded at San Francisco harbor at the rate of 60 tons a hatch hour, and that they have kept up a rate of 55 tons a hatch hour for an entire day at a time, the New York record is a sorry one. The steamer which was analyzed had various mishaps and delays due to loading coal without proper trim, lack of steam, waiting for lights, broken winch, shifting lines, etc. But suffice it to say that she spent fifteen days total in port, and although she took on bunkers from lighters alongside, she stayed almost two full days at the wharf completing her bunkering after all cargo had been handled. Her average daily expenses, inclusive of overheads, were $3938.59. We prepared a table to show how much would have been saved for each day less that the ship might have remained in port, and carried this down to a total stay in port of six days, which we thought to be a reasonable time. If she had only saved one day she would have saved $3938.59, but if she had saved nine days, the financial saving would have been $35,447.31. Putting it another way, she would have been 2376 miles on her way to the next port. I showed these figures to a prominent shipping man, who was much interested. He remarked that he had been in the habit of looking at the problem in a somewhat different light—that a ship such as we had described should make a net profit at the present time of about $2000 per diem. Now, we all know that under our present shipping laws, our ship operators are obliged to spend more money for the operation of a ship at sea than their foreign competitors, and it seems to me very sure that we are not going to design ships which cost less in propulsive power than the British, who have been at it so many years. Bearing in mind the large savings above shown, we certainly can afford to spend large sums upon terminals if thereby we can reduce the port turnaround. It is up to some of us to prove that cranes, belts, tractors and trailers, and other mechanical devices, will reduce the ship turnaround, and it seems to me that you gentlemen can do a great deal to produce comparative figures. I believe, too, that you gentlemen should promote not only handling machinery, but also terminal layouts.

In conclusion, I wish to state to you that while I am chief engineer and member of the Port Facilities Commission of the Shipping Board, the commission has, for reasons of retrenchment, been deprived by the Shipping Board of practically its entire paid personnel. The Board of Engineers for Rivers and Harbors of the War Department has secured permission to carry on all of that part of the Port Facilities Commission's investigations which relate to our home ports.

Oil Engines and Motorships



First Large Marine Diesel Engines Complete on Pacific Coast

By **Frederik Van Rossen Hoogendyk, M. M. E.***
Chief Engineer of the Skandia Pacific Oil Engine Company, Oakland, California

THE first of ten 1100 I. H. P. Diesel engines building at the Skandia Pacific Oil Engine Company under license of the Dutch Werkspoor Company for the United States Shipping Board Emergency Fleet Corporation has passed its shop test successfully.

Besides the engines for the Shipping Board, two more of the same size and two of 700 I. H. P. each are under construction for tankers of the Standard Oil Company of California.

When the order for the Shipping Board engines was placed with the company in the summer of 1918, it was decided by the builders that the engines would be redesigned, not only to meet the local shop conditions, but also and mainly on account of the desire to attain greater rigidity in the general structure of the engines, so as to have less wear on the working parts and thus to insure a longer life of the engines in severe ocean-going service. Furthermore, it was considered important to have the greatest possible accessibility of all parts—hence, e. g., the removal of the link-driven, three-stage air compressor from the inboard side to the forward end of the engine.

The fuel supply, which in the original Werkspoor design is taken care of in a somewhat different manner, was abandoned, and the system of a separate fuel plunger for each cylinder was adopted.

With the exception of the air compressor and the high-pressure fuel pump, all pumps are driven electrically and separately from the engine.

The engines are of the four-cycle, single-acting marine crosshead type, 20½-inch bore, 35½-inch stroke and 135 R. P. M.. Two cylinder blocks, connected by an intermediate piece over the maneuvering stand, carry each a set of three cylinders. The cylinder block at the same time forms a water jacket around the cylinders, and is supported by cast-iron frames on the crosshead guideblock and on the opposite guideblock columns, which are bolted to its under side. These and the guideblock are again supported by hollow cast-iron housings which rest on and are bolted to the bedplate. Heavy steel tierods run from the top of the cylinder block to the bottom of the bedplate through the columns and housings.

An advantage of the original Werkspoor design is the possibility of taking out the crankshaft without dismantling the engine. However, the crankshaft cannot be taken out to the inboard side, the heavy crosshead guide columns blocking the way.

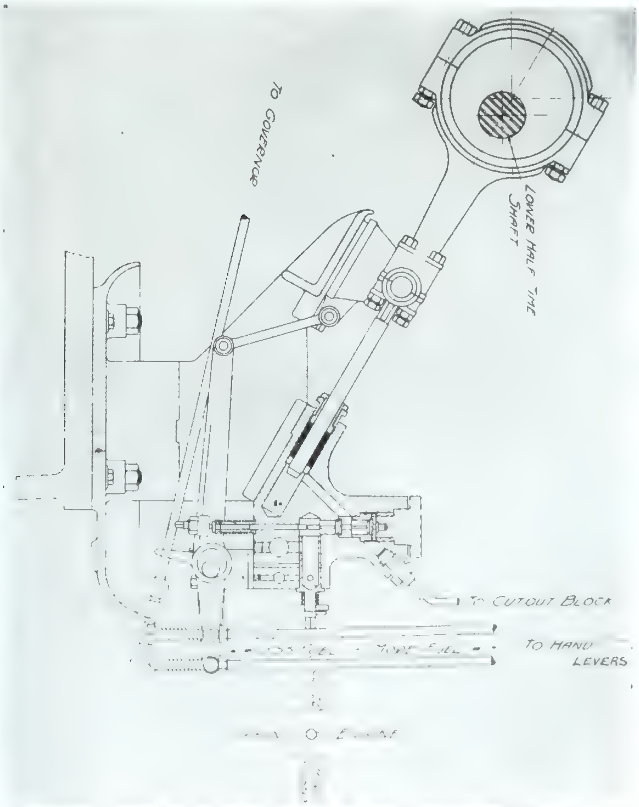
With the new design each set of three cylinders has one combined crosshead guideblock which is supported, as mentioned above, by lower columns. After lifting four tierods on one side of the engine, these small columns are taken out and the crankshaft can then be removed to the inboard side.

The built-up crankshaft is 12½ inches in diameter. The main bearings are of the square box type, the square boxes carrying the bottom brasses which are made so that they can be rotated and come clear.

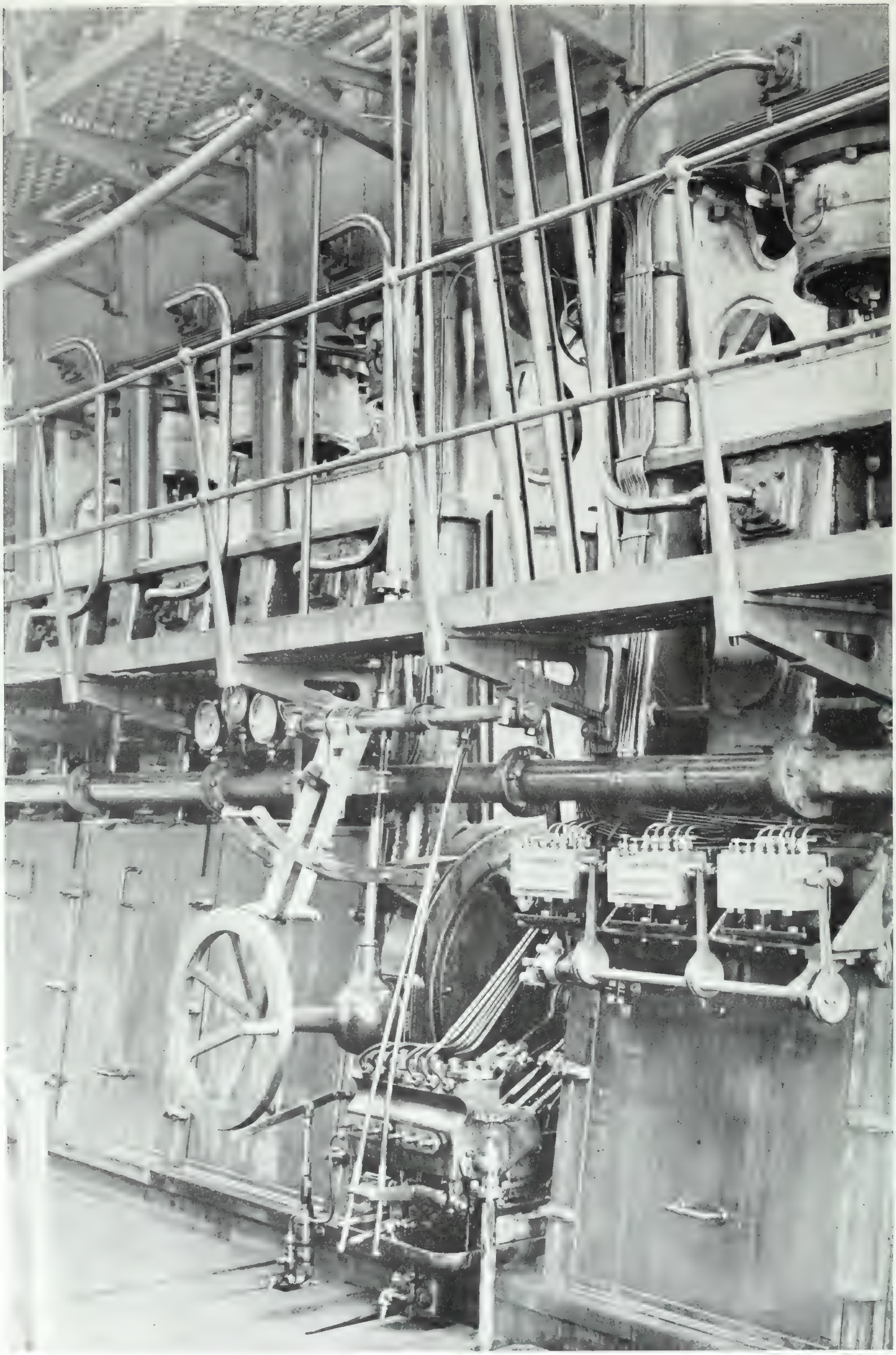
The piston rods pass through stuffing boxes of drip pans which collect carbon from the cylinders and prevent piston cooling water from the telescopic pipes from leaking into the lower oil-tight part of the engine which is provided with forced lubrication. The oil enters through the cover of each main bearing and is lead through the crankshaft to the connecting rod brasses and to the crosshead. Two drip pans bolted under the bedplate collect the oil, which is pumped by an electrically driven pump through strainers back to the main bearings.

The cylinder and the cylinder head are cast in

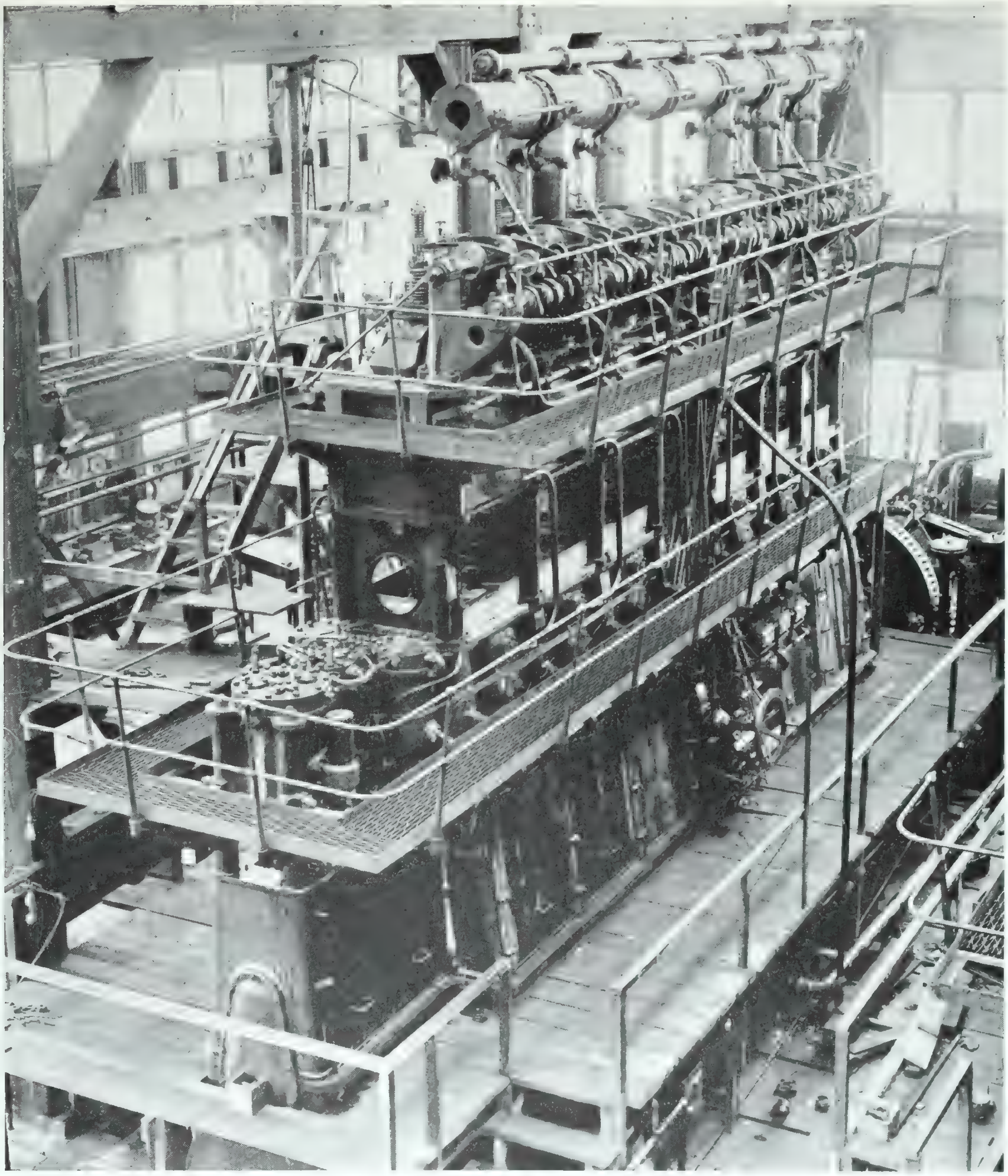
*Illustrations from photographs by the author.



Sectional Elevation of Fuel Pump of the Werkspoor Diesel. On the engine the bolted face at left is horizontal, and the levers at bottom of cut are vertical



View of Control Stand of the Werkspoor Engine, showing Reversing Wheel, Starting Levers, Fuel Pump, Lubricating Oil Pumps and many of the Details of Construction



View of completed engine looking down from forward end, showing top of air compressor, rocker arms and cam shaft

one piece. Although this method does not allow the use of different iron for cylinder and head, it provides an efficient water-cooling around the cylinder top. Moreover, to increase the cooling water circulation in between the valve housings, the fuel valve is placed off center and the cooling water is drawn out of the cylinder at its center.

The cylinder head being cast in one piece with the cylinder necessitates the removal of the pisten from below. For this reason the lower part of the cylinder is cast separately and bolted to the upper part. The piston in its lower position is removed together with this lower part of the cylinder, dropping of which allows the inspection of piston and rings.

The piston is water-cooled and provided with eight rings, while its flange is connected by four through bolts with the piston rod.

The intake and exhaust valves are of cast iron with steel stems. The exhaust valve cage is water-cooled.

The fuel needle can be easily removed and ground in place while the engine is running.

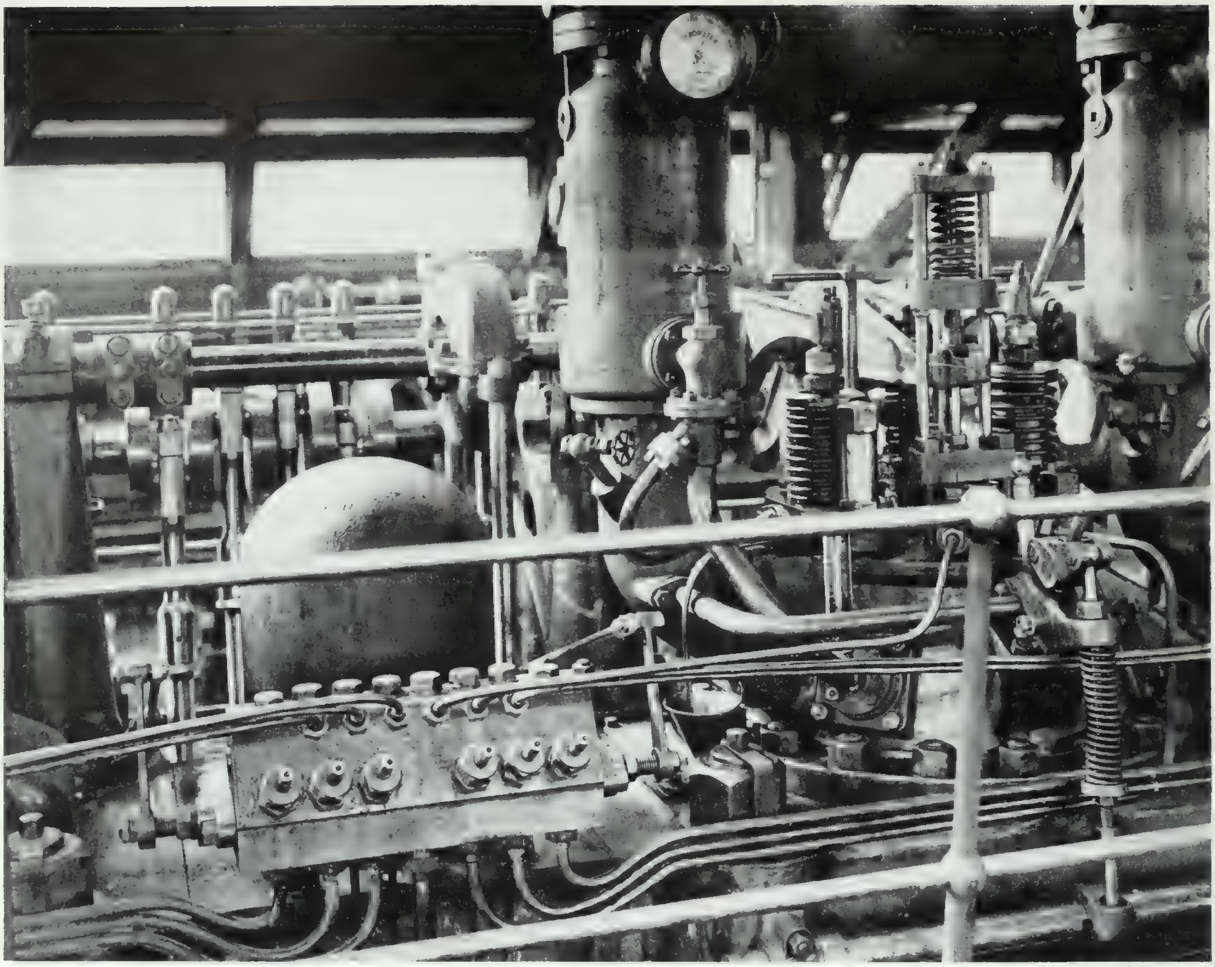
This also applies to the safety valve, which at the same time is used as relief valve, its spring being relieved while the engine is reversed.

All valve springs are outside the valve cages in order to keep them cool and free for inspection.

The engine is fitted with the new Werkspoor reversing gear. The rockers are mounted on skew eccentrics, keyed to the reversing shaft, which when turned over 180 degrees lift and transfer the rocker rollers from the ahead to the astern cams and vice versa.

The camshaft is actuated by four long connecting rods from the half time shaft below which is driven by a spur gear from the main crankshaft. The gear wheel on the lower half time shaft contains the governor, which acts on the fuel pump when the engine speeds up over 135 R. P. M.

The lower half time shaft carries two eccentrics, each operating a set of three plungers of the fuel pump, which is bolted on the bedplate at the maneuvering stand. The fuel pump has to take care of an equal fuel distribution to all fuel needles and therefore has a separate plunger for each cylinder.



Close up detail on top of engine, showing cutout block, the head of one cylinder with all valves, the pyrometer on exhaust, the worm gear for turning over rocker arm shaft to effect reversal and cam shaft for operating rocker arms

Each plunger delivers fuel only when its suction valve is closed. The suction valves are lifted by two rockers which are actuated by the crossheads of the pump and which pivot around an eccentric. The pivoting points of these rockers are lowered or raised by turning the eccentric through either the hand levers on the maneuvering stand or through the action of the governor. When lowered, the suction valves close earlier and the pump delivers more fuel; when raised, the suction valves close later and the pump delivers less fuel. Three adjusting screws in each of said rockers, one under each suction valve, allow an accurate adjustment of the amount of fuel to each cylinder. A pyrometer in each exhaust enables the engineer to check the amount of fuel fed to each cylinder in comparison with the others.

The fuel from the fuel pump passes through the cut out block, which is placed on top of the frame between the two cylinder blocks. It contains a second delivery valve for each fuel plunger and is called cut out block, as it carries two cut out valves for the injection air, one to each set of three cylinders. These two valves are operated by the hand levers from the maneuvering stand. Moreover there are six spindle valves to cut out by hand the injection air to each cylinder separately.

At the fuel pump there are six individual cocks which for each cylinder connect either with the main fuel supply, the handpump or the drain-pipe to the drip-pan. In case one of the plungers due to air in the piping should fail to deliver fuel, the corresponding one of the above mentioned cocks is put on "handpump" and the injection air to the corresponding cylinder is shut off at the cut out block. Thereafter the testcock in the fuel piping at the fuel injection valve cage is opened, whereby at the same time the fuel to the fuel valve is shut off. The handpump is then operated until a continuous flow of fuel oil leaves the testcock.

The air compressor is provided with crossheads and is driven by a three throw crankshaft which is bolted to the forward end of the main crankshaft. The piston rods run through stuffing boxes of a diaphragm drip-pan. The cylinder liners and the three corresponding coolers are set in one cast iron block, which forms at the same time a water jacket. The arrangement allows the pistons and coolers to be easily removed from the top.

Besides delivering air to the injection air bottle the air compressor can feed the starting air bottles from the intermediate pressure cooler. The air inlet to the low pressure cylinder can be regulated by hand. All valves are of the plain disc type.

The engine is reversed from the maneuvering stand by a handwheel, which by means of a bevel gear, a vertical shaft and a wormgear on the reversing shaft rotates the latter over 180 degrees.

Symmetrically to the vertical shaft of the reversing gear there are over the handwheel at the maneuvering stand hand levers, each of which controls at the same time starting air and fuel supply to a set of three cylinders.

In starting the engine both handles are pulled from the neutral position towards the operator on starting air. Then one handle is pushed through neutral on fuel, while the other three cylinders still remain on starting air. As soon as the first three cylinders start firing, the other handle is brought forward on fuel.

The control levers for fuel and starting air and the vertical shaft of the reversing gear are interlocked in such a manner that the control levers can only be moved away from neutral to either air or fuel, when the engine is either on ahead or astern, while the reversing gear can only be operated when the handlevers are in neutral.

On the right of the maneuvering stand are the forced feed lubricators for the main cylinders and those of the air compressor, while directly on the left are pressure gauges for lubricating oil, low pressure air, intermediate pressure air, starting air, and injection air. On the bedplate at the maneuvering stand are mounted the high pressure fuel pump and a fuel handpump, both in reach of the engineer.

Two long strikes have delayed the completion of these engines for over half a year. By the time these lines will be in print, however, the first engine will be on its official test under inspection of the U. S. Shipping Board Emergency Fleet Corporation, which requires for the first engine an uninterrupted run of thirty days.

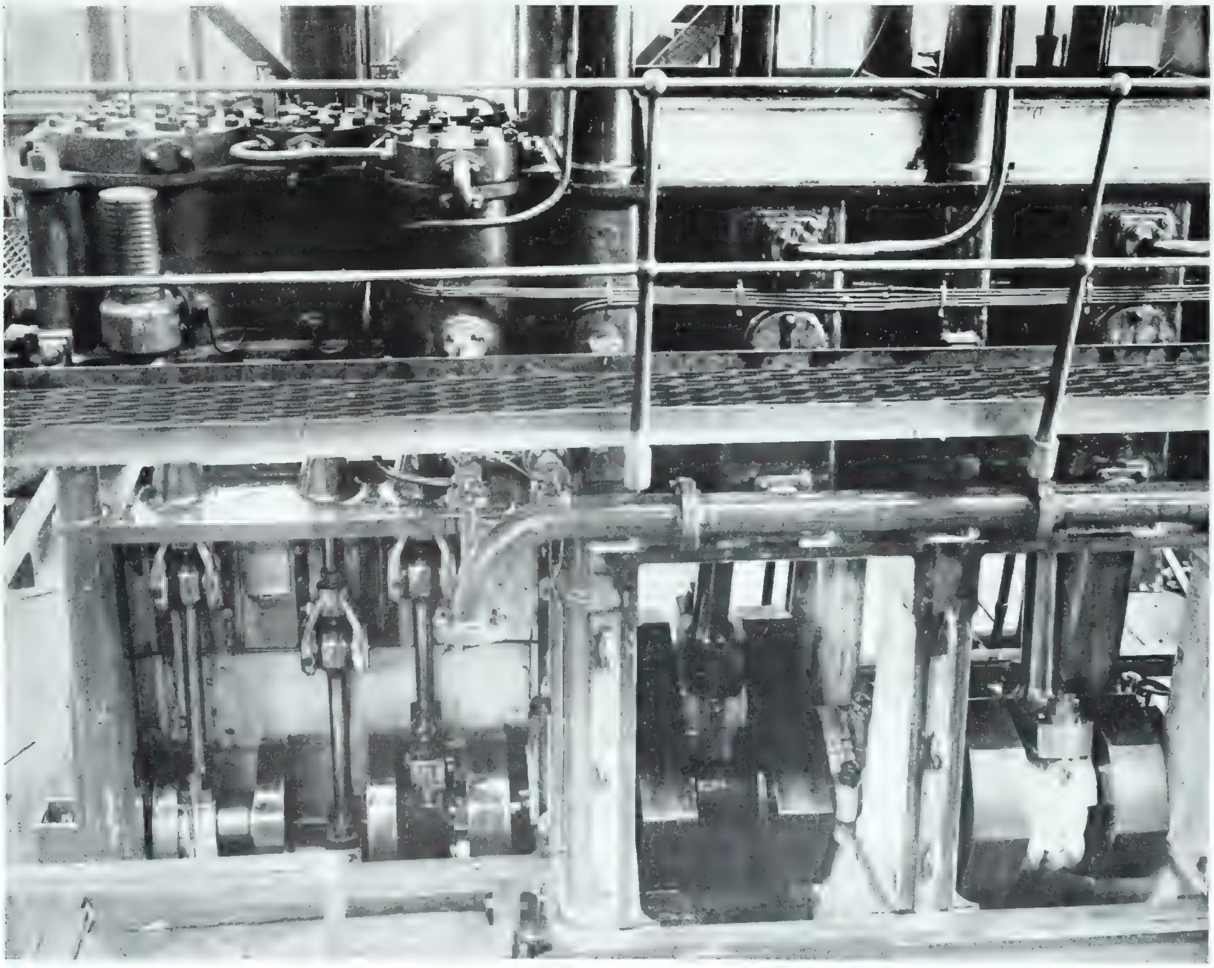
It is the opinion of the writer that the large marine Diesel engines will more and more resemble each other and that certain standards in design will be adopted by all builders, as long since has been the case with the reciprocating steam engine. This tendency shows already in the design of the engine described above, where notwithstanding the addition of cast iron frames the accessibility of the engine in comparison with the original design has been increased considerably.

For the present, engines of this type can be built up to about 2500 B. H. P., while marine engines of greater power to advantage might be built double acting, thus reducing to a mechanical problem the construction of reliable engines from 2500 to 5000 B. H. P. A 10,000 B. H. P. twin screw installation of such engines would give a 22,000 tons combined cargo and passenger vessel a speed of approximately 14 knots.

THE MOTORSHIP AFRIKA

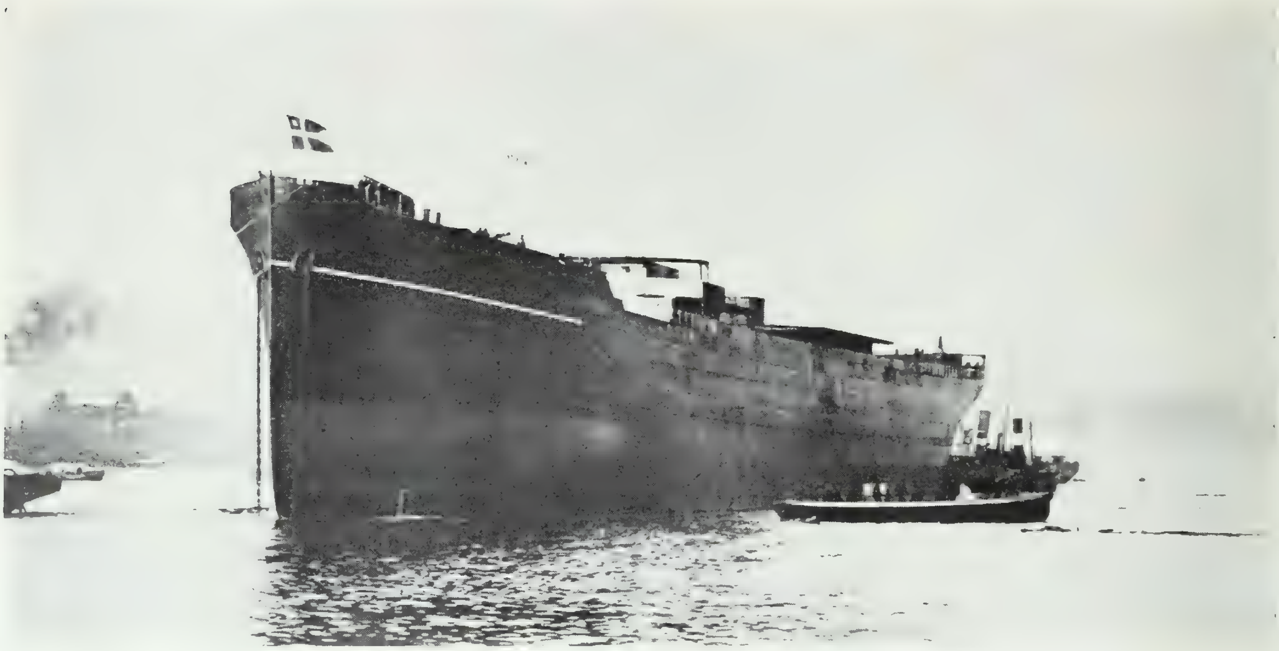
LAST December there was launched at the Copenhagen yard of the Burmeister & Wain Company the largest Diesel-engined vessel yet constructed. She was built for the African run of the East Asiatic Company and was christened Afrika. This ship will have a carrying capacity of 13,200 tons deadweight. Her length over-all is 465 feet with a beam of 60 feet and a draft of 31 feet 6 inches loaded. She will be of the conventional East Asiatic Company's design, without funnels and with the engine room amidships and cargo holds fore and aft. On the upper deck accommodations are provided for about sixteen passengers.

The Afrika is twin screw with Burmeister & Wain oil engines, each developing 2250 i. h. p. or about 1500 b. h. p. at 115 r. p. m.



Close up view of forward end of frame with splash covers removed showing construction of crank pin bearings and the cast frame surrounding steel columns

Motor Shipbuilding in Europe

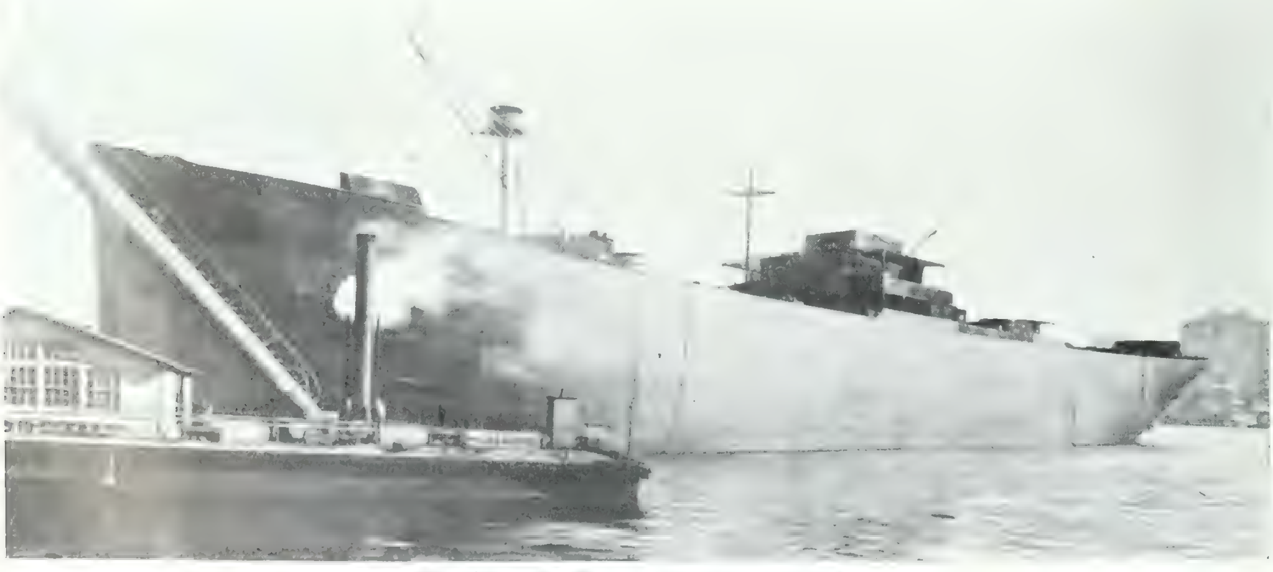


Motorship Afrika just after Launching. See page 111

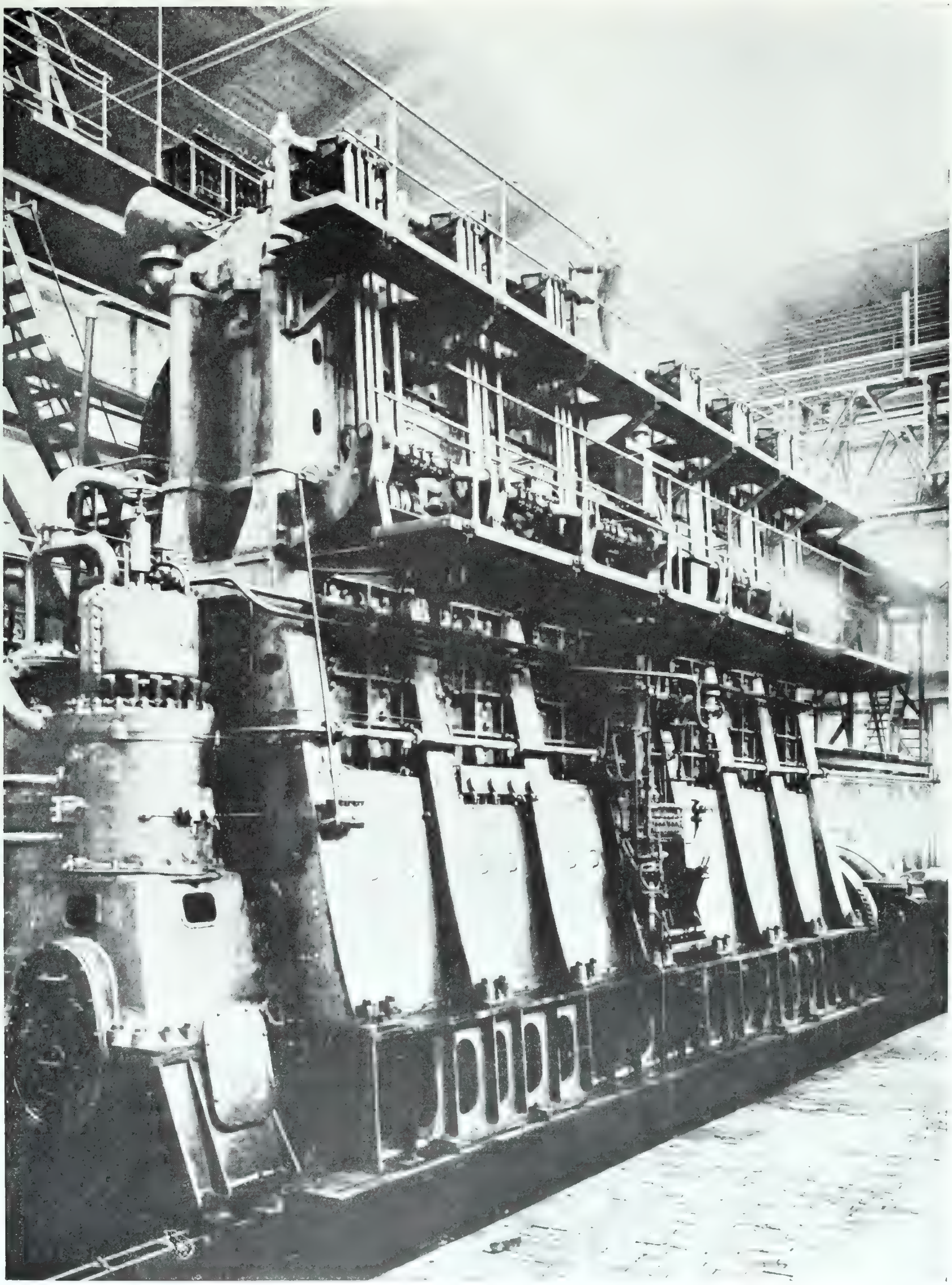
SEVERAL new motor vessels have been launched or have run their trial trips in Europe during the past few weeks, while numerous new orders have been placed and everything points to the present year being the most remarkable in motorship construction that has ever been experienced. . One of the most interesting features lies in the fact that the increasing orders for internal combustion engined ships are being placed by the best known and largest shipowners in Great Britain and on the Continent, thus indicating that the value of this class of vessel is now appreciated in all quarters. At present the largest program of motorship construction is being carried out by the East Asiatic Company of Copenhagen, who were practically the pioneer motorship owners, and although it has been known for some time that about twenty new vessels were on order by this company, details of their dimensions and power have not hitherto been available.

We are now able to give some particulars of these ships. The total number contracted for is twenty-one, and of these seven are much larger than any motorships now in service and are fitted with the highest powered machinery that has yet been installed. The vessels have a deadweight carrying capacity of between 13,600 and 14,000 tons and are 485 feet in length with a beam 64 feet, a depth of 43 feet and a draft of 29 feet 6 inches.

The fact of their being of such large size is of itself interesting, but it is especially important to note that the owners have decided that a speed of 12½ knots is necessary for the future type of cargo-carrying vessels. They have therefore arranged to install two 3000-horsepower engines in each of these ships, giving a total machinery power of 6000 horsepower. The engines are of the Burmeister & Wain type and have eight cylinders, 740 m. m. diameter and 1150 m. m. stroke, giving their power at 115 r. p. m. These ships will represent the finest fleet of motor vessels afloat, and although it will be some time before they are in service, it will not be long before the first of them is put into commission. They will be exactly iden-



New Motorship Elmaren just after Launching



Burmeister & Wain marine Diesel engine, 2250 indicated horse power at 1115 revolutions per minute, one of a pair being installed in the motorship Afrika. See page 111.

tical in every respect and each will be fitted throughout with electrical auxiliaries, no steam being utilized except for heating the cabins.

The other fourteen vessels on order for the East Asiatic Company include five of 11,000 tons deadweight capacity with 4500-horsepower machinery, giving a speed of 12 knots, and eight of 9700 tons deadweight capacity with similar machinery, the designed speed in this case being 12½ knots.

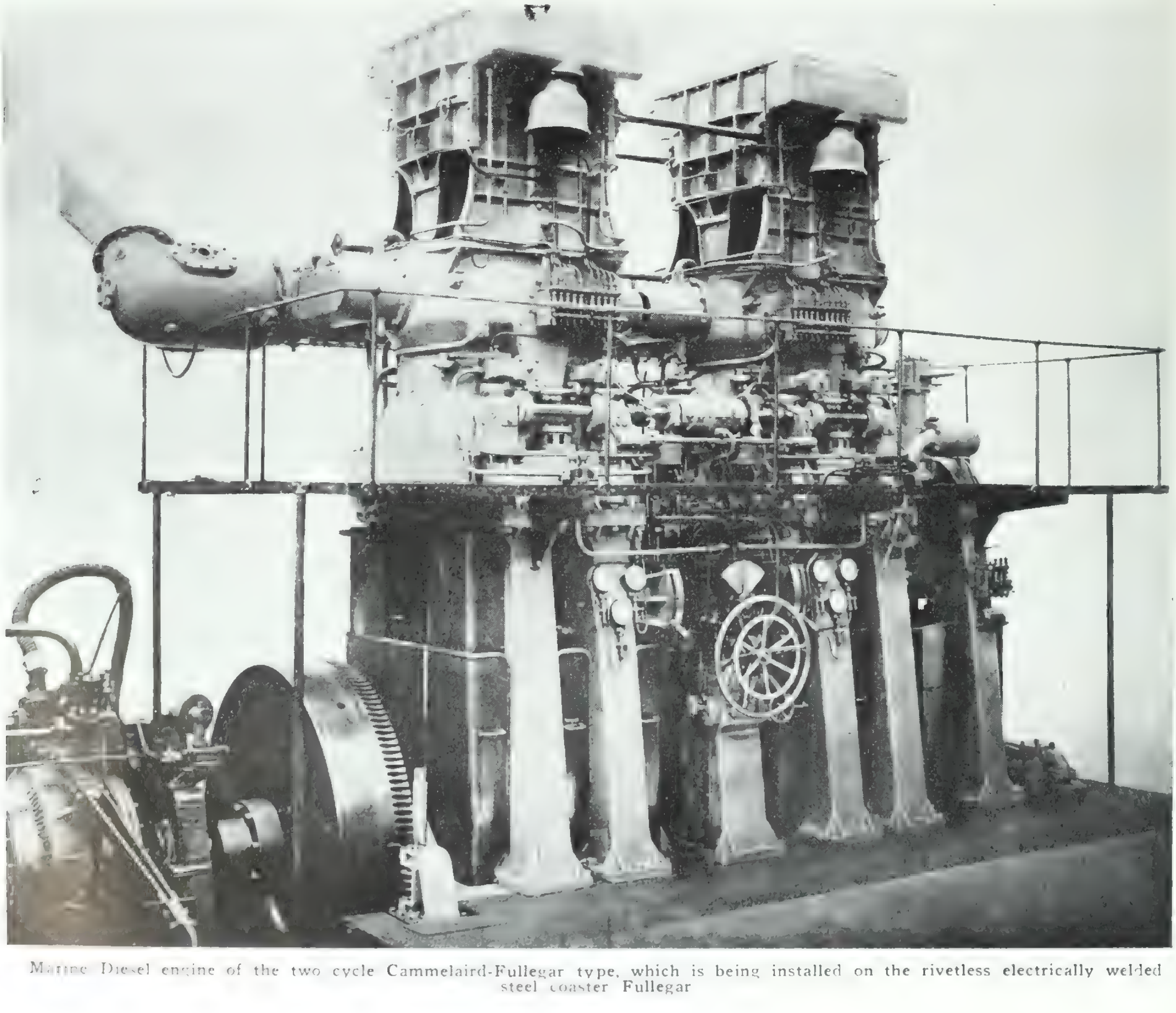
In order to render itself to a certain extent independent of the ordinary oil supply companies, the East Asiatic Company has built a motor tank ship, the Mexico, which has recently been launched (and of which an illustration is given) for the purpose of transporting the necessary oil from the oil fields to the home ports, and also to supply Danish buyers in case any surplus is available. This ship has a deadweight capacity of 4700 tons and is fitted with a new type of oil engine, known as the Holeby motor. Two sets, each of 800 horsepower with six cylinders, are installed, the cylinders having a diameter of 500 m. m. and a stroke of 730 m. m., while the speed is 140 r. p. m.

Two new motorships have just been launched in Holland, these being the San Miguel and the Athene, the former for Mr. K. Salvesen and the latter for the Otto Thoresen Line of Christiania, while the first motor vessel for the last-named firm, the Salerno, has just run her trials and is now on her maiden voyage from Christiania to South America. The Salerno and the Athene are sister ships, 375 feet in length with a beam of 51 feet 3 inches and a carrying capacity of 6600 tons. They are fitted with engines of the new Werkspoor type, built in Amsterdam, each of 1050 b. h. p., which give a speed of about 11 knots on a fuel consumption of nine tons a day. These motors represent the latest development in Diesel engine construction in Holland and are chiefly interesting owing to the adoption of a new form of reversing gear, in which it is not necessary either to move the camshaft or to rotate it at an angle. The operation of the valves at the correct timing for astern or ahead running is effected by means of eccentrically arranged valve levers which are themsolves moved so as to come into contact with ahead or astern cams, as may be required.

The Werkspoor engine has been taken up for construction under license by two of the best-known marine engineering firms in Great Britain, both of which are now building sets of this type for installation in motorships on order in Great Britain. These firms are the NorthEastern Marine Engineering Company and Messrs. Hawthorne, Leslie & Company, both on the Tyne, the arrangement with the latter concern having been effected in the past few weeks.

An order has been placed by Mr. Thor Thoresen, the brother of Mr. Otto Thoresen, for two new 6000-ton motorships to be built at Ardrossan, for which Messrs. Hawthorne, Leslie & Company will construct the machinery. This fact has a certain significance, since it shows that the demand for motor vessels is so urgent that shipowners are willing to place orders with firms who have not previously gained experience in the construction of Diesel engines.

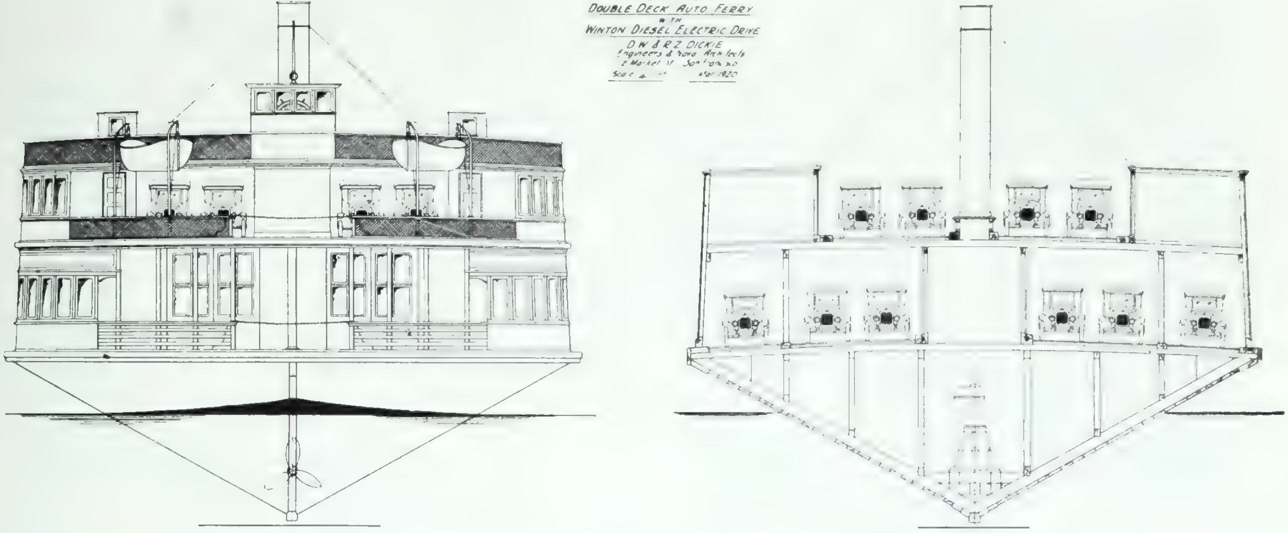
Although a small craft, one of the most interesting motor vessels that have been built was launched a short time ago at Birkenhead by Messrs. Cammell, Laird & Company. She is the 500-ton motor coaster, the Fullagar, an electrically welded vessel, the first of her type to be constructed. She is also the first motorship in which an engine of the "Camellaird-Fullager" type has been installed and an illustration is given of the 500-horsepower set which is to be fitted. This new type has already been mentioned in these columns, but it may be repeated that the chief feature lies in the adoption of the opposed piston design, with the crosshead of the top piston being joined to the crosshead of the bottom adjacent cylinder by means of diagonal rods. The engine illustrated comprises two units, each of two cylinders, while on the top are arranged scavenging pumps, of which there is one for each cylinder. The motorship Fullagar is for the Anchor Brocklebank Line, who have a much larger vessel, the Malia, on order, in which similar but higher-powered engines will be fitted. This vessel, which is being built on the Clyde, carries about 6000 tons and will have twin screw machinery of about 1800 b. h. p.



Marine Diesel engine of the two cycle Cammelaird-Fullegar type, which is being installed on the rivetless electrically welded steel coaster Fullegar

A Double-Decked Automobile Ferry with a Winton Diesel Electric Drive

By Renwick Z. Dickie


FRONT VIEW & SECTION
DOUBLE DECK AUTO FERRY
WITH
WINTON DIESEL ELECTRIC DRIVE
D W & R Z DICKIE
Engineers & Naval Architects
2 Market St San Francisco
Scale
Mar 1920

This drawing shows graphically an End View and a Midship section of the Proposed Diesel-Electric driven double-decked Automobile Ferry

THE problem of automobile transportation over water is becoming acute and much interest is manifested in the design of vessels for the carriage of motor vehicles.

Up to the present time no radical departure had been made in the design of these vessels or their power plant, as in most cases boats that were formerly used for other services have been converted into automobile ferries.

From the standpoint of the hull a vessel of certain fixed dimensions could have its capacity increased nearly 100 per cent by the addition of another deck designed to carry machines, and for the sake of safety it would be well to carry the machines in the middle of this upper deck with the cabins on the side, so that it would be impossible for any driver to make a mistake and drive off the boat.

This would mean specially designed slips with double aprons, which could be arranged to work simultaneously. The main deck should be made to fit the slips which are now in use, so that the boat could be used temporarily in another route if necessary. To thus double the capacity of the boat would involve a 20 per cent increase in the cost of hull, decks and houses, while the increase in cost of the slips would be about 50 per cent.

Many projects which are contemplated in the present day founder on their first cost due to the high cost of material and labor. In starting a new project the ideas of the principals are often so expensive that it is impossible to carry them out and make a paying proposition.

In International Marine Engineering for December, 1913, a steel ferry boat, called the South Jacksonville, is shown using a V-bottom of the simplest type of construction. This boat was designed and built by Merrill-Stevens Company, Jacksonville, Florida, for the Jacksonville Ferry & Land Company, and is the result of the experience with a wooden steam ferry, called the Duval, designed and built by the same builders some time ago, and which had proved highly successful in service.

It is our intention to use this simple model, thereby reducing the weight and the cost of the hull. This type, lending itself very readily to ferry boat design as a normal ferry boat hull, has a block co-efficient of .4 and the displacement and stability increase very rapidly as the boat is loaded.

The sketches show a double deck auto ferry, 205 feet over all, 191 feet between perpendiculars and 44 feet beam, with a breadth over the guards of 68½ feet.

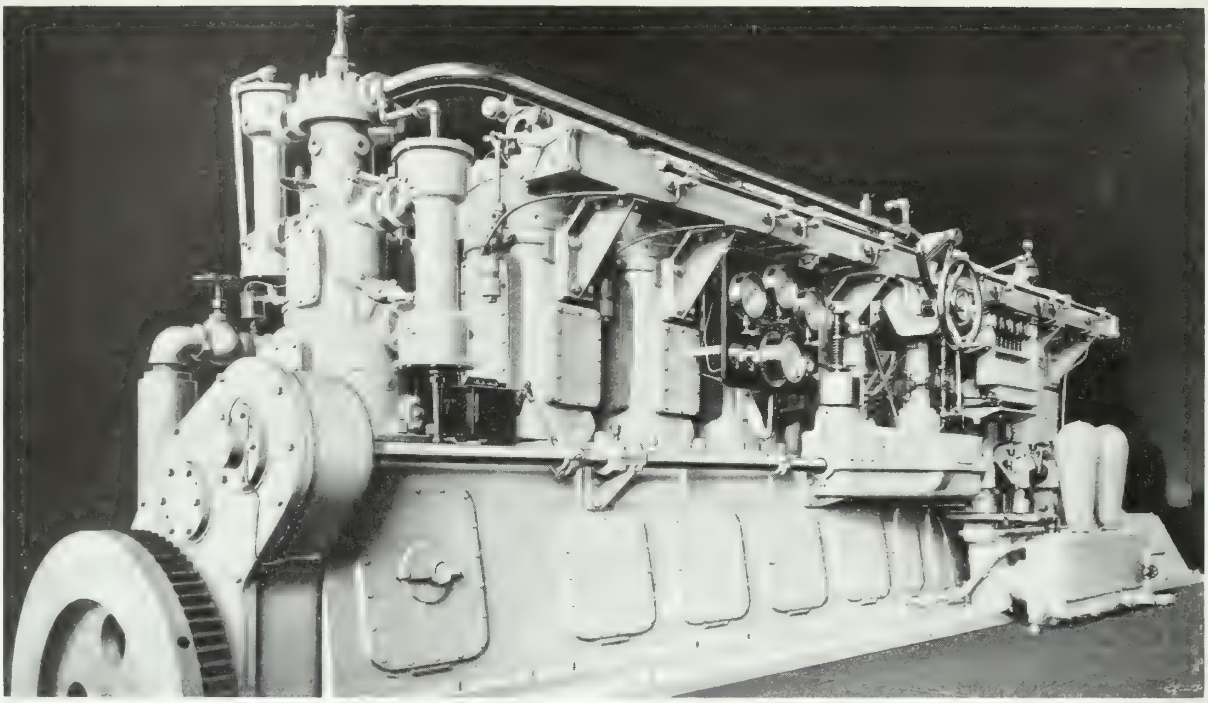
Accommodations for crew, not shown in sketch plans, will be arranged in the under deck space adjoining the engines. Upper deck is shown open on plans, but can be easily roofed over if found advisable.

The old high-pressure beam engine has not been departed from except in a few cases where an inclined compound engine or propeller boat has been used, but in this vessel for reasons of economy it is proposed to install Diesel electric propelling machinery as developed by the Winton Engine Company of Cleveland, in collaboration with the Westinghouse Electric Company, and the plant will consist of two 500 H. P. eight-cylinder engines each directly connected to a generator. Each generator is electrically connected to a motor on a propeller shaft, which runs at a speed of 135 R. P. M.

Each driving motor will be operated independently of the other and this will give an opportunity of getting data as to the gain, if any, of operating these propellers at different speeds, as it is generally believed that a screw ferry boat would give higher propulsive efficiency if the propeller at the stern were driven faster, due to its working partly in the wake of the forward propeller.

The driving motors will be designed large enough to take at least an overload of 50 per cent when starting and stopping and the control of the field current will be arranged so the motors can be reversed and if deemed advisable this control can be at the hand of the navigator in the pilot house.

All the auxiliaries, such as steering gear, sanitary, fire and bilge pumps can be handled from



Winton Diesel engine of the type proposed for electric drive on automobile ferries

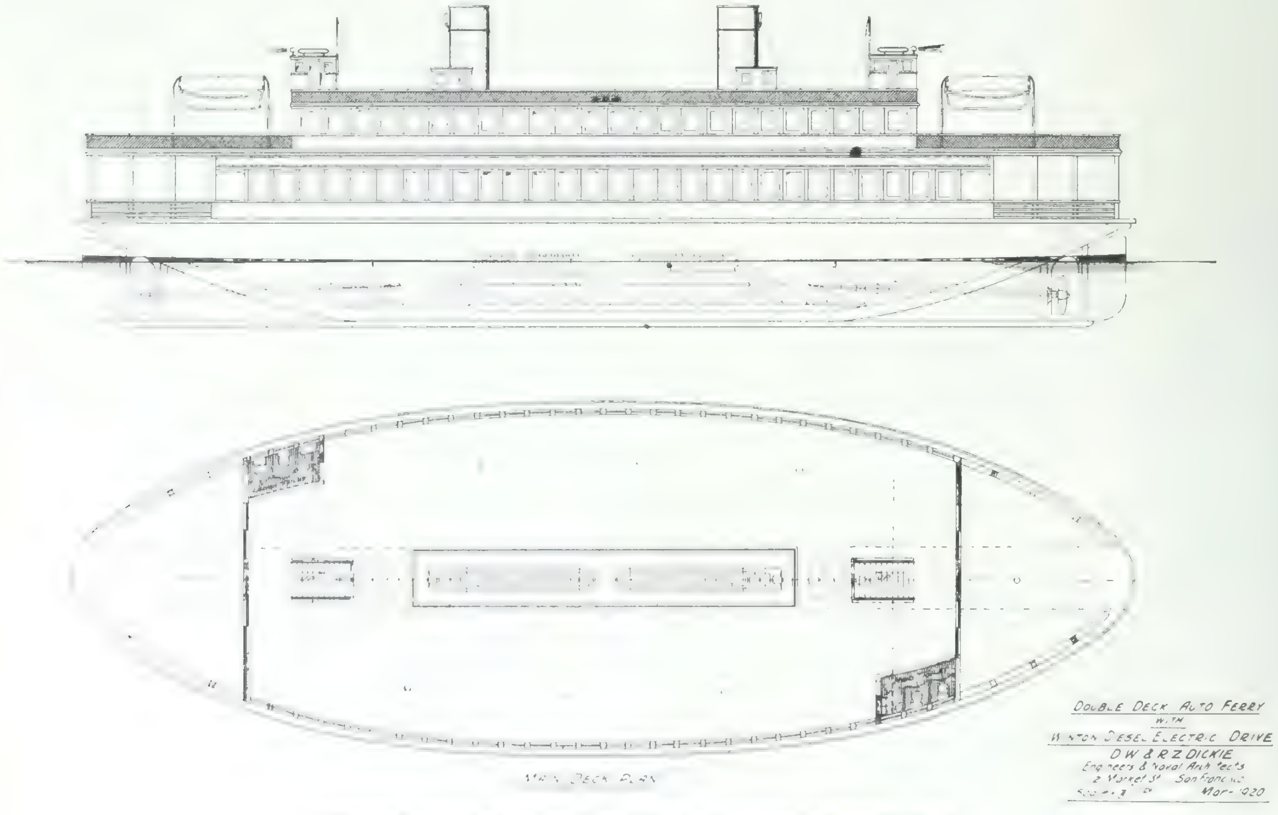
the main power plant, as they will all be motor driven.

An auxiliary generating set of 30 kilowatt capacity will be fitted to take care of the lighting and pumps while the vessel is in the slip.

In comparing this electric installation with propulsion by a steam beam engine, it is assumed that two electricians can properly care for the plant, and that their wages would just offset the wages of the firemen in the steam plant.

For the sake of comparison it is assumed that the boat will be in operation for sixteen hours a day and will be in the slip about eight hours.

	Diesel Electric Drive	Beam Engine Jet Condensing Plant
Indicated H. P.	1,000	1,000
Weight of plant installed	200 tons	250 tons
Fuel used per hour, per h.p.	.45	2.
Fuel used per hour, barrels	1.7	4.7
Fuel used in barrels per day running 16 hours	27.2	75.2
Fuel used per hour in slip, barrels	.25	.25
Lubricating oil used per day 16 hours' running	18 gals.	6 gals.
Lubricating oil used per		


MAIN DECK PLAN
DOUBLE DECK AUTO FERRY
WITH
WINTON DIESEL ELECTRIC DRIVE
D W & R Z DICKIE
Engineers & Naval Architects
2 Market St San Francisco
Mar-1920

Outboard elevation and main deck plan of proposed automobile ferry

hour in slip	.75 gals.	.25 gals.
Hours running	16	16
Hours in slip	8	8
Cost of lubricating oil per gal.	.29	.43
Cost of lubricating oil per yr.	$2540.40	$1255.60
Cost of fuel oil per barrel	$1.85	$1.60
Cost of fuel oil per day running	$50.32	$120.32
Cost of fuel oil per day in slip	$3.70	$3.20
Water used per day for power plant		25 tons
Weight of water carried in tons for power plant		50 tons
Cost of water at 10 cents per ton, per day		$5.00
Fuel used per year in barrels	10,658	28,178
Water used per year for power plant, tons	00	912
Cost of water per year		$912.00
Total cost of fuel, water and lubricating oil for 1 year	$22,240.00	$47,267.60

It will be seen that there will be a saving of about $2000 a month in the cost of operation of the power plant, through the saving in fuel, water and lubricating oil, and besides this, the boat can handle nearly twice as many machines as a single decked auto ferry.

The Diesel Electric Yacht Guinivere

IN the March issue of Pacific Marine Review appeared a detailed description of the Winton Westinghouse Diesel electric propelling machinery installed in the yacht Elfay. Since that description was written, Mr. Russell A. Alger, owner of the Elfay, has made with her a trip of over 8000 miles, during which no trouble of any kind developed in the Diesel engine or electrical equipment. As a result of this satisfactory service, Mr. Edgar Palmer, who is building a large schooner yacht at the shipyard of George Lawley & Son, Neponset, Massachusetts, has decided to install a Diesel electric drive in his vessel along the same lines as those which have operated so successfully in the Elfay.

A model of the Guinivere
Photo by [illegible], New York

The dimensions of the Guinivere are, length over all 195 feet, length at water line 150 feet, molded beam 32 feet 5 inches, draft 15 feet, displacement 642 tons. Her power plant will consist of two six-cylinder, 350-horsepower, model 24-A Winton Diesel oil engines, each direct connected to a 225-kilowatt, 125-volt Westinghouse shunt-wound generator, operating at 225 revolutions a minute, and each also connected by chain drive to a 15-kilowatt, 125-volt, direct current, compound-wound Westinghouse exciter, running at 1150 revolutions a minute. The two generators are connected in series for normal running and the two exciters likewise, so that with both generators in operation power is supplied to the 550-horsepower Westinghouse Electric motor at 250 volts, which will drive the motor at 220 revolutions a minute. This normal power will drive the hull at a speed of 11½ knots an hour through the use of a special two-bladed propeller, 8 feet 4 inches in diameter, designed by A. Loring Swasey. Should it be desirable at any time to cruise at a slower speed up to two-thirds of the full speed, one generating set can be cut out and the power delivered to the motor at 125 volts, which would give practically half the normal speed of the motor under full load of the generator and would drive the ship at approximately two-thirds of her full speed.

The control of the motor is arranged through the field of the generator in the same way as that described for the Elfay. An interesting feature of the Guinivere installation is the provision made for flooding the bearings with oil from the pressure oil system of the Winton Diesel engines. This gives assurance that the bearings will operate satisfactorily, no matter what the angle of list may be.

The driving motor is to be of the semi-inclosed ventilated type, cool air being blown in from a centrifugal fan direct connected to a 1½-horsepower motor and furnishing 3500 cubic feet of air a minute. The auxiliary equipment consists of two 15-kilowatt generators driven by 25-horsepower Quayle engines and the usual bilge, fire and service pumps. Ventilating fans, windlass and cargo and sail winches all operate by electric power, as does also a two-ton Clothel ice machine.

As this new yacht of Mr. Palmer's is of practically the same dimensions as a steam yacht of the same name formerly owned by him, a comparison between the two installations will be of interest. The older vessel was equipped with quadruple expansion steam engine and Scotch boiler. For a cruising radius of 4000 miles with this equipment she had to carry 160 tons of coal and the boiler room and engine room had to be located in the space best suited for living accommodations. The new Guinivere with the equipment above described has a cruising radius of 11,000 miles with 95 tons of oil in the tanks and it is obvious that oil lends itself to a far greater flexibility in location of storage than does coal. It is also found that in comparison with the older outfit, this new yacht could get along with six less men in the crew, which is not only quite an item in saving in the operating cost, but also allows more room for living accommodations for guests and a larger capacity for stores. In this new yacht there is no necessity for a smoke stack or exhaust stack of any sort, the exhaust running out of the after end of the vessel below the water line.

The design of the power plant in the Guinivere was worked out under the personal supervision of Mr. Alexander Winton of the Winton Engine Works and Mr. Wilfred Sykes of the Westinghouse Electric & Manufacturing Company. While the method of control is the same as that employed in the Elfay, the Guinivere will not be arranged for direct control of the generators from the deck, but will be controlled in the engine room by signals from the pilot house.

The S. S. William Henry Webb

THE steamship William Henry Webb is now docked at Pier 36, Atlantic Basin, New York, after a very eventful maiden trip from Philadelphia to New York. Should Mr. Briggs of the New York Tribune, in his inimitable drawings, choose to portray "what the steamship William Henry Webb thinks," we can well imagine that the burden of the plaint of this ship would be that a great deal of insult has been added to injury. True, she did encounter considerable trouble on her maiden trip, but the facts have been badly distorted in many instances, and stories of every imaginable trouble, from complete breaking down of the engines to an almost total demolishment by fire, have been woven about her.

The steamship William Henry Webb is a steel freighter of about 8800 tons deadweight capacity, built by the Chester yard of the Merchant Shipbuilding Corporation, and propelled by Westinghouse geared turbines of 3000 shaft horsepower, furnished with steam from water tube boilers.

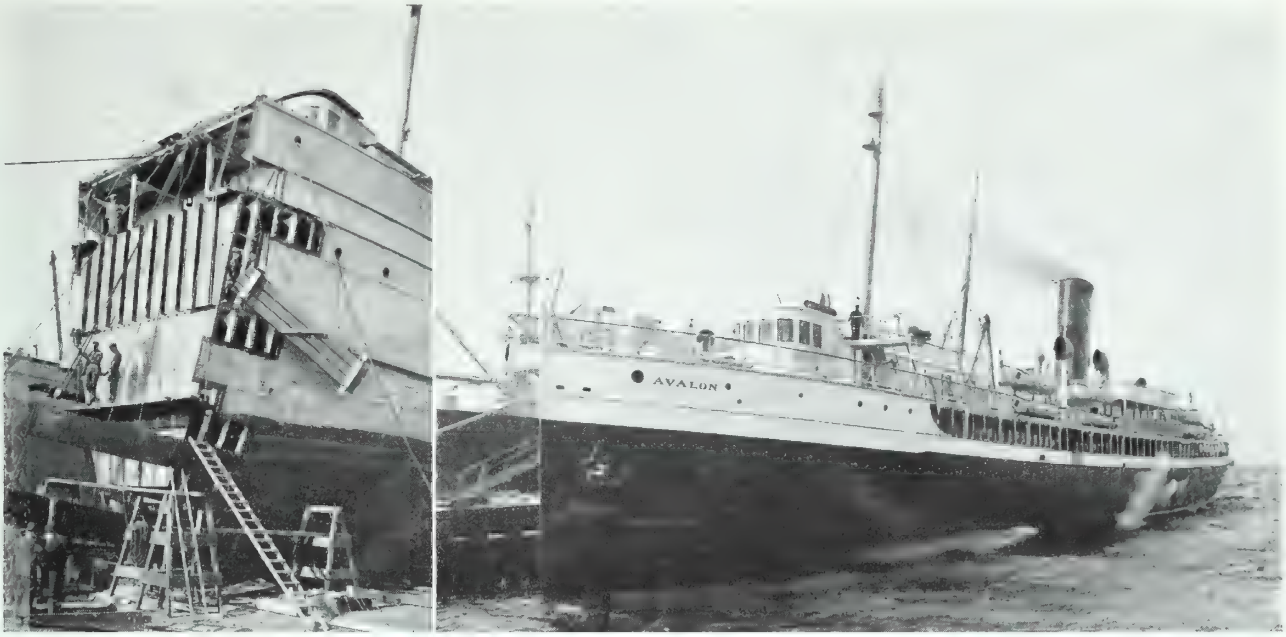
The ship had passed her trials very satisfactorily and was on her first voyage from Chester, Pennsylvania, to New York. Off Atlantic City a stop was made to replace the thrust bearing shoes in the high pressure turbine, the shoes having wiped due to dirt and foreign matter in the oil which had not been filtered out. Spare thrust shoes were quickly fitted and the vessel proceeded.

The real trouble came later, when water in some way became mixed with the fuel oil supply to the boilers and caused the fires under the boilers to go out. Thereupon followed a strenuous time ascertaining the source of the water leak into the fuel oil and attempting to get up steam again. The troubles were aggravated about this time by a fire which broke out in the fire room. This, however, was quickly controlled and put out before any particular damage had been done. The ship being unable to make headway during this time, anchored and radio messages were sent out for assistance. The steamship Panama stood by and towed the William Henry Webb to Ambrose Light, where she was taken in by tugs.

The troubles with the William Henry Webb were not due to the engines or the boilers; and outside of the wiping of the high pressure turbine thrust bearing shoes, it is stated that the main turbines and gears had given perfect satisfaction. Little delay will be required to get the ship back into good condition, and she will probably sail for Yokohama in March.

View of the big Drydock of the Todd Shipyards Corporation, new York, showing severe ice and snow conditions being overcome by steam attack

Grafting Operation on Steamer



The Steamship Avalon Before and After the Operation

REHABILITATED from a vessel minus bow and stern to a veritable floating palace, the steamship Avalon, owned by William Wrigley and associates, recently left the Brooklyn yards of the Morse Dry Dock & Repair Company to pass through the Panama Canal and thence to the waters of the Pacific. Plying between San Pedro and the Santa Catalina Islands, this ship will aid in the development of the city of Avalon and the Santa Catalina Islands.

A witness to the wonderful skill of modern ship surgeons, the Avalon, with her nose and tail grafted to their natural places, has been transformed from a battle-scarred hulk to a thing of beauty, with two dance halls, de luxe cabins and woodwork costly and resplendent and so arranged as to obscure all inside piping and wiring. Since the signing of the armistice, when the United States government halted work on her, this vessel has acquired, in addition to her wonderful appointments, her normal length, which had been reduced by forty feet in the process of amputating her at bow and stern.

A sturdy, well-preserved ship, the Avalon was coveted by the government during its war-time need of tonnage. She was then in the vicinity of Chicago. The demand for tonnage became more and more urgent and the government decided to send her to Boston for conversion.

To make this trip, the Avalon was required to pass through the locks of the Lachine Canal, above Montreal. As the vessel was 277 feet 8 inches long and the locks of the canal did not permit a boat of this size to pass, she was sent to the Chicago navy yard, where her length was reduced.

The several plates of bow and stern were placed in the forward part of the ship, and, surprising as it may seem, the Avalon proceeded to Boston under her own steam.

She was towed from Boston to the Brooklyn, New York, yards of the Morse Company, where her rehabilitation, even to a fuel oil-burning system, has been made complete. The Avalon has a speed of twenty-two knots an hour.

FOURTH ELECTRIC BATTLESHIP LAUNCHED

THE superdreadnought Maryland, fourth capital ship of the navy to be equipped for electric drive, was launched at Newport News, Virginia, on March 20. The Maryland is a sister ship to the U. S. S. California, launched in November, 1919, at the Mare Island Navy Yard, California.

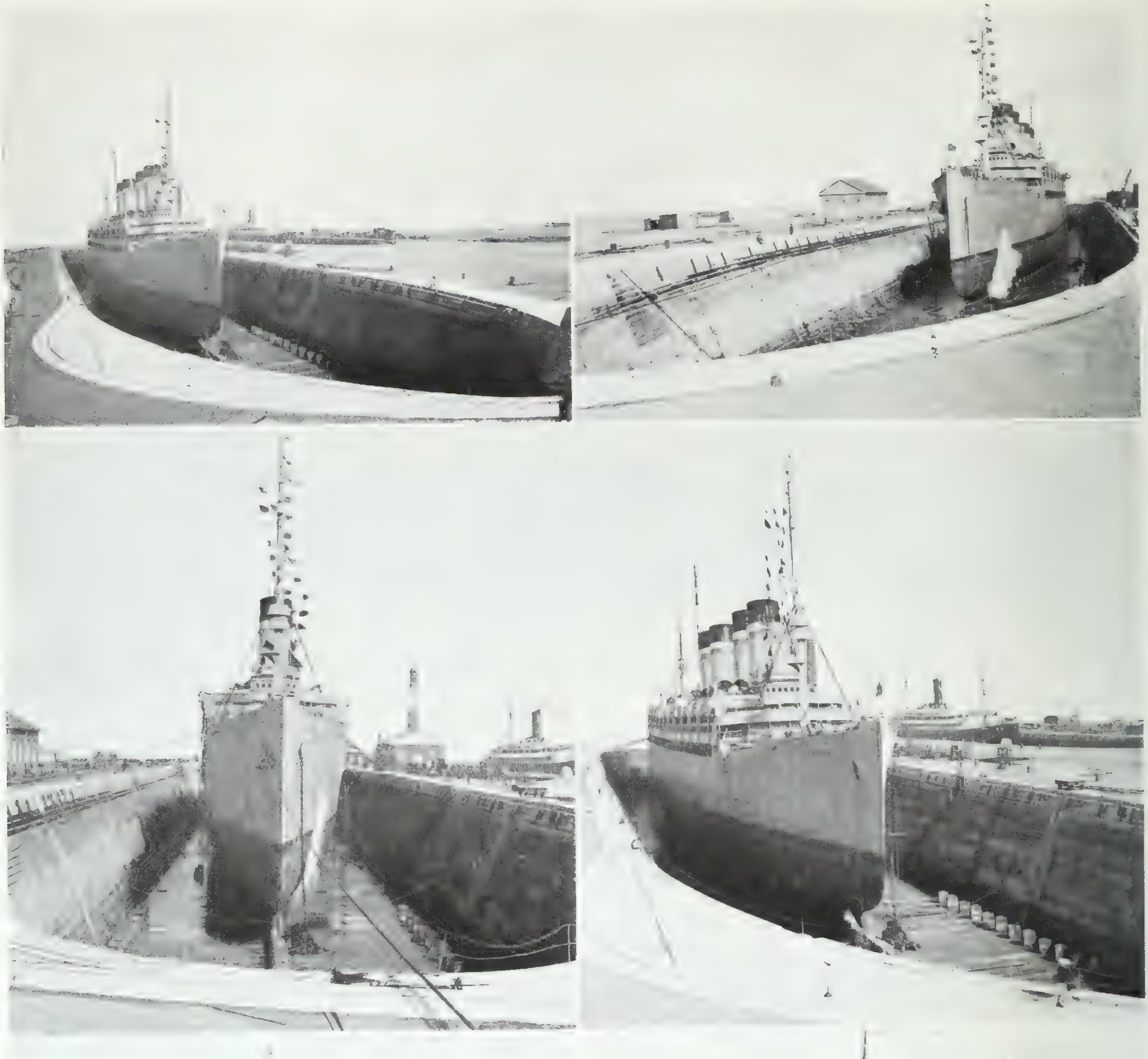
Her electrical propulsion equipment, which is of the General Electric Company manufacture, consists of two turbo-generator units rated at 11,000 kilowatts each, one control board, four 7000-horsepower propeller motors of the induction type, and six 300-kilowatt exciter sets. The capacity of the complete power plant for propulsion is 28,000 horsepower. In most respects the Maryland's propulsion equipment follows that of her predecessors, the California and New Mexico.

From a naval standpoint, she is the first vessel to mount 16-inch guns, being supplied with a battery of eight, thus possessing a range greater than any other American warship.

UNION OIL TANKERS

FOUR modern steel tankers, which total 46,000 deadweight tons capacity, have been contracted for by the Union Oil Company, 120 Broadway, New York. Two of 12,500 tons each—85,000 barrels capacity—are to be delivered in March, 1921, by the Sun Shipbuilding Company, Chester, Pennsylvania. Two of 10,500 tons each—75,000 barrels capacity— have been contracted for through W. A. Harriman & Company, Inc., New York, to be delivered in November and December, 1920, by the Merchant Shipbuilding Corporation, Chester, Pennsylvania. Each of the 12,500-ton vessels will be equipped to carry about 3500 tons of package cargo on return voyages.

These contracts place the Union Oil Company of Delaware well up in the list of the large oil companies which have tankers building or under contract in American shipyards.



Views of Army Transport Mount Vernon in the Drydock of the Union Plant of the Bethlehem Shipbuilding Corporation at Hunters Point. The largest Drydock on the Pacific Ocean

The Largest Drydock on the Pacific Ocean

WORLD'S LARGEST SHIP	
Length	907′ 6″
Beam	100′ 3″
Depth	58′ 2″
Draft	32′

HUNTERS POINT DRY DOCK	
Length	1020′
Breadth at bottom	110′
Breadth at coping	153′
Depth	48′ 6″

THE graving dock of the Union plant of the Bethlehem Shipbuilding Corporation, Ltd., at Hunters Point, San Francisco, may justly claim the above title.

This has been emphasized recently by the docking there of the former German trans-Atlantic liner Kronprinzessin Cecilie, now the United States Army transport Mount Vernon. As the pictures on the opposite page very graphically show, this huge vessel might be said to have been lost in the hugher dock—there being ample room for a 300-foot steamer in addition to the great transport.

A few figures comparing the dimensions of the drydock with those of the Mount Vernon and other great marine structures might be of interest. The Mount Vernon is 685.5 feet in length, 72.2 feet in breadth, 40.5 feet in depth, and 31 feet draft. The former Vaterland, now the Leviathan, the largest steamer afloat, is 907 feet 6 inches in length, 100 feet 3 inches in breadth, 58 feet 2 inches in depth, and 32 feet draft. The locks at the Panama Canal are 1000 feet in length, 110 feet in breadth, 40 feet in depth. The large drydock at Hunters Point is 1019 feet in length at the top, 1000 feet in length at the bottom, 153 feet in breadth at coping, 110 feet in breadth at the bottom, and 48 feet 6 inches in depth. It will thus be seen that this dock will take the largest ship afloat very nicely, and will take any ship that can ever come through the Panama Canal. The dock is, in fact, the largest basin for drydocking ships on the Pacific Ocean, and it is a very great adjunct to the marine facilities of San Francisco harbor that such a dock is always available for great ships. And the use of this dock in conjunction with the tremendous facilities of the shops of the Union plant of the Bethlehem Shipbuilding Corporation, Ltd., enables that plant to guarantee prompt deliveries on the repair and reconditioning of the largest ships that come into this harbor.

Varied Lines of World Commerce to be Represented at Foreign Trade Convention

By C. P. Converse

Secretary of the Pacific Coast Committee in Charge of the Convention

VISIONING with splendid unanimity the full importance to the Pacific Coast of the forthcoming seventh national convention of the National Foreign Trade Council at San Francisco, May 12 to 15, leading commercial organizations of the major cities of the coast are co-operating to make the convention loom forth in the annals of the Foreign Trade Council as the most significant and far-reaching in its results of any convention previously held by the great Trade Council of America.

While the general theme of the convention is, "The Effect of Being a Creditor Nation," the significance of placing the seventh convention on the shores of the Pacific cannot but center here the great trade problems and possibilities of the Pacific over-seas commerce.

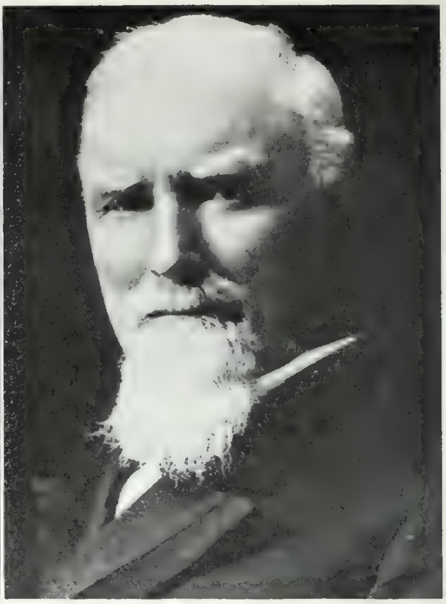
Quick to realize the importance of this great meeting of American traders at a Pacific port, the nations of the Orient and of South America are hurrying their list of delegates to the convention headquarters. In every mail from South America, the Orient, Australia, New Zealand and the Strait Settlements, come lists from individuals, firms and commercial organizations pledging participation. At this writing eight of the nations of the Pacific and of South America have officially listed their delegates and it is expected that by the time the convention opens twenty-seven nations and their representatives will be directly represented.

Through their commercial organizations the major cities of America are sending delegations.

Some idea of the scope of participation can be gathered by a glance at the list of delegates already accredited. First on the alphabetical list is E. H. Angier of the Angier Mills, Framingham, Massachusetts. First on the list of "B's" is L. C. Bryan of the Boatmen's Bank, St. Louis, Missouri. First on the list of "C's" comes another banker, George B. Carpenter, of the Merchants' National Bank, Los Angeles, California. On the list of "D's" is first G. F. Deering of the American Oriental Sales Corporation of Seattle.

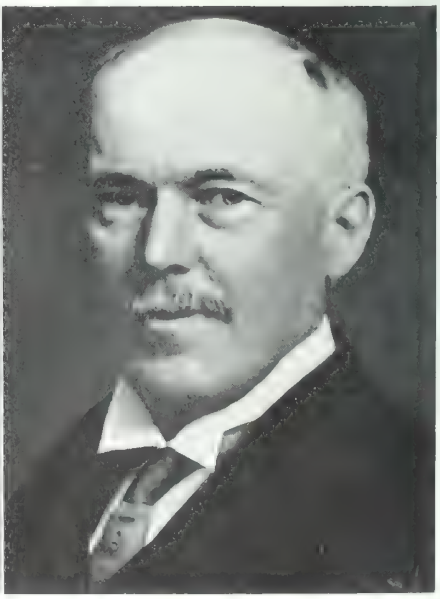
The Caldwell Shipping Company of New York, represented by their Mr. Fowler, is first on the "F's." Bankers again lead the list of "E's" and "H's" and first on the list of "J's" comes the Jones & Laughlin Steel Company of Pittsburgh.

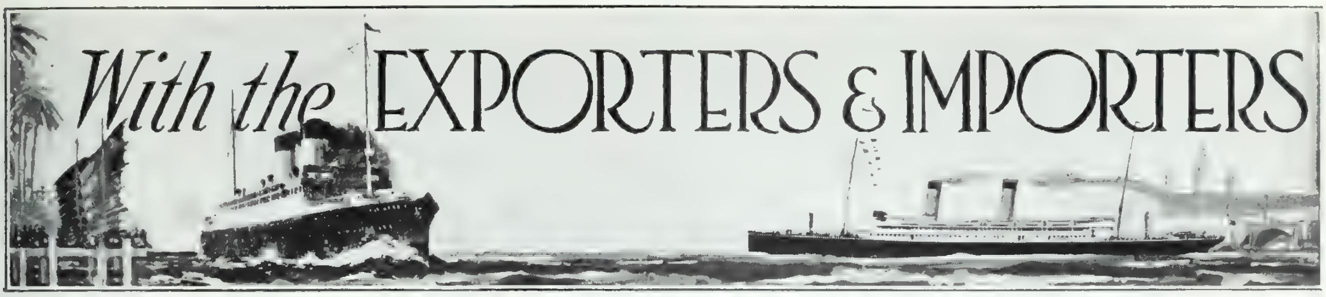
And so the list reads to the end of the alphabet. Every line of industry and trade is represented; finance, export and import, shipping, agriculture mines, timber, metal—in fact, the entire varied resources of our country are reflected through the delegate list.



The Pacific Coast Committee in Charge of Arrangements for the Seventh Annual Convention of the National Foreign Trade Council

Top Row—left to right—J. K. Armsby, San Francisco; H. F. Alexander, Tacoma; Robert Dollar, San Francisco. Center—F. J. Koster, Chairman. Lower Row—left to right—William Piggott, Seattle; M. H. Houser, Portland; J. J. Donovan, Bellingham.





With the EXPORTERS & IMPORTERS

FREIGHT REPORT

OUR last circular was dated February 19, and we are glad, at last, to report some transactions for flour from Portland to Europe. The Swedish steamer Braeholm, about 7000 tons' cargo capacity, commenced to inquire for bids for wheat or barley or flour from Puget Sound to the United Kingdom or the Continent, and even offered firm at $25 a ton. At the time there was no inquiry whatever on the part of shippers, and the best indications made were $20 a ton, which apparently did not interest owners. Then an inquiry for flour from Portland or Puget Sound to Alexandria came into the market, and after some negotiations the above steamer was chartered by the Pacific Grain Company at $28 a ton, full cargo of flour from Puget Sound to Alexandria. Immediately following this charter, the United States Shipping Board vessel, the Eilbek, handled by Williams, Dimond & Company, succeeded in chartering for a full cargo of flour from Portland to Alexandria at $33 a ton, the Portland Flouring Mills being the firm supplying the cargo. Now, the fine Norwegian motorboat George Washington is reported chartered for a full cargo of flour from Portland to Alexandria by Kurr-Gifford & Company at $33 a ton, and there are still inquiries for further tonnage at the above rate in the same direction.

We are glad to say that good rains have fallen all over the state, affording great relief mentally to all, and materially to the growing crop, and with similar rains in April and cool weather in May, we may be surprised by a very good harvest of barley in Caliornia.

Chartering has been fairly active, since our last circular, in different directions.

J. J. Moore & Company chartered the wooden steamer Bundarra at $40 for lumber to Melbourne. They also chartered the steel sailer Wm. T. Lewis at $57.50 from Puget Sound or British Columbia to one African port; also the new schooners Oregon Fir and Oregon Pine at a reported rate of $37.50 Sydney and $40 Melbourne.

Comyn, Mackall & Company chartered steamer Boobyalla at $35 from the North with lumber to Callao.

The owners of the Rosalie Mahony got $8 a ton for a cargo of scrap from Panama to San Francisco, and they chartered her on arrival at $36 a thousand for railroad ties from Eureka to two ports on the west coast of South America, to Balfour, Guthrie & Company. This firm also chartered the steamer Boobyalla for a cargo of nitrate from Chile to San Francisco and Dupont at $15 a ton. They have also chartered their vessel Monterey, on private terms, for lumber from the north to South Africa.

Hind, Rolph & Company chartered the Lord Templetown from Newcastle to a nitrate port with coal, and the same vessel for a cargo of nitrate to Honolulu, at a reported rate of about $33 for the round trip.

Christenson, Hanify & Weatherwax chartered the steamer Ashland County at $36.50, lumber to two nitrate ports, and the Finance Import & Export Company chartered the barge Acapulco at $35 net a thousand, lumber from Portland to Callao.

W. R. Chamberlain & Company chartered the steamer Florence Olson at $37.50, lumber from the north to Africa.

A. O. Anderson chartered the motorboat Oronite at $15 a ton for coal from Australia to a nitrate port.

The schooner Resolute was chartered by the Bank Line Transport & Trading Company at $9.50 from Newcastle to Honolulu, and W. R. Grace & Company chartered the steamers Nika and G. A. Flagg at $17.50 and $18 a ton, respectively, with nitrate from Chile to New Orleans.

London charterers are supposed to have chartered the iron sailer Shandon at 87/6 for coals to a nitrate port, and $14 from nitrate port to San Francisco.

Burns-Philp & Company chartered the H. D. Bendixen at $15 from the South Seas to San Francisco, and Mindoro, $16 similar charter, and the schooner Echo at $17, two ports South Seas, copra to San Francisco.

Comyn, Mackall & Company sold the schooner Meteor at $45,000 to Mr. Seaborn of the Skinner & Eddy Corporation, and the same party is reported, on the street, to have bought the Mindano from Atkins, Kroll & Company at the same price.

The steam schooner Daisy Freeman is reported sold at $140,000, and the motorboat San Cosme was sold to Frank Petersen at, presumably, about $15,000.

At this closing we quote freights as very steady, and with a good demand. Freights are certainly lower on the east coast of the United States and Europe, but on account of the comparative scarcity of tonnage in this ocean, we do not feel the weakness here yet.

PAGE BROTHERS, Brokers.

FOREIGN CREDIT SESSION

MR. E. W. WILSON of the Anglo & London Paris National Bank of San Francisco, who is chairman of the Foreign Credits' Section of the National Creditmen's Association, announces that the topic of Foreign Credit Information will be very ably covered at one of the early sessions of the Seventh National Foreign Trade Convention.

Professor A. C. Whitaker of Stanford University and C. H. Swift, credit manager of Getz Brothers & Company, will deliver the principal addresses at this meeting. Professor Whitaker, who is the author of a new and interesting work entitled "Foreign Exchange," will discuss this very important phase of foreign trade relations from a theoretical standpoint, while Mr. Swift will emphasize more particularly the immediate "ways and means" of establishing closer and more mutually satisfactory credit relations with foreign customers.

DRAKE LOCK-NUT COMPANY GOING AFTER EXPORT TRADE

THE Drake Lock-Nut Company claim they are finding a demand for their product from foreign countries, and Mr. Geo. F. Drake, general manager, being an enthusiastic student of foreign trade development, not only for his company's product but for the United States in general and especially for California and San Francisco, has worked out a plant to quote C. I. F. to any usual seaport in the world.

By investigating ocean freight rates and getting an average, Mr. Drake learned that an average slightly lower discount from the list price of Drake Lock-Nuts would pay the ocean freight rates to any usual seaport in the world and in a few cases a combination of rail to Galveston, New Orleans or New York and ocean.

In some cases the freight rate will amount to slightly more than the amount gained by the lower discount from the list price and in others it will be slightly less, so that an average is obtained, thus enabling the Drake Lock-Nut Company to quote their product C. I. F. to any usual seaport in the world.

This shows the prospective foreign buyer just the ground he stands on as to landed costs of merchandise he may want to purchase.

The Drake Lock-Nut Company is to be commended on the energy and effort to develop foreign trade relations for the United States and especially California and San Francisco.

E. F. TOWNSEND

THE many friends of this popular young man are congratulating him upon his recent important appointment as agent at Singapore for the Foreign Trade Service of the Pacific Steamship Company. This in itself would be a good man-sized job, as Mr. Townsend will have jurisdiction over the Straits Settlements, the Dutch East Indies and India, but the old proverb, "Unto him that hath shall be given," is true in this case also, and Mr. Townsend carries with him the additional appointment of agent and surveyor of the American Bureau of Shipping at Singapore. He will also represent the Barber Steamship Lines, Inc., at that port, handling their Shipping Board vessels, which will amount to about two sailings a month. It can readily be seen that E. F. Townsend will be quite a busy man and that Singapore is going to see some action.

Mr. Townsend has had many years' experience in the shipping and freight forwarding business, having been with the old Pacific Coast Company as cashier, contracting freight agent, and traveling freight and passenger agent. When the merger was formed organizing the present Pacific Steamship Company, E. F. Townsend started independently as a contracting freight agent at Seattle and later was chief clerk to C. E. Flye, general freight agent of the new company. He enlisted with the United States Army and on his release returned to the service of the Pacific Steamship Company and was appointed general agent for Alaska. Shortly after this appointment he was taken over by the Shipping Board and spent about a year in Washington, D. C., ending as assistant manager of the supervisor's department of the Shipping Board. Returning to Seattle at the request of Mr. Pinneo, manager of the foreign department of the Admiral Line, Mr. Townsend has for the last four months been assistant manager in that department.

Trade Notes on a Trial Trip

ON the trial trip of the steamship Havilah, the 9400-ton steel cargo carrier built by the Union Construction Company at Oakland, our advertising manager was interested to see the great number of American manufacturers represented in the various installations of machinery, fittings, nautical instruments, etc.

An inspection of the ship which started at the pilot house showed McNab engine speed indicators, manufactured by the McNab Company of Bridgeport, Connecticut, who are represented locally by Ford & Geirrine. A novel tell-tale panel, manufactured by the Marine Electric Company of San Francisco, acts as automatic indicator to show the navigating officer that the running light circuits are in good order. In case of trouble in these circuits the pilot lamp flashes, indicating the particular light out of order, and the panel is so constructed that simply throwing a switch restores the light through an emergency circuit.

Among other modern nautical instruments the electric automatic whistle operator was noted. This appliance is manufactured by the Signal & Control Company of New York. The compasses were furnished by A. Lietz. Between the pilot house and emergency tiller, Magnavox marine telephones are in use. These sound-proof telephones are manufactured locally by the Magnavox Company with offices and factory in Oakland. The ship's telegraph was manufactured by Charles Corey & Sons of New York. The American Engineering Company of Philadelphia was represented by their Benson electric telemotor and their steam steering engine. This company's local offices are in charge of James C. H. Ferguson.

On the main deck were noted the Lidgerwood Manufacturing Company's 8¼ by 8 double cylinder, single fixed drum cargo winches, with a capacity of 10,000 pounds at 120 feet per minute on a single line with steam pressure of 150 pounds at the throttle. The Lidgerwood Company is represented locally by Livermore & Company, T. L. Williams, manager, in the Merchants National Bank Building.

The Steward Davit & Equipment Corporation of New York was represented by boat-handling equipment that included the Steward mechanical davits and releasing gear.

Haviside, Withers & Davis, 55 Stewart street, San Francisco, furnished the canvas binnacle covers and awnings.

The deck hose was from the American Rubber Manufacturing Company of Oakland.

An ice machine and refrigerating room were fitted by the Gloekler Manufacturing Company of Pittsburgh, Pennsylvania, and the ship's fresh water supply is obtained from a Jewel marine still.

In the engine room Falk reduction gears are used between the turbine and propeller shaft, being of the same type supplied by this company for all of the 9400-ton Emergency Fleet Corporation vessels in which Falk gears are used. They are made for compound turbine drive and are of the double reduction type, reducing from turbine speed of 3600 r. p. m. to shaft speed of 90 r. p. m.

The Falk Company's branch office for the Pacific Coast is located in the Rialto Building and is under the direction of Mr. F. W. Grimwood.

The thermometers for the engine and boiler rooms, also the bridge, were furnished by the Tagliabue Manufacturing Company, whose local offices are at 67 Second street.

Kingsbury bearings were used to carry the thrust load between the engines and propellers. These bearings are manufactured by Albert Kingsbury, with offices in the Oliver Building, Pittsburgh, Pennsylvania.

Bulkhead fixtures, water-tight fixtures and a rudder angle indicator were installed by H. S. Tittle, 766 Folsom street, San Francisco.

Feed, water, bilge and other types of pumps on the steamship Havilah were furnished by the Epping-Carpenter Works, C. H. Wheeler Manufacturing Company, and the Worthington Pump & Machinery Company.

The S. F. Bowser Company, whose local offices are at 612 Howard street, supplied their oil storage system, and for oil purification there was installed a De Laval oil purifier, manufactured by the De Laval Separator Company, represented locally by the Herzog Electric & Engineering Company.

The Coen Company of San Francisco furnished the mechanical oil-burning equipment.

Foster superheaters are installed in connection with Scotch marine boilers.

Crane Company valves and fittings were well represented throughout the vessel.

Magnesia steam pipe covering was furnished by the Plant Rubber & Asbestos Works, 537 Brannan street, San Francisco.

Electric lighting throughout the ship was supplied by two General Electric Company's generators, driven by Terry steam turbines. These turbines are manufactured by the Terry Steam Turbine Company of Hartford, Connecticut. Local representatives are Stephenson & Nichols, Inc., 1070 Folsom street.

In the machine shop a 14-inch heavy-duty Axelson lathe was installed. These high-grade lathes are manufactured by the Axelson Machine Company of Los Angeles.

The propelling engines were Parsons turbines, manufactured by the Midwest Engine Company of Indianapolis, Indiana.

The bronz propeller blades were manufactured by the Standard Brass Castings Company of Oakland, California.

Crane Company's steam traps and Lunkenheimer valves and fittings were well represented on the vessel.

The paint used throughout the ship was furnished by W. P. Fuller & Company, whose local offices are at 301 Mission street.

A UNIQUE SHOW ROOM

THE Black & Decker Manufacturing Company of Baltimore, Maryland, has recently established a permanent office and show room at 1436 South Michigan avenue, Chicago, which will be in charge of Mr. R. G. Ames, whose territory will include the entire Middle West. Mr. Ames will have two assistants and six salesmen to cover this territory.

The office and show room is rather unique in its finishing. The front of the office has a big plate glass show window backed with royal blue velvet, against which the aluminum frame of the Black & Decker portable electric drill stands out like a "jewel in a case." The interior is finished with five-foot mahogany panels and a dark blue tapestry paper. Considerable comment has been caused by the attractive effects that are being obtained in the weekly re-decoration of the show window.

WINCH EXHIBIT

THE Lidgerwood Manufacturing Company will have an interesting exhibit at the National Marine Exposition to be held in the Grand Central Palace, New York, April 12 to 17. They will exhibit two types of their standard reverse valve cargo winches. They have installed a compressed air outfit, and the winches will be operated, and an actual demonstration made of the hoisting ability of these winches and the extreme simplicity of their control.

Over 6000 of these winches have been built and installed, from which can be estimated the number of ships that are equipped today with Lidgerwood standard winches.

The exhibit is located at Booth No. 43 and is in charge of Mr. Ed J. Boynton, who has had sea experience, was employed in the Lidgerwood works supervising the construction of their winches, and is now a member of their selling and engineering force.

NEW OPERATORS

The Thorndyke-Trenholme Company of California have opened offices in San Francisco at 214 Front street and are actively represented by Mr. J. C. Ogden.

Mr. Ogden reports traffic as being very heavy. The company has the steamers Catherine D, Juneau and Valdez under charter and is operating the West Hasseltine, Eastern Ocean and Eastern Moon for the U. S. Shipping Board.

AMERICAN CLAY MACHINERY COMPANY

The American Clay Machinery Company, manufacturers of modern deck equipment, including windlasses, winches, steering gears and capstans, have extended a cordial invitation to the trade to visit their exhibit at the New York Exposition in the Grand Central Palace, New York City, from April 12 to 17.

Progress at the Union Construction Company

THE Union Construction Company has recently completed and delivered to the Emergency Fleet Corporation of the United States Shipping Board its fourth vessel, the steamship Havilah.

The Havilah is a standard 9400-ton deadweight cargo carrier with Scotch marine boilers and steam turbines developing 2800 horsepower. The keel of this vessel was laid on January 10, 1919. A delay of launching was caused by a defective stern casting which had to be taken out and replaced and the ship was launched on July 30, 1919. She has now been finished in spite of strike conditions and has given a very creditable account of herself on a trial trip in the bay.

It is rather interesting, however, and unique in the history of modern Pacific Coast shipbuilding plants that the original organization is still in charge at the Union Construction Company, the various departments being almost without exception under the guidance of the men who started with the origin of the company. Every one of the men is a practical mechanic in his own line and well able to do the work which he outlines for the men under him. It is probably due to this fact that the Union Construction Company is considered by its employes to be the safest yard on the Pacific Coast and one of the most desirable at which to work.

Much of the credit for recent progress at this yard is due to the close co-operation and splendid spirit of three of the heads of departments—Mr. W. D. Gardner, master mechanic; Mr. J. G. Sjoberg, an old superintendent; and Mr. W. E. Anderson, resident inspector for the Emergency Fleet Corporation.

Mr. Gardner served as a machinist with the New York Central Railroad; then for two years as a machine boss for Wagner & Chalmers, building marine engines; for one year with the South Chicago Shipbuilding Company, and for two years as general foreman with the Southern Pacific Railroad; afterwards he went to the United Engineer Works, where he had charge of the shop as foreman for six years, and was later for two years with the Union Iron Works.

Gustav Sjoberg was four years with the Union Iron Works; fifteen years with the United Engineer Works; and one year with the Bethlehem Steel Company before accepting his present position. He is well known as being one of the best mold loft men and steel shipbuilders on the coast.

Mr. W. E. Anderson had a long experience as chief engineer on steamers operated by the Admiral Line. At the entrance of the United States into the war and the beginning of the Emergency Fleet shipbuilding program, he offered his services as inspector and served in that capacity at the Moore Shipbuilding Company, Oakland, under the late George W. Dickie. The fact that he has a keen sense of the practical bearing of the problems presented to him in their relation to shop and construction work has been a very large factor in the efficiency of the work carried on by the Union Construction Company.

The 9490-ton steamer Havilah on her trial trip

The Union Construction Company has recently closed a contract for five revenue cutters for the Coast Guard service to cost $3,430,000. Four of the crafts will be electrically driven and will be 246 feet long, 38 foot beam, and 256 feet draft. The fifth will be steam-engine driven and 150 feet in length. Work is now under way on these ships and two of them are to be delivered in December, and they will all be capable of 16 knots speed at sea.

W. D. Gardner

W. E. Anderson

J. G. Sjoberg

Pacific Port Notes

THERE has been very little of the unusual or sensational in shipping matters on the Pacific Coast during the past month. Lumber shipments from the Northwest to foreign ports continue to increase, as will be seen in the detailed statements given in the notes from ports in that region. Probably the most interesting clearance during the month was that of the Shipping Board freighter West Kasson from San Francisco on a trip around the world under charge of the Pacific Mail Steamship Company. Such a trip recalls to the mind of the ancient mariner the good old days of clipper ships when the master of a vessel was practically the manager of a business enterprise and carried his ship to the points where business could be gotten to the best advantage for his owners. This is, of course, a new thing in the new American merchant marine, but in the days before the Civil War, and especially in the early days of the nineteenth century, such a voyage was common practice for the skippers of New England and the middle Atlantic ports, and is still very common practice for the Scandinavian cargo ships, these vessels often being absent from home for two or three years at a time in trading voyages.

The return of the transcontinental railroads to private control and the immediate request for permission to raise freight rates is causing some perturbation in the minds of exporters and importers on the Pacific Coast and of shipping men generally. The action of the Railroad Commission on this subject will be awaited with great interest, and as these increases of freight rate will be granted only on a showing of financial necessity on the part of each railroad, it may be that the well-known prosperous condition of the lines feeding the Pacific Coast ports will prevent any considerable raise in the transcontinental rate.

The entire coast is intensely interested in the convention of the National Foreign Trade Council which is coming to San Francisco in May, as many of the special features of this convention will bring to the Pacific Coast foreign trader a broader outlook on world conditions and an enlarged knowledge of the special requirements of individual foreign markets.

Minor marine casualties have kept the drydocks and ship repair plants at all coast ports busy on repair work. Notably among the serious mishaps was the sinking of the Ituna, fishing fleet tender of the Booth Company, which floundered in a storm off Point Reyes with the loss of two lives.

Victoria, B. C.

THE co-operative shipbuilding company, Victoria Shipowners Limited, is going ahead with their undertaking to construct four modern ships and have placed a considerable amount of stock subscriptions. This company will receive a loan of $700,000 from the Canadian government contingent upon stock subscription by the people of Victoria to the amount of $300,000. On latest advices only $40,000 of this stock remained to be sold. It would, therefore, seem that they are well on their way to a successful consummation of their plan.

The Grand Trunk Railway has inaugurated a new weekly service to Stewart and Massett—the steamers Prince John and Prince Rupert alternating out of the port of Prince Rupert.

French capitalists are still negotiating with the Foundation Company as to a lease on their shipyard sites at Victoria.

The British Columbia Sugar Refinery reports that 22,000,000 pounds of sugar was lost to the inhabitants of the three western provinces of Canada through the longshoremen's strike in Vancouver last summer. The refinery, set back by the loss of the raw sugar due to the strike, has not been able to catch up with the demand since and hence the apparent sugar famine in Western Canada.

The Canadian government is completing its plans for the new Esquimalt drydock, and it is expected that work will be begun on this undertaking about the first of May.

A great deal of agitation has been created over the question of wages for officers and crews in the Dominion government merchant marine fleet. Seafaring men declare that the wages on this fleet are far below the average on other deep-sea vessels running out of West Canadian ports. The matter has now been placed in the hands of D. T. Bulger, fair wage officer for the Dominion government, and it undoubtedly will be adjusted in a manner satisfactory to all parties concerned.

Vancouver, B. C.

ON March 4 the Pacific Construction Company executed a contract with the Canadian Pacific Railroad for excavation and fill on their new pier and work was started on March 8 and is now well under way. This pier will be a great addition to Vancouver's waterfront. It is to be a most modern structure and fully equipped with cargo-handling facilities, and will cost complete $3,000,000.

During the last five months almost 50,000 Chinese coolies have passed through the port of Vancouver on their way from work in the European war zone back to their homes in China. At times the congestion at the Williamshead quarantine station has been very great. For instance, at the end of the second week in March there were over 8000 coolies housed at that point. On March 14 the steamer Ixion sailed with 3625 of these Chinamen and during the same week the steamer M. S. Dollar took 4300 and the Bessie Dollar took those remaining, or about 1400. As the steamship companies got $55 each for transporting the men across the Pacific, it can readily be seen that these vessels will net a nice little sum out of this work.

During the last week of February, the steamer Chilcotte was launched at the Wallace yards for the Union Steamship Company. She is an oil-burning freight and passenger steamer and will be placed on the coast run to northern ports. She was sponsored by a daughter of Henry Darling, a local naval architect, who designed the ship.

Large shipments of paper, pulp and lumber are going out of Vancouver regularly. Often there are as many as four steamers a day loading partial cargoes of paper and pulp from the Ocean Falls mills.

The Kaisha Maru cleared on March 14 with a full cargo, including 1,250,000 feet of lumber and a considerable amount of pulp and paper. The M. S. Dollar cleared early in the week of March

14 with 2,000,000 feet of lumber in addition to the 4300 Chinamen above mentioned. On March 17 a Harrison Line steamer, Tactician, docked at Balfour Guthrie's pier to discharge 12,000 tons of general cargo from the United Kingdom and to load 2,500,000 feet of British Columbia lumber.

During the month the fish market became very much demoralized on account of car shortage for Eastern shipments. The cold storage warehouses, both at Vancouver and Prince Rupert, were overflowing, and when the season's catches began to come in, the fish had to be unloaded locally at any price. As the situation now stands, many of the local boats and those of Prince Rupert are being tied up until the market can be relieved by shipments to outside points.

Seattle

THE outstanding incident in Seattle marine horizon during the past month was the purchase by David Rogers of the Skinner & Eddy Shipyard No. 2 and the announcement by Rogers that he has contracts for twenty-five big steel steamers which he will build in this yard. The purchase price of the yard was said to be $3,400,000. The new contracts held by Rogers are valued at $40,000,000 and will mean the employment of 6000 men at this plant, which will bring to Seattle an additional daily payroll of $35,000. The great popularity and well-known ability of David Rogers, who through the war emergency period was general manager of the Skinner & Eddy plants and was considered at one time the master shipbuilder of America, lends an additional interest to this announcement which means the revival of steel shipbuilding on a big scale at the port of Seattle.

A. M. Gillespie of Seattle has been appointed Puget Sound agent for the new Shipping Board service between Pacific Coast ports and the River Platte via the Straits of Magellan. It has been announced that nine steel steamships will be placed on this route, giving a fortnightly service, and that the first vessel will begin loading at Seattle on April 26.

Passenger business for the Orient continues to boom, all passenger accommodations on regular liners being sold for weeks ahead of sailing date.

Like Vancouver and other Northwest fishing centers, Seattle is feeling very keenly the refrigerator car shortage which has demoralized the halibut market, and the increased operating cost to fishing boats due to the withdrawal of distillate from the market. The Seattle Halibut Fishing fleet, numbering about 100 vessels, will be temporarily driven out of business if relief is not forthcoming in the immediate future.

On March 5 some eight hundred business men of Seattle met at luncheon in the Masonic Club rooms for the purpose of working up enthusiasm and interest in the National Foreign Trade Council's seventh annual convention to be held in San Francisco May 12 to 15. William Pigott of Seattle presided at the luncheon and addresses were made by M. H. Houser of Portland and A. F. Haines, vice-president and general manager of the Pacific Steamship Company, and the chairman.

There has been a little movement this month in the sale of wooden hulls from the fleet laid up at Lake Union, the National Oil Company of New York having purchased five of the larger size, which are being taken to the Meacham & Babcock Shipyards on Salmon Bay to be fixed up as steamships.

On March 5 the tanker Devolente discharged into the General Petroleum Company's new 600,000-gallon fuel tank terminal on Harbor Island the first cargo of fuel oil.

The 10,000-ton steamship Brave Coeur offers an interesting example of the application of the load-line regulations. An accident to her propeller caused her return to Seattle and a delay of a week, which would have meant a large loss to the owners, but during that week the summer load line succeeded the winter load line, which permitted a vessel the size of the Brave Coeur to load to a point six inches deeper and this ship took advantage of this regulation, loading 600 tons more cargo, which will very largely offset the loss due to the delay.

Captain E. L. McNoble has been appointed as port captain for the big fleet of Shipping Board vessels operated by the Pacific Steamship Company. Heretofore he has directed the port activities of the company's entire fleet, but his work will now be confined to the oversea vessels, and another port captain will be assigned for the vessels of the coastwise service—the constant addition of Shipping Board freighters having made the work too heavy for one man.

On March 4 three Shipping Board carriers and a Japanese freighter were simultaneously discharging or loading at the Harbor Island terminal of the East Waterway Dock & Warehouse Company. The inbound shipments consisted of 12,300 tons of Asiatic oils and 6000 tons of general cargo, and the outbound freight of 5100 tons of steel, cotton and general merchandise.

The Japanese-built Shipping Board vessels are arriving in Seattle for delivery at the rate of about six per month, and the local shipyards and repair plants are kept busy fitting American standee berths and American plumbing in the accommodations for officers and crew. Through delays in supply of material and in some cases through intentional omissions from the contract, none of these vessels were so fitted in Japan. They were, therefore, temporarily equipped with accommodations for the Japanese crews and finished on this side up to American standards.

Mr. Earl F. Townsend of Seattle has been appointed agent of the Pacific Steamship Company at Singapore. Mr. Townsend was formerly assistant to R. D. Pinneo, manager of the foreign trade department of the company. He left for his new post on March 18 on the City of Spokane. As the Pacific Steamship Company is to place four Shipping Board steamers in the Seattle-Singapore service, the first of which will sail from Seattle about April 1, Mr. Townsend will be kept quite busy at his post, more especially as he will also represent the American Bureau of Shipping at that port.

A rather unusual cargo, and the largest of its kind ever brought across the Pacific, was discharged at the Smith Cove pier of the Port Commission from the new Japanese steamship Eastern Planet. It consisted of 3200 tons of shelled peanuts valued at near a million dollars.

It has been definitely announced that the Moore Shipbuilding Company of Oakland has bought the large wooden dry dock at the Skinner & Eddy Corporation Shipyard No. 1, and also the two service tugs of the Skinner & Eddy Corporation.

Tacoma

ON March 12 the Philippine Vegetable Oil Company announced the signing of contracts with the Pacific Steamship Company, the Nippon Yusen Kaisha and the Osaka Shosen Kaisha, whereby all oil and copra cargoes for the oil company from Manila, or other ports in the Pacific, will be discharged at the Milkauwee docks in Tacoma. Under this arrangement the port of Tacoma will have a large Asiatic liner at its docks at least every week and a possibility of six ships per month. This will double the present arrivals from the Orient.

Both of the Ferris hulls, which were on the ways of the Tacoma Shipbuilding Company, have been launched during the month. It is understood that several parties are now negotiating to secure these hulls.

The Osaka Shosen Kaisha has announced that over 60,000 tons of freight will be moved from its docks at Tacoma during the months of April and May. Much of this freight has been on hand awaiting vessel space on account of the shortening of the schedule of the steamship company, and now that these schedules are to be placed on a normal basis, it is expected shipments will continue to be heavy.

Initial work has been begun in the development of the port of Tacoma—the first item in the plans being the dredging of the waterway for the first two pier units and the building of pier No. 1. This pier will be of the open type and will cost approximately $575,000.

Reports from the collector of customs for the district of Washington show that exports from Tacoma are making gradual gains and that imports are gradually falling off. The total value of exports for the month of November, 1919, amounted to $5,479,484, while the imports were valued at $2,085,874.

The British steamer Bracholm, now being finished at Vancouver, B. C., will start her maiden voyage from Tacoma with 8500 tons of flour from the Puget Sound flouring mills. This will be the first cargo of flour shipped in a foreign vessel to a foreign port from Tacoma since the days before the European war.

The Eastern Knight, Japanese-built Shipping Board steamer, loaded a full cargo of 10,000 tons of flour at the local flour mills for Atlantic Coast ports. The Eastern Mariner also took a full cargo from the local flour mills in addition to the cargoes going out regularly on the steamers of the Pacific Steamship Company, the Osaka Shosen Kaisha, and the Grace Lines.

There is strong rumor to the effect that the Blue Funnel Line is about to resume its Puget Sound service with Tacoma as a port of call.

Grays Harbor

C. A. STRONG, recently appointed by the port commission as consulting engineer for the port of Grays Harbor, has arrived and assumed his new duties. He has established an office in the Hodgdon building, Hoquiam, and plans to make his home in Hoquiam while his work with the port commission continues. Mr. Strong states he will begin immediately on an extensive survey of the development needs of Grays Harbor. The matter of chief interest here is the dredging of the inner channel and the building of a dock at Cow Point, midway between Hoquiam and Aberdeen. The Cow Point property, it is understood, will be filled by the dirt dredged from the channel. Construction of a dredge for the outer harbor may be started the present year, information from Senator Wesley L. Jones being to the effect that the project is included in the Rivers and Harbors Bill. Construction does not depend on the size of this year's appropriations, according to Commissioner Frank H. Lamb, it being perfectly feasible to begin with a small expenditure and depend on future appropriations to complete the work. Some money is available from former appropriations. Mr. Strong was formerly engineer for the Tacoma dredging Company, and comes highly recommended. He has had considerable experience in dredging, surveying and construction work, and was selected after the qualifications of other engineers had been considered.

The Hoquiam Commercial Club is promoting a movement for construction of a marine railway with docking facilities for 3000-ton vessels. The project as proposed has been taken up with Engineer Strong, and he indicates it will be included in his recommendations to the Grays Harbor port commission.

About 10,000,000 more feet of lumber was exported by water from Grays Harbor in February, 1920, than the cargo shipments of the same month a year ago. A total of thirty-two vessels cleared, all but one of which were coastwise. The shipments of February, this year, totaled 26,050,000 feet, as compared to only 16,000,000 feet in February, 1919.

Wreckers have finished salvaging the machinery from the wreck of the motor schooner Janet Carruthers. This machinery has been placed on barges and towed to Portland for sale.

Astoria

STATISTICS compiled by the deputy collector of customs of the State of Oregon, with headquarters at Astoria, show that during the month of February 27,134,594 feet of lumber were shipped from that port. Twenty-three vessels carried this lumber—fifteen of them, carrying 15,934,000 feet, cleared for California ports; four of them, carrying 4,433,145 feet, to foreign ports; and the remaining number, carrying 6,867,449 feet, to Pacific Coast ports outside of California.

The Port of Astoria Commission, at its meeting on March 9, ordered the purchase of 8500 barrels of cement for use in the construction of the new import and export pier and the warehouses. The engineering department reported the Foundation Company making excellent progress in its work on the new pier, and that it will take about four months' time with the dredge Natoma to complete the fill for this new structure.

The question of securing the property to be offered the United States government as a naval base site has been occupying a good deal of the board's time. At present the title of all the various parcels of land involved is being investigated and the abstracts brought down to date. As soon as this work is finished, the arbitration committee will meet and fix valuations, and a concrete proposal will be submitted to the voters at a special election.

Traffic Manager Tabke submitted a report showing that Astoria port charges on freight stowage and handling are less than those at any port in the Northwest. The space on Pier No. 1 is rapidly being filled and flour is coming into the elevator at the rate of fourteen carloads a day, and during the week of March 27, 3000 tons of box shooks were shipped from Astoria to Honolulu.

The Wilson Shipbuilding Company have closed a deal with the Shipping Board for the purchase of the unfinished Ferris type hull Meridan, which will be completed in some form on their own account.

Portland

THE Commission of Public Docks at Portland has advertised for bids on the contract for construction of a 15,000-ton drydock. This drydock, as planned, will have five pontoons of 3000 tons' capacity each. It is to be constructed of wood and the work must be done in Portland under the supervision of the commission. A bonus of $250 a day will be paid the contractor for completing the job within a specified time and a penalty of $250 a day will be levied against delayed delivery. The commission also has voted to change the name of the famous St. Johns Terminal at Portland to Portland Municipal Terminal No. 4. This action is taken to eliminate the idea on the part of many outsiders that this big terminal is not within the city limits of Portland. The docks are now to be all named numerically in the order of the date on which they were opened. The Fifteenth street dock will thus be known as Portland Municipal Terminal No. 1; the East Washington street dock as No. 2, etc.

The Willamette Iron & Steel Works during the month undertook a contract for eighteen Scotch marine boilers for San Francisco shipbuilders. These boilers will be 15 feet in diameter by 11 feet 9 inches in length, and said to be the largest ever built by this firm. They have recently shipped to Fort Alice, B. C., for the Whalen Pulp & Paper Company, a 66½-ton pulp digester.

At the present writing only two vessels—the Carone and the Cartona, both wooden and both at the Peninsula Shipbuilding Company's yard—remain [illegible] delivery of all the Emergency Fleet Corporation's great shipbuilding program in the Portland district. The last of these vessels is due for delivery on April 30.

There is considerable hope for a revival of the steel shipbuilding industry here on account of persistent rumors that the Northwest Steel Company is to have contracts from the Emergency Fleet Corporation for the construction of ten 10-000-ton steel tankers.

G. F. Matthews of Hoquiam, Wash., will move his shipbuilding plant to Portland and will be located at Peninsula Shipbuilding Company's yard, using several ways until they can decide on permanent location. Matthews is building a steam schooner for the Hart-Wood Lumber Company, 210 feet at water line, 43 feet beam, 15 feet depth double-ended type, carrying 1,200,000 feet of lumber; the engines of 700 horsepower are being built by Pacific Marine Iron Works. Vessel will be completed at Portland and delivery will be about October 1. G. F. Matthews will also carry on repair work at Portland yards.

The American Wood Export Association has disposed of 15,500,000 feet of ship timber left over from the shipbuilding construction in the yards of the Northwest.

San Francisco

THE Chamber of Commerce of San Francisco is trying to awaken the citizens of the city by the Golden Gate to the idea that it is necessary for them to sell San Francisco. By this is meant that all merchants in the city, all shipping men, exporters and importers shall, in order to build up their own business in a really constructive sense, advertise San Francisco to an equal, if not greater, extent than they are advertising their own wares. This idea has taken a wonderful hold on such cities as Seattle, Chicago and Los Angeles and the results have been little else than marvelous in the growth of business in those centers, while San Francisco, with natural advantages equal to, if not exceeding, those given to any city in the United States, has comparatively been almost at a standstill. It is to be sincerely hoped that the Chamber of Commerce will be able to innoculate the commercial blood of San Francisco with this virus and thus enable it to have a more unrestricted flow in the industrial veins of the community.

Another matter of great interest to San Francisco shippers which has been effected by the Chamber of Commerce during the last few months is the decision reached by the Shipping Board that a number of the cargo carriers which have been assigned for service between Pacific Coast and European ports shall put in at Atlantic Coast ports on their return voyage from Europe to pick up general merchandise tonnage consigned to the Pacific Coast.

Swayne & Hoyt, San Francisco shipping operators, have recently arranged to act as agents for the Shipping Board in a new line of steamers which is to be established between Pacific Coast ports and the River Platte, via the Straits of Magellan. This route cuts 1000 miles off the distance from San Francisco to Argentine ports as compared with the route via Panama Canal, and by this route San Francisco is only 1776 miles further from Buenos Ayres than is New York. Three or four steel steamers of the 7500-ton class will be used at first and the sailing schedule will be about one boat every six weeks. If business warrants, undoubtedly this line will eventually encircle South America, returning via Panama. The outbound products will consist of lumber, dried fruits and other Pacific Coast general merchandise; and the return products of corn, linseed, hides and coffee.

The recent alliance of Struthers & Dixon with the Green Star Line will soon expand into a regular round-the-world service with the Green Star privately-owned freighters and Shipping Board cargo carriers. Already agents are on their way to Calcutta, Singapore, Batavia and Sydney to establish company agencies at those points.

Local shipping firms are endeavoring to have the Emergency Fleet Corporation install a greater refrigerator cargo space on vessels, as they recognize that future outbound cargoes will increasingly consist of California fruits and return cargoes will very often be largely made up of eggs, meats, tropical fruits and vegetables.

George A. Armes, president and general manager of the Moore Shipbuilding Company, while in Seattle on his way to New York, closed a deal with the Skinner & Eddy Shipbuilding Corporation for the purchase of its floating drydock. This drydock is approximately 600 feet long and can be used in connection with two pontoons already built by the Moore Shipbuilding Company on their proposed new dock, so as to give that company a floating dock capable of handling the largest merchant vessels entering San Francisco harbor. The dock will be towed to San Francisco during April or May by the tugs Holyoke and Tyee, which vessels were also purchased by the Moore Company from the Skinner & Eddy Shipbuilding Corporation. The purchase price of the dock and tugs is said to have been $1,000,000. The American Dredging Company is now engaged in excavating a basin at the Moore plant to accommodate the new drydock.

The Hunters Point docks of the Union plant of the Bethlehem Shipbuilding Corporation were brought to the attention of transbay ferry passengers by the huge bulk of the Mt. Vernon, apparently sitting on dry land on the promontory. Yet if the many curious eyes that were turned that way during the stay of the big liner in the dock had been given the opportunity to look into the big basin with the big liner in it, they would have found that there was ample room in the dock for an ordinary coast steamer in addition to the huge transport. San Francisco harbor is second to none on the Pacific Ocean in its facilities for repair and re-conditioning work and these facilities are constantly being increased.

Details were recently made public of a very interesting agreement between the State Board of Harbor Commissioners, represented by J. H. McCallum, president of the commission, and the two principal tug boat companies, represented by Henry C. Peterson of the Peterson Launch & Tugboat Company, and Thomas Crowley, of the Red Stack Tugboat Company. This agreement calls for the equipping with fire-fighting apparatus of twenty-five boats belonging to these two companies. The arrangement is such that there will be no subsidy charge for maintaining the apparatus other than that entailed in supplying hose and other equipment necessary, but when the boats and crews are called upon to perform actual service in fighting fire, the charge will be based on the usual scale paid for the services of the boats used. Insurance underwriters have co-operated in this agreement, which has been brought about in a very clever and diplomatic manner through the good offices of J. H. McCallum. This arrangement is especially interesting in view of the fact that the city fire boats have practically been abandoned by the municipal treasury.

John H. Bulger, supervising inspector of steam vessels, has compiled some very interesting figures on the passenger traffic of San Francisco bay ferry service. Without counting any of the smaller ferries crossing arms of the bay, the boats running between San Francisco and Oakland, Point Richmond and Sausalito have carried during the year 1919 over forty-eight million passengers. This tremendous traffic has been carried on without the loss of a single life due to marine or other casualty of the ferry service. We would invite comparisons between this record and that of any other similar service in the world.

Shipbuilding is being carried on under the American plan at all of the yards around the bay, and ships are being turned out satisfactorily, as evidenced by several trial trips, launches and deliveries during the month.

Much indignation has been expressed on the waterfront over the action of the agent of British Lloyds at Kobe, Japan, in sanctioning the stowage of oil in damaged packages aboard the freighter West Hepburn. The local shipping authorities have telegraphed a protest to Washington on this matter and are preparing a memorial suggesting that American surveyors, representing the American Bureau of Shipping, be sent to all the principal ports of the world.

Los Angeles

ON March 20 two 8800-ton Shipping Board freighters were launched almost simultaneously—one the steamer Crown City at the plant of the Los Angeles Shipbuilding & Drydock Company, and the other the steamer West Nomentum at the plant of the Southwestern Shipbuilding Company. This is the first time in two years that two vessels have been launched in San Pedro yards on any one day.

A movement has been started for the improvement of a section of Vermont avenue and the opening of that thoroughfare to the harbor. It is hoped by this means to greatly relieve the congestion of traffic on the Harbor boulevard.

Ships built in the shipyards of Southern California are now being found in practically all of the large seaports of the world. A poll taken through January and February showed that ships built in or adjacent to Los Angeles harbor had arrived at Havre, Buenos Ayres, London, St. Thomas, Hongkong, Suez, Antwerp, Glasgow, Rotterdam, Manila, Kobe, Singapore, Shanghai and Yokohama.

Consideration of this widespread activity of the Los Angeles fleet has broadened the horizon and given wings to the imagination of Los Angeles foreign traders, as was evidenced at a meeting of the Foreign Trade Club on the evening of March 17, when O. S. Orrick, president of the California

Paint Company, gave an illustrated address on the subject, "Around the World in Forty Minutes," in which he, as it were, hit the high spots of trade conditions in our foreign markets.

There has been a decided improvement in the local sardine packing situation during the last few weeks on account of the relief in can shortage. During the last week in February, 2,358,291 pounds of sardines were packed in the San Pedro canneries, as compared with 1,969,785 pounds for the week previous. The sardine of California waters is coming to be recognized as a very excellent seafood and is fast finding its way onto the dining tables of the world.

The new steamer Avalon (described in detail elsewhere in this issue of Pacific Marine Review) is now on her way to Los Angeles harbor and will be on her arrival there immediately put into service between that port and Santa Catalina Island.

Honolulu

AROUSED by the pressure of tourist business and the apparent failure of the authorities at Washington to give any serious consideration to the steamship needs of Hawaii, the Honolulu Chamber of Commerce, the Retail Board and the Hawaii Tourist Bureau have joined forces in a strenuous campaign for a steamer to be allocated to the Matson Navigation Company for operation pending the completion of the Shipping Board's "535s" in June.

Three organizations are bombarding the Hawaiian representatives in Washington with cablegrams setting forth Hawaii's needs and urging action. It has been made clear in the cables that the local men do not care whether the ship is a Shipping Board vessel or not as long as it is an acceptable passenger craft and can be brought to the run in time to relieve the present congestion.

In the meantime much interest is manifested in the style of the "535s" now under construction by the Shipping Board and proposed for allocation in the Pacific. Some of the local men do not believe that the new vessels, excellent as they may be for rough weather routes, will be suitable for this smooth and sunshiny run where plenty of light, air and promenade space are desirable.

If the campaign for a ship at the present time does not bring immediate results it will at least have the effect of calling the attention of some people on the mainland to the fact that Hawaii as a trade center is demanding more vessels with which to handle her passenger traffic and market her products.

Living up to her reputation as the haven for ships that wander and a hospital for crippled vessels, Honolulu harbor gave needed succor to two liners during the past month. The Pacific Mail steamer Ecuador started forth on her way to the Orient on February 15, but two days later she was back into port with one of her propeller blades gone. The vessel was put on the big floating drydock of the Inter-Inland Steam Navigation Company and the new blade shipped.

Oceanic liner Sonoma limped into this port from Australia on the morning of February 25 with a broken propeller shaft. When she was put on the drydock it was discovered that the starboard shaft had broken just inside the hull and had then slipped out until the propeller was a foot aft of the heel of the rudder blade. A collar on the shaft, marking the place where a former break had taken place, was all that saved the piece of shaft and the propeller from sliding into the sea. The collar slipped as far as the "strut" or steel bracket used as a brace on the shaft, and caught there. Had the broken shaft slipped a foot less than it did the propeller would have fouled the rudder. The propeller was removed here and the broken shaft slipped back into the hull.

It is reported here that Honolulu is not to lose the bark Falls of Clyde and the ship Marion Chilcott, said to have been sold by the Associated Oil Company to South American interests. It is now reported that the two vessels, which have sailed between the coast and Honolulu for the past twenty years, have been only chartered to the George W. McNear Company of San Francisco and that they will return to the Pacific run for the oil company after completing two trips to England and Holland. Captain William Smith of the Falls of Clyde has written to T. W. Wright, manager of the Associated Oil Company's offices here, that the bark will be back in Honolulu within a year and a half.

During the walkout of 10,000 Japanese cane cutters on the Island of Oahu, the Hawaiian stevedores took advantage of the opportunity to earn $3 a day while they were not employed at their usual work. As a result many of them have been assisting in cutting cane, but when, as during the week of February 22, a large number of big cargo-carrying vessels called at Honolulu, they deserted the ranks of the plantation workers for their regular employment at $4.50 a day. During that week there were in Honolulu harbor, either loading or unloading, the Oceanic liners Ventura and Sonoma, T. K. K. liners Persia Maru and Shinyo Maru, Matson liners Lurline and Maui, Pacific Mail steamers Colusa and Santa Cruz, and the China Mail liner Nanking.

The crew of the Russian Volunteer Fleet freight steamer Omsk threatened to leave the vessel while here because they said their articles had been invalidated by the fall of the Kolchak regime, but they were warned that their papers held them to the vessel. They finally agreed to proceed with the ship to Vladivostok. The Omsk carries supplies intended for the Kolchak armies, and also Red Cross materials.

Work is progressing on the dredging of the Kalihi channel which will open this water as an upper arm of Honolulu harbor, giving a dock space of more than three times the present area. The Hawaiian Dredging Company's dredger is constantly at work and during the night the reports of the dynamite explosions to remove the coral are plainly heard throughout the city. Not only will the work when completed give dock space in Kalihi harbor proper, but it will permit a long line of docks to be erected on Sand Island, at the right of the channel leading from the present Honolulu docks to deep water.

Marine Insurance

Recent Developments in Marine Insurance

By C. F. Howell

A CRISIS has been reached in the development of marine insurance in this country, and the future prosperity of the business depends upon the wisdom displayed in solving the problems now pressing for consideration. There are two opposing groups, and each is very tenacious of its ideas. One believes that marine insurance originating in America should be handled by Americans; the other is convinced that we lack the necessary facilities for taking care of it and that foreign reinsurance is indispensible. A third element arises from the fact that the government is taking a hand in the matter, and is waiting with what patience it can for the warring camps to get together on some definite working platform. The uncomfortable inference is that unless such a getting together develops before long, it may be necessary for the government to enter the marine insurance business on its own account—and that would mean, of course, the end of private enterprise.

It can scarcely be wondered at if the Washington officials are betraying signs of impatience. They have requested the marine underwriters to indicate just what they wanted the government to help them do, and the result has been the submission of such artificial and conflicting programs that notice has practically been served that unless the underwriters can manage to reconcile their differences and discover what is really wanted, it will become necessary for the Federal authorities to proceed on their own account. The dispute has reached a point where a time limit is virtually set upon future bickerings; and the result has been the display of a rather feverish activity on the part of the underwriters to find the desired common ground.

There are, as we have said, two opposing views of the situation and its remedies. Both sides are agreed that there should be a pool, but differ as to the extent of its application. Those who would have the old state of things continue have been dubbed the "Old Guard"; and, in the opinion of these gentlemen, the activity of an American pool, composed of exclusively American companies, should be limited to covering the hulls of government-built vessels; and that if the coverage is to extend further, then the pool must be allowed to include "admitted" companies of other lands. The "New Guard" is absolutely opposed to any such concession. Their whole fight, from the first, has been on the platform of "America for Americans," and they will have no foreign companies, admitted or unadmitted, in the proposed pool. They claim that a pool of purely American companies can easily supply all the resources and facility necessary for the marine insurance protection of the people of this country. They deny any desire to corner the American business, and insist that they merely wish to afford Americans marine insurance protection in companies of their own countrymen.

The government's attitude toward all this is one of marking time. The Shipping Board leaders, and the chairmen of the House and Senate committees most directly interested, are, it is reliably reported, favorable to an all-American pool that shall write all kinds of American hulls and cargo as well. This is the "New Guard" platform. At present a committee of seven, appointed by the Association of Marine Underwriters of the United States, is engaged in an attempt to reconcile all differences of the two "Guards" and devise a working program that shall combine the best points of the two plans already on paper and meet the expectations of the Washington authorities.

That is a man's job; but it has got to be done if the government is to be kept out of marine insurance, and anything even looking like harmony is to be maintained between the two opposing groups of American underwriters.

Docking Representations

Interesting decisions by the Circuit Court of Appeals, Second Circuit, with respect to certain familiar marine insurance representations as regards docking have been made in the case of Snare & Triests Company vs. the St. Paul Fire & Marine, thus: The word "docked," as used in application for marine insurance, is held not to be ambiguous, but to mean dry-docked.

A statement in an application for a marine policy on a vessel, "warranted docked and overhauled," not carried into the policy, is a representation only, and in an action at law on the policy is a representation only, and in an action at law on the policy may be shown to have been substantially performed.

Where the underwriter requests information in the application which, when given, amounts to a representation, such answer to a specific question is conclusively presumed to be material to the risk.

A representation in an application for insurance on a vessel during a voyage, that she will be dry-docked and overhauled before the voyage, is promissory, and a substantial compliance with it is sufficient to sustain the contract.

A representation in the application for a marine policy that the vessel would be dry-docked and overhauled before the voyage may be shown to have been substantially complied with by proof which warrants a finding that, while not dry-docked, she was made entirely seaworthy, and was in as good condition as she would have been made if dry-docked.

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PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

Losses Keep Up

There is little let-up in the steady run of losses. They seem to come in from every side. Some of the newer underwriting concerns are asking why. The answer comes readily from the more experienced, and it is along this line: Just so long as there are underwriters on the street who write business under conditions that admit of the entering of every conceivable kind of a claim, just that long will losses pile up. In other days, now regretted, when cargoes were written free of particular average, and hulls were accepted free of damage, there was chance of making a profit, but today, when a cargo policy covers against all claims, including theft, pilferage, leakage, breakage, etc., etc., and hulls are being written on a straight form with an infinitesimal franchise, it is next to impossible. The cost of repairs has gone up by leaps and bounds. The $4850 franchise formerly took care of the small and petty losses, such as the breaking of a propeller blade or the damaging of a plate; but now, when a plate that cost $200 to replace five years ago calls for $3000, and rates instead of increasing have been forced down and down, is there any wonder that there is little or no profit to be made? It is high time that covers were restricted and rates doubled or trebled. But with the advent of the new and venturesome spirits into the business, there has come steady and insidious rate cutting. It might be supposed that the wiser, old heads would simply sit back and let the tyros rush to ruin—but, unfortunately, they do not do this. They see their premiums shrinking and rival offices crowded with brokers, and presently they begin to let the word get around that they will concede this and that, and that they will meet this rate, or better that. And thus the mad dance continues, with the number of participants increasing steadily. An occasional withdrawal from extensive writing on the part of some far-seeing underwriter is the only hopeful sign of the times.

Pilferage on the Increase

From evidence secured by the Argentina branch of the United States Chamber of Commerce, there appears to be good reason to believe that pilferage of merchandise from steamships is being conducted on a wholesale scale by a highly organized international movement. Identical characteristics are visible in thefts of merchandise from Italy, Spain and England as from the United States. In the last few months the increase has been astonishing, and particularly in the department of parcels post. That systematized robbery is flourishing is deduced from the certainty and accuracy with which the thieves locate precisely the loot they want. For example, a shipment of thirty automobiles was recently rifled of its tool-sets by the packing cases being cut into at the precise corner where that company regularly packs the tools. Two separate shipments, of 150,000 sewing machine needles each, that were believed to be secure when the merchandise was placed aboard the steamer at New York, were looted by the time the vessel had reached Buenos Ayres. The steamship companies, both American and British, are employing a clause in their bills of lading to the effect that they are not responsible for pilferage in any case where the hazard might have been covered by insurance. The marine insurance men, on the other hand, believe that the only remedy is for the steamship companies to reassume responsibility for pilferage, and that, if they decline to do this, they should be legally compelled to eliminate the objectionable pilferage clause from their bills of lading.

It is interesting, in this connection, to note that the new French marine policy has, as one of its most striking features, the reduction of this coverage. An additional premium is charged, when the risk is accepted; and goods consigned to certain South American ports are refused insurance protection altogether. Schedule rates are increased 50 per cent for such interests as hosiery, hats, boots, shoes, woolens, perfumery, foodstuffs, etc. The new French minimum theft schedule quotes tariffs ranging from 1s. 6d. to 80s. per cent.

Inland Marine

Business in the Middle West appears to have been but little affected by the turmoil in marine insurance reorganization in the East; but, even so, it is not the line to pile up fortunes in. River marine is at such low ebb, owing to the virtual abandonment of the water ways except by the coal fleets, that there is not much opportunity for a disturbance in that activity; and inland marine as regards railroad transportation is influenced by so many factors that it is hardly a desirable field for companies not already committed to that line. In the West there is, as respects marine insurance, a perturbed state of mind rather than an actual disturbance of conditions. Most of the business is left to the companies that have long been writing it. The new companies have flirted with the inland field, but show little disposition to accept risks when offered, and the older ones are reducing their lines and restricting their coverage. The result is that the business is becoming increasingly difficult to place. Theft and pilferage are developing into

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alarming hazards. Railroad and express efficiency has fallen into such low ebb that few valuable packages are really safe in transit. So bad has the situation become, the American Railway Express takes nothing in the more valuable merchandise classes without full declaration of value, which calls for 10 cents charge on each $100, in addition to the regular tariff; and it is losing heavily, even on that basis. Formerly the inland marine companies wrote the business at 2½ cents, and made large profits; as thefts increased they raised the rates successively to 5 cents, to 7½ cents and to 10 cents; and then they abandoned writing theft and pilferage on such shipments altogether. There has been an increase in the collision, derailment and fire hazards also, particularly the collision and derailment, owing to loss in railroad efficiency. It is an interesting fact that the express companies fare better than the underwriters. If the latter are called on to pay a loss there is no salvage, whether the goods are stolen or merely lost by reason of the destruction of tags or other identifying marks. On the other hand, the express company, ordinarily liable for only $50, recoups itself largely out of its salvage sales. To illustrate: A typical case would be a shipment valued, say, at $500 and insured for that amount; while the express company, under its regular tariff rates, would be liable for but $50. Identifying marks are destroyed, and the underwriters pay the $500. The express company pays its $50 of liability, leaving the insurers with a net loss of $450. The goods, which really belong to the insurance company, cannot be identified and pass into the "lost" warehouse of the carrier. In due course they come up for sale, and as the invoice usually is a wholesale invoice the express company realizes substantially the real value of the shipment. The consequence is that it makes a profit of several hundred per cent on its investment of $50.

Lake Marine Unprofitable

Statistics are now available as to the hull business written on the Great Lakes by the insurance companies last year, and they bear out the predictions made in these columns recently to the effect that the season of 1919 was unprofitable. Cargo figures are not yet ready, but the likelihood is that the usual meager gain was on a par with preceding years. In early years of Great Lake underwriting each season spelled disasters for the insurers. Insurance companies were marks for irresponsible shipowners, risks were accepted on vessels practically uninsurable, and towing associations and drydock operatives charged unreasonable prices without checking. There had to be an end to this, and it came with the organization of the Great Lakes Protective Association—a group of responsible owners of lake fleets. This organization raises its own fund for insuring 25 per cent of their risks, the insurance companies co-operating in 75 per cent of the insurance. The 1919 figures of this association have been compiled, and they show an income from assessments and all sources of $385,012 and total net losses of $546,334, or a 1919 net loss of $161,322, which has had to be made up by additional assessments. In 1918 the association had a total of losses incurred of $544,000, with a deficit of $121,000. In 1917 their deficit was but $5000. The underwriters' premium rate for the past year was 3¾ per cent. The heaviest losses have been on post-rate losses—those covering vessels after the closing of the regular season of navigation. In the classification of accidents it is interesting to note that strandings in 1919 were but sixteen, as compared with twenty-two in 1918; groundings were forty-eight in 1919, and forty-four in 1918; and collisions in 1919 were forty, for thirty-three in 1918. Safety to vessels in storms depends largely upon unlimited searoom; land limitations on the Great Lakes give, accordingly, an increased hazard to lake marine insurance to which ocean-bound vessels are not subject.

JOHN B. MATTHEWS

With offices in the Federal building at Oakland, and in the Phelan building at San Francisco, John B. Matthews has entered the San Francisco field as a consulting engineer and a designer of marine and industrial machinery.

Mr. Matthews has had a long and varied experience in connection with machine works of all kinds—beginning in 1904 when he served his apprenticeship in the shops and drafting room of the Pennsylvania Iron Works at Philadelphia, Pa. He has held responsible positions in the William Cramp Ship & Engine Building Company, Philadelphia; the Lake Torpedo Boat Company of Bridgeport, Conn., and at the Brooklyn Navy Yard where he held a position as submarine expert from January, 1913, to June, 1915. For three years thereafter, Mr. Matthews acted as chief engineers at the Moore Plant, Elizabeth, New Jersey, of the Bethlehem Shipbuilding Corporation, and from February, 1918, to February, 1920, he was engaged in engineer work for the Moore Shipbuilding Company at Oakland.

Pacific Coast Shipbuilding Returns

Albatross Metal Furniture Company, Portland, Ore. (Standard Vault & Metal Works)

Purchasing Agent, **K. Kerekes.**
Manufacturing steel cabinets and lockers for ships.

Albina Engine and Machine Works, Inc., Portland Ore.

General Manager, **Mr. William Cornfoot.**
Overhauling and marine repairs a specialty.

American Marine Iron Works, Portland, Oregon

Purchasing Agent, **Carl R. Jones.**
Contracts covering cast iron fittings for steel and wood yards of G. M. Standifer Construction Corporation, Vancouver, Wash.

Ames Shipbuilding and Dry Dock Co., Seattle, Wash.

Purchasing Agent, **J. M. Roth.**
Twenty-seven vessels under contract, mostly 8800- ton freighters.

Apex Manufacturing Company, Emeryville, Cal.

Purchasing Agent, **A. Youngholm.**
Several hundred metallic life boats for U. S. Shipping Board and shipyards.

Astoria Marine Iron Works, Astoria, Ore.

Purchasing Agent, **Mr. J. A. Jackson.**
Completely outfitting 27 Hough and Ferris type wooden vessels.
Contractors for United States and French governments.
Overhauling and repair of ships a specialty.
Marine railway under construction capable of handling ships up to 12,000 tons register. Fabricators of steel buildings, bridges, tanks and other structures.

Babare Bros., Old Town, Tacoma, Wash.

Purchasing Agent, **Mr. Geo. Babare.**
Four wooden freighters, Ferris type.

Ballin Water Tube Boiler Co., Portland, Ore.

Sixteen Ballin type water-tube boilers for eight steamers. For the Supple & Ballin Shipbuilding Co.
Twelve Ballin type water-tube boilers for six steamers building at the G. M. Standifer Construction Corporation.

Barnes & Tibbitts Shipbuilding & Dry Dock Company, Alameda, Cal.

President: **W. G. Tibbitts.**
Vice-President: **J. D. Barnes.**
Secretary: **J. J. Barnes.**
General repair and dry-docking business.

Benicia Shipbuilding Corporation, Benicia, Cal.

Purchasing Agent, **L. S. Jones,** Alaska Commercial Bldg., San Francisco, Cal.

Bethlehem Shipbuilding Corporation, Ltd.
Union Plant, Potrero, Hunter's Point, Alameda Works (Alameda Side)

General Manager, **Jos. J. Tynan.**
Assistant General Manager, **A. S. Gunn.**
Secretary and Treasurer, **Arnold Foster.**
Purchasing Agent, **O. W. Streett.**
Contract for eleven 10,100-ton dw. steel tankers, 453 feet 2 inches by [illegible] feet by 33 feet 6 inches, 2800 h. p.
Three Scotch marine boilers, for the United States Shipping Board Emergency Fleet Corporation.
Contract for three 12,000-ton dw. steel freighters, 457 feet 6 inches by [illegible] feet by [illegible] feet, 2800 h. p.
Three Scotch marine boilers, for the United States Shipping Board Emergency Fleet Corporation.
Contract for three 10,100-ton dw. steel tankers, 4[illegible] feet 2 inches by [illegible] feet by 33 feet 6 inches, 2800 h. p.
Three Scotch marine boilers, for the Pan American Petroleum Co.
Contract for one 10,100-ton dw. steel tanker, [illegible] feet [illegible] inches by [illegible] feet [illegible] inches, 2800 h. p.
Three Scotch marine boilers, for the Standard Transportation Company of Delaware.
Contract for two 10,1[illegible]-ton dw. steel tankers, 4[illegible] feet 3 inches by [illegible] 33 feet [illegible] inches, 2800 h. p.
Three Scotch marine boilers, for the Standard Oil Company of [illegible]
[illegible] dw. steel tanker, [illegible] feet by [illegible] feet [illegible]
Three Scotch marine boilers, for the Standard Oil Company of California.
[illegible] 10,100-[illegible] dw. steel tanker, 452 feet 3 inches by [illegible]
[illegible]
[illegible] for the Pacific Coast [illegible]

Ralph J. Chandler Shipbuilding Co., Wilmington, Cal.

[illegible]

Chilman's Shipyard, Hoquiam, Wash.

Purchasing Agent, **Mr. Iver Chilman.**
Two 3-mast auxiliary schooners 130 by 33 by 14. One 300-h. p. engine, for [illegible]

Columbia Engineering Works (Linnton), Portland, Ore.

Purchasing Agent, **Mr. C. W. Steele.**
[illegible]

Columbia River Shipbuilding Corp., Portland, Ore.

Purchasing Agent, **J. C. Bowles.**

Commercial Boiler Works, Seattle, Wash.

Purchasing Agent, **Mr. J. H. Fox.**

J. Coughlan & Sons, Vancouver, B. C.

Purchasing Agent, **F. Brammall.**
Four 8100-ton dw. freighters, 400 by 52 by 31, 3000-h. p., three Scotch marine boilers. For Dominion Government.
Two 8800-ton dw. freighters, 427 feet by 54 feet by 29 feet, 9 inches.

Crowley Launch & Tugboat Co., San Francisco, Cal.

Purchasing Agent, **John L. Crowley.**
Two 28-foot launches with 10-h. p. engines.
Two 38-foot launches with 30-h. p. engines.
Four 45-foot launches with 50-h. p. engines.
Eight covered barges, 125 by 40 by 12.
Derrick barge, 75-ton lifts, 125 by 50 by 12.

J. F. Duthie & Co., Shipbuilders & Engineers, Seattle, Wash.

Purchasing Agent, **E. C. Gaumnitz.**

Elliott Bay Dry Dock Company, Seattle, Wash.

Local repair work, cleaning, painting and overhauling.

Elliott Bay Shipbuilding Co., Seattle, Wash.

Purchasing Dept., **C. A. Morrow.**

Elliott Bay Yacht & Engine Co., Seattle, Wash.

Large amount of repair work.

Foundation Company of British Columbia, Ltd., Victoria, B. C.

Purchasing Agent, **Mr. D. D. Long.**

Foundation Co., Portland, Ore.

Local Purchasing Agent, **G. M. Raymond.**

Foundation Co., Tacoma, Wash.

Purchasing Agent, **Mr. Whiteside.**
Seattle Office: **Smith Building.**

Grant Smith-Porter Ship Company, Aberdeen Yard, Aberdeen, Wash.

Manager: **Charles Albertson.**
Superintendent: **J. C. Langille.**

Grays Harbor Motorship Corporation, Aberdeen, Wash.

Purchasing Agent, **Mr. H. L. Rich.**
Eight building slips, maximum length 350 feet.
Complete machine shop for installing machinery.

Hammond Lumber Co., Eureka, Cal.

Purchasing Agent, **W. R. McMillan.**

Hanlon Dry Dock & Shipbuilding Company, Oakland, Cal.

Purchasing Agent, **H. P. Armes.**
Six cargo vessels, 320 feet 9 inches by 46 feet by 26 feet 9 inches, 22 feet 1½ inch draft; three watertube boilers. For Emergency Fleet Corporation.

Harrison & Lamond, South Vancouver, B. C.

One auxiliary schooner.

Helser Machine Works, Inc., Portland, Ore.

20 large size hawser reels for Pacific Coast Shipbuilding Co.
12 same as above for Pensacola Shipbuilding Co.
Cargo winches, for various steamers.

Hesse-Martin Iron Works, Portland, Ore.

Purchasing Agent, **Mr. W. L. Ireland.**
Steam capstans and miscellaneous deck equipment for various contracts.

Herzog Electric & Engineering Company, San Francisco

Purchasing Agent, **H. C. Toumey.**

G. W. Kneass, San Francisco, Cal.

Purchasing Agent, **G. W. Kneass.**
Two tow boats, 60x15, 125-h. p. engine. For Peterson Tow Boat & Lighterage Company.

King & Winge Shipbuilding Company, Seattle, Wash.

[illegible] J. E. King.

Kruse & Banks, North Bend, Ore.

Purchasing Agent, **Robert Banks.**
Two steam schooners, 240 feet over all, 43 feet beam, 17 feet depth of hold, double end type. For J. R. Hanify Company.
One five-masted sailing schooner, with a carrying capacity of 1[illegible] feet of lumber. For private interests.
Three building ways.

Llewellyn Iron Works, Los Angeles, Calif.

Builders of Marine Engines, Boilers, Tanks, etc., for Emergency Fleet Corporation.
Present contracts include 1400-h. p. and 2800-h. p. marine engines with marine boilers for same, for most of the ships being built on the Pacific Coast.
Also reinforced concrete bars for concrete ships being built for the Emergency Fleet Corporation at the San Francisco Shipbuilding Company's yard in Oakland and at the Pacific Marine & Construction Company's yards in San Diego.

Long Beach Shipbuilding Company, Long Beach, Calif.

Purchasing Agent, **Frank W. Philpot.**

Three steel steamers, 8800 tons dw., 2700 h. p., triple-Scotch boilers. For U. S. Shipping Board.

One steel motorship for California & Mexican Steamship Company.

One steel vessel for sugar and coal trade, for Cuban interests.

Los Angeles Shipbuilding & Dry Dock Co., Los Angeles, Cal.

President, **F. L. Baker.**

Vice-President and General Manager, **S. L. Naphtaly.**

Works Manager, **John Murray.**

Comptroller, **F. G. Phillips.**

Nine 8800-ton dw. vessels, 410 by 54 by 29.9, 3500 I. H. P.; three Foster water-tube boilers. For Emergency Fleet Corporation. Delivery 1919-1920.

Five 11,000-ton dw. vessels, 430 ft. 3 in. by 54 by 29.9 to second deck, and 38.3 to upper deck. For Emergency Fleet Corporation. Deliveries 1919-1920.

Equipment ample to build passenger, freight and naval vessels of any size and type, including machinery and equipment.

The Wm. Lyall Shipbuilding Co., Ltd., North Vancouver, B. C.

Three auxiliary schooners, 235 W. L. by 44.6 by 20.6 moulded.

Two 200-h. p. Fairbanks Morse Semi-Diesel engines for these boats.

Eight full-powered steamers, 1500 tons deadweight. For Republic of France.

Main Iron Works, San Francisco, Cal.

Four ocean-going tugs; engines 17 by 25 by 42 by 30; complete for Emergency Fleet Corporation.

Shafting for concrete ships for Emergency Fleet Corporation.

Repairs to vessels for Emergency Fleet Corporation.

Mare Island Navy Yard, Mare Island, Cal.

Battleships (superdreadnaughts): California (44), 82.8 per cent completed February 1, 1920; Montana (51), 5 per cent completed February 1, 1920. California displacement, 32,300 tons; Montana displacement, 43,000 tons.

Destroyers: Litchfield (336), 86.9 per cent completed February 1, 1920; Zane (337), 82.3 per cent completed February 1, 1920; Wasmuth (338), 65.1 per cent completed February 1, 1920; Trever (339), 61.4 per cent completed February 1, 1920; Destroyer (340), 36.1 per cent completed February 1, 1920; Destroyer (341), 33.1 per cent completed February 1, 1920.

Seaplane Derrick No. 4, for Naval Air Station, San Diego; 82.5 per cent completed February 1, 1920.

Note—This barge including house and boom is electric welded throughout.

Navy Aubulance Boats Nos. 2 and 3, 65-foot motor tug type (175 h. p. Union engine): No. 2 (for New York), 85 per cent completed February 1, 1920; No. 3 (for Norfolk), 85 per cent completed February 1, 1920.

Marine Pipe and Machine Works, Inc., Seattle, Wash.

Purchasing Agent, **Mr. E.' A. Lamb.**

One 6-cylinder Sumner type heavy oil engine, 650-h. p. For Chilean Government.

Two 1200-h. p. triple exp. steam engines.

Special marine repair department.

Matthews Shipbuilding Company, Hoquiam, Wash.

Purchasing Agent, **G. F. Matthews.**

Five-masted sailing schooner, 262 feet by 44 feet by 21 feet 6 inches. Lumber capacity, 1,750,000 feet. For owner's account.

McAteer Shipbuilding Company, Seattle, Wash.

Purchasing Agent. **Mr. Ramm.**

One steel vessel, 160 by 30 by 16.

Two four-masted schooners, 250 by 44 by 21; Skandia engines.

McEachern Ship Co., Astoria, Ore.

Purchasing Agent, **Mr. O. E. Draper.**

Three steamers, 286 by 46 by 28, Hough design.

Moore Shipbuilding Company, Oakland, Cal.

Purchasing Agent, **M. G. Waites.**

Contract for seven 9400 dw. steel freighters, [illegible] feet [illegible] by 53 feet by 34 feet 6 inches, [illegible] h.p. For United States Shipping Board.

Two of the above vessels [illegible].

Contract for nine 10,000-ton dw. steel tankers, 425 feet 6 inches by 57 feet by 33 feet; 2800 h.p. For United States Shipping Board.

Three of the above vessels [illegible] three keels yet to be laid.

Contract for two 10,100 dw. steel tankers, [illegible] feet by 33 feet, 3300 h.p., for Vacuum Oil Company. [illegible]

Contract for two 14,000 dw. steel freighters, [illegible] 41 feet 10 inches, 3000 h.p. for Matson Navigation Company. Keels yet to be laid.

Contract for [illegible] 10,100 dw. steel tankers, [illegible] feet, [illegible] Standard Oil Company of New Jersey. [illegible] yet to be laid.

Contract for [illegible] steel tankers [illegible] feet 10 inches, for Standard Oil Company of California. Keels yet to be laid.

One tanker, [illegible] for Pacific Atlantic S. S. Co.

Motorship Construction Co., Vancouver, Wash.

President, **Merrill A. Reed.**

Purchasing Agent, **J. W. Dougherty.**

Builders of [illegible], tenders, tugs, [illegible], [illegible], [illegible] boats and concrete barges.

National Engineering Corporation, Wilmington, Calif.

Outfitting ships for Emergency Fleet Corporation.

One 500-h. p. triple expansion engine for McAteer Shipbuilding Co.

New Westminster Construction & Engineering Co., New Westminster, B. C.

Purchasing Agent, **Mr. H. M. Fullerton.**

Four 2800 dw. wooden freighters, 250 by 43.6 by 25, 950 h. p.

Five 1500-ton dw. wooden freighters, 204 by 40.6 by 17, 550 h. p. twin engines, watertube boilers.

Northwest Steel Company, Portland, Ore.

Purchasing Agent, **Mr. W. C. Smith.**

Four freighters, 2800 I. H. P., 423 feet 9 inches by 54 feet by 29 feet 9 inches, 8800 tons dw., geared turbine drive.

Three freighters, 2800 I. H. P., dimensions same as above; three Scotch marine boilers, oil burners, reciprocating engines.

Pacific American Fisheries, South Bellingham, Wash.

Purchasing Agent, **Mr. B. U. Slyster.**

Pacific Boat & Iron Works, Portland, Ore.

Metal lifeboats and life rafts for steel yard in this district.

Contract for Corser's one-man simultaneous releasing hooks on all lifeboats.

Capacity: Three boats a day.

Pacific Coast Shipbuilding Co., 311 First National Bank Bldg., San Francisco, Cal.; Plant, Bay Point, Cal.

Purchasing Agent, **Mr. J. A. Smiley.**

Seven 9400 dw. steamers.

Two oil barges.

Pacific Construction Co., Ltd., Coquitlam, B. C.

Purchasing Agent, **Mr. R. W. Holland.**

Two 2800-ton dw. wooden freighters, 250 by 43.6 by 25, 950 h. p.

No. 3, Wooden steamer, 250 by 43.6 by 25, 1000-h. p. water-tube boilers.

No. 4, Same as No. 3.

Nos. 5 and 6, 1500-ton full-power barges, 204.8 by 39.8 by 17, 275 I. H. P. engines, 5 water-tube boilers.

Pacific Marine and Construction Company (Scofield Engineering Company) San Diego, Cal.

Contracts for two concrete ships of 7500 tons, 420 by 54, draft loaded 27 feet, light 17 feet, carrying capacity 58,000 barrels.

Thirty-four-acre yard. Two building ways for sidewise launching. Two other ways.

Pacific Marine Iron Works, Portland, Ore.

Purchasing Agent, **Mr. V. L. Hamlin.**

Contracts for four 1600-h. p. triple expansion engines.

Contracts for six 1400-h. p. triple expansion engines.

Pacific Shipbuilding Corpn., Seattle, Wash.

Purchasing Agent, **C. H. Jones.**

Yard designed with six building ways.

Peninsula Shipbuilding Co., Portland, Ore.

Purchasing Agent, **Mr. H. H. Fisher.**

Two sailing vessels, 287 feet by 49 feet 8 inches by [illegible] feet [illegible] inches. For United States Shipping Board.

Capacity of yard: Four ways, wood construction, installation wharf 1000 feet by 125 feet.

Puget Sound Boiler Works, Seattle, Wash.

One Scott Patent Water Tube Boiler, 200-h. p. pressure, for Anderson Shipbuilding Co.

Contracts for condensers, water feed tanks, boiler casings and smoke stacks.

Large amount of local marine repair work.

Rolph Shipbuilding Company, Eureka, Cal.

Purchasing Agent, **John D. Stelling.**

One steamer and one barge for U. S. Shipping Board.

[illegible] for Rolph, Navigation & Coal Company.

[illegible] schooners, [illegible] tons, [illegible] for United States Shipping Board.

San Diego Marine Construction Co., San Diego, Cal.

Purchasing Agent, **C. W. Stose.**

No. [illegible], Towboat "Puller," [illegible] by 12 by [illegible] engines.

No. 15, [illegible] by [illegible] feet [illegible] Engine, Motor [illegible] deck.

No. 1[illegible], [illegible] inches; 6-cylinder, 3½ by 5¼ Continental motor. C. W. Stose, owner.

San Francisco Shipbuilding Co., 310 California St., San Francisco, Cal.

General Manager, **V. H. Poss.**

Purchasing Agent, **E. F. Atkinson.**

[illegible] Pacific [illegible] Co.

Schaw-Batcher Company Ship Works, South San Francisco

Purchasing Agent, **K. L. Dazey.**

[illegible] I. H. p. reciprocating engines, 24½ by 41½ by 72 by 48, three Scotch boilers.

Seaborn Shipyards Company, Tacoma, Wash.

Four-way yard prepared for any kind of wood construction.

Seattle Machine Works, Inc., Seattle, Wash.

Purchasing Agents, **Frank H. Wheelon and D. Crause.**

Seattle-North Pacific Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **F. H. Magune.**

Skandia Pacific Oil Engine Co., Oakland, Cal.

Purchasing Agent, **Mr. E. B. Brown.**

Ten 825 B. H. P. Werkspoor Diesel engines for installation in 5600 tons steel fabricated motorships.

Two 550-B. H. P. Werkspoor Diesels.

Four 240-h. p. and two 120-h. p. Skandia engines.

Two 850 b. h. p. Werkspoor Diesels for installation in tanker

Additional engines of smaller capacity.

Skinner & Eddy Corporation, Seattle, Wash

Purchasing Agent, **Ray Anderson.**

Sloan Shipyards Corporation, Olympia, Wash.

Purchasing Agent, **Mr. L. P. Byrne.**

Sixteen freighters, 281.6 by 46 by 26, 19-32-56 by 36; 1400-h. p.

Somarstrom Shipbuilding Co., Columbia City, Ore.

Four wooden steamers, Hough design, 288 feet long.

Four wooden steamers, Ferris type.

Southwestern Shipbuilding Co., Los Angeles, Cal.

Sixteen single screw freighters, 8800 tons dw., 427 by 54 by 29.9; 2800 i. h. p. reciprocating engines; three Scotch boilers. For U. S. Shipping Board.

Two 12,000 dw. tankers, 440 by 58 by 41 feet deep, molded depth to shelter deck. Three Scotch boilers. Quadruple expansion engines, 3300 horsepower. For Union Oil Company.

G. M. Standifer Construction Corp., North Portland, Ore., and Vancouver, Wash.

Purchasing Agent, **Mr. H. Luckett**, Vancouver, Wash.

Three shipyards, fifteen building berths.

Stephens Bros., Stockton, Cal.

Eight boats, from 25 to 50 feet long, for various companies.

St. Helens Shipbuilding Co., St. Helens, Ore.

Purchasing Agent, **Mr. A. F. Barnett.**

No. 49, steam schooner, 250 over all by 46 by 22, to the order of Charles R. McCormick & Co., San Francisco, Cal.

W. F. Stone Shipbuilding Co., Oakland, Cal.

Purchasing Agent, **Mr. Lester F. Stone....**

Four 150-foot wooden hulls for seagoing tugs, 30-foot molded beam by 17 ft. depth.

One tug, 95 feet by 21 feet by 11 feet, 500 horsepower gas engine.

Miscellaneous repair work.

T. R. Trahey, Ballard, Wash.

One oil barge, 110 feet long and 32 feet wide, capacity 150,000 gallons. For General Petroleum Company

Tregoning Boat Co., Seattle, Wash.

Purchasing Agent, **Mr. C. Tregoning.**

A large number of lifeboats and ship power launches.

Todd Dry Dock & Shipbuilding Co., Tacoma, Wash.

Purchasing Agent, **Mr. C. L. Bankson.**

Todd DryDocks, Inc., Harbor Island, Seattle, Wash.

Purchasing Agent, **Mr. C. R. English.**

General drydock and repair work.

Union Construction Company, Oakland, Cal.

President: **W. W. Johnson.**

Vice-President and General Manager: **H. G. Peake.**

Purchasing Agent, **Mr. Chas. L. Froding.**

Contracts for seven steel ships of 9400 tons, Isherwood type, 402.5 by 53 by 34.5; three watertube boilers, 2800 h. p. turbines. For the U. S. Shipping Board.

One 1685-ton Diesel-engined oil tanker for the Standard Oil Company of California.

One 10,000-ton tanker for the General Petroleum Company.

One 10,200-ton steel tanker for the Standard Oil Co. of California.

One 10,200-ton steel tanker for the Anglo-Saxon Petroleum Co.

Four revenue cutters, turbines and electric drives.

One sea-going tug for Coast Guard.

Vancouver Shipyards & Engine Works, Ltd., Vancouver, B. C.

Contracts in hand for two wooden vessels.

Wallace Shipyards, Ltd., North Vancouver, B. C.

Purchasing Agent, **Mr. C. Wallace.**

Contracts for four 8,100 dw. steel vessels.

One steamer, 320 by 44 by 25, single screw, triple-expansion, reciprocating engines, 1800 h. p., 4300-ton dw. capacity.

Two steamers, 331 by 46 by 25, single screw, triple expansion, reciprocating engines, 2500 i. h.p., 5100-ton dw. capacity.

Western Canada Shipyards, Ltd., Vancouver, B. C.

Five 195 by 39.8 by 17 watertube boilers.

Willamette Iron & Steel Works, Portland, Ore.

Purchasing Agent, **S. F. Woodbury.**

Nine Scotch marine boilers for vessels building in Pacific Coast yards for Emergency Fleet Corporation.

Two gunboat type boilers, 7 feet 8½ inches diameter by 17 foot 7 inches long, for Rodeo Vallejo Ferry Company, San Francisco, Cal.

Five submerged flue type boilers for Haviside, Withers & Davis, San Francisco, California.

One submerged flue type boiler for Union Construction Company, San Francisco, California.

Eighteen 15 feet diameter, 11 feet 9 inches long, Scotch marine boilers, for the Union plant of the Bethlehem Shipbuilding Corporation, San Francisco.

Wright Shipyards, Tacoma, Wash.

Purchasing Agent, **Mr. Geo. P. Wright.**

Yarrows, Ltd., Victoria, B. C.

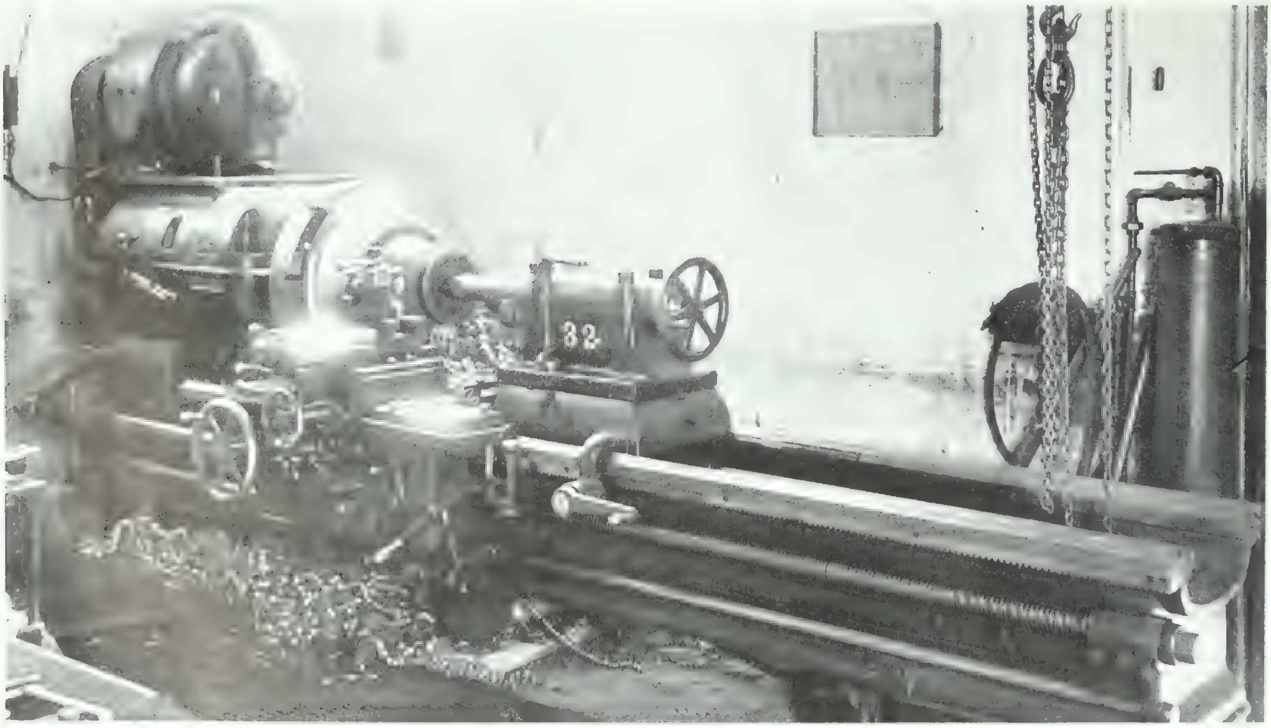
Two slipways suitable for building vessels up to 350 feet in length.

Marine railway, 315 feet long, 3000 tons dw. capacity.

Graving dock, 480 feet long, 65-foot beam.

Makers of manganese bronze propellers and large marine engine castings.

Engaged chiefly with repair work.



A Lodge & Shipley engine lathe at the plant of the Johnson Gear Company. This machine tool is especially adapted for heavy, accurate work and it is here shown roughing out of a solid forging a blank for the reverse gear of a Union Gas Engine

PACIFIC MACHINERY

Cam Grinding

By E. N. Moor, Jr.

THE rapid change in the design and the improvement made in the various types of gas engines from the earlier types of single cylinder or multi cylinder engines with the cylinders cast single to the present up-to-date machine with the cylinders "en bloc" has called for corresponding changes in the methods employed for the machining and finishing of the cams used.

The most up-to-date and economical method of producing accurate and uniform cams at the present time is to grind them to conform to a master shape, using a suitable attachment on a plain cylindrical grinding machine. The Norton Company have developed this equipment for handling either cams of the loose type which are keyed and pinned to position, or the integral type which is formed from the solid and in correct angular relation to other cams on the shaft. These attachments not only finish grind the hardened cam, but are also capable of economically roughing out the shape from a drop forging, or in most cases even from a cylindrical piece of stock.

Figures 1 and 2 show the loose cam attachment from front and rear. Motion is transmitted to the attachment by the headstock on the grinder through the crank at "A." The hardened master cam which produces the desired shape on the cam blank is mounted at "B" and the attachment oscillates on the trunions "C." The work to be ground is mounted on the centers and is supported by the overhanging arm "D." Rigidity and wear are the main factors in the accuracy of the work produced. These points have been carefully considered in the design of this tool, which is characteristic of all Norton products. Ample bearings are provided and the design is such that strength and solidity with extreme accuracy is obtained, which helps toward quality and quantity of work. The work can be lifted from the grinding wheel by lever "E." The cam blank is driven by dog "F," which is provided with set screw adjustment to take out blacklash of the cam blank while grinding. Proper work speeds are obtained through the regular speed change mechanism in the headstock of the grinding machine.

The use of the forged camshaft having a number of cams integral with the shaft made necessary the development of a fixture to grind the cams, so the integral cam grinding attachment was designed, taking its name from the type of shaft it was to handle. The attachment may be driven from the headstock of the grinder similar to the loose cam attachment or may be driven direct from overhead, using a shorter bed where the machine is to be used for cam grinding only.

Figure 3 shows the attachment on the machine in operating position. Figure 4 is a rear view of the headstock end of the attachment. "A" is the driving arm; "B" the set up of master cams on the master cam spindle; "C" is the roll which can be quickly located before the proper master cam by sliding the fork along shaft "D"; "E" is an en-

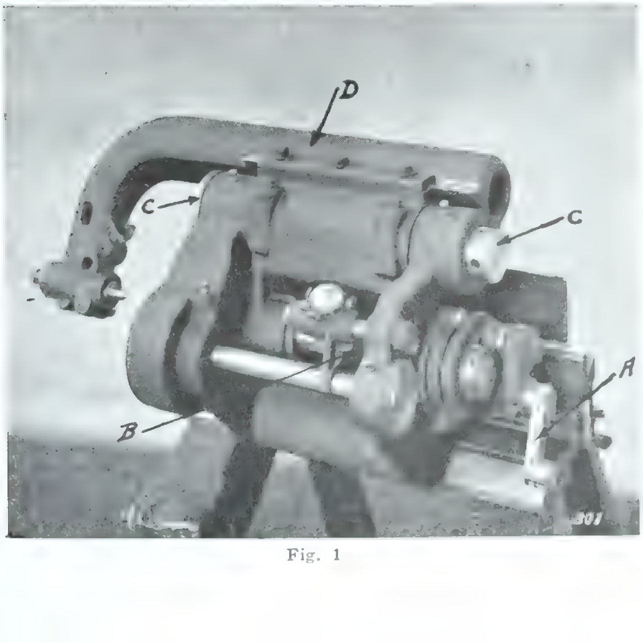


Fig. 1

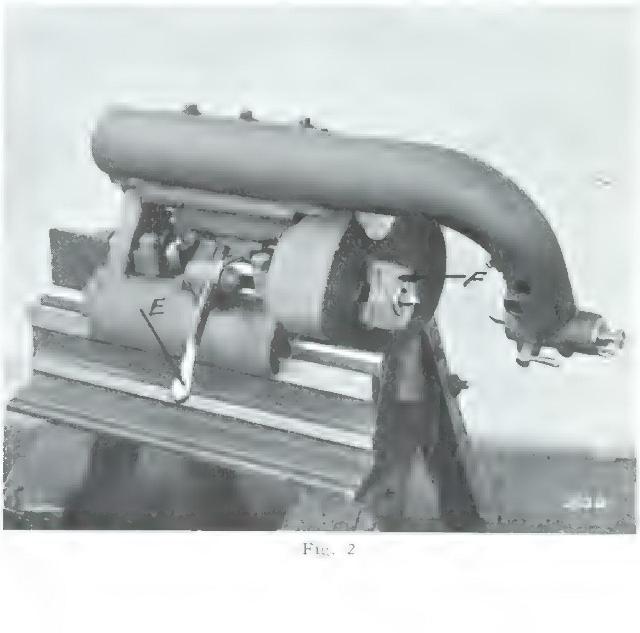


Fig. 2

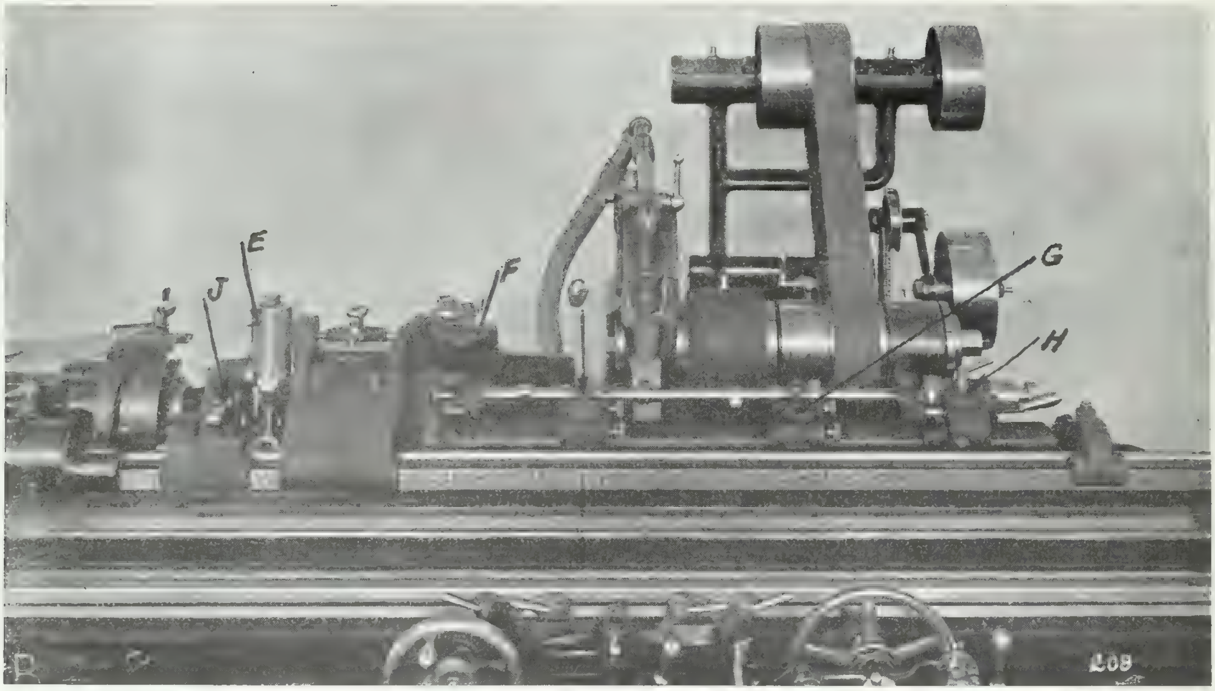


Fig. 3

cased coil spring which holds the master cam snugly against the roll "C"; "F" shows the driving dog in position on the shaft to be ground, and "G" shows one of the steady rests in position on the work. "H" is the foot stock which is movable to allow for different lengths of work that are carried on the centers of the attachment.

As the master cams revolve and bear against the roll, the attachment oscillates the work bed carrying the centers and produces a duplicate of the master shape on the cam in the corresponding position, which is being ground on the shaft.

The wheel is fed into the work with the wheel feed index by the operator until the desired shape and size are produced, handle "J" being provided to lift the work away from the wheel when it is necessary to inspect during the process of grinding or when moving the roll from one master cam to another.

The driving dog must be put on the work in the same angular relation to the cams each time, and this is usually accomplished by keying to a seat which has been previously machined in the camshaft.

In handling long, slim work of this type, too much stress cannot be laid on the use of suitable and sufficient steady rests if uniform results are wanted. Much thought must be given to the number required and to their location with reference to points to be ground. A closed type is usually best—that is, one which surrounds the shaft. These rests should ordinarily be applied at the points of bearing of the shaft in the motor, but the application of rests will vary on different jobs.

A convenient fixture for testing contour, angular position and lift is shown at Figure 5. This is an inexpensive jig and may be made up very easily with a dial indicator with roller and slide to act on the indicator stem and the use of indexed wheel graduated in degrees and a suitable pointer. Where

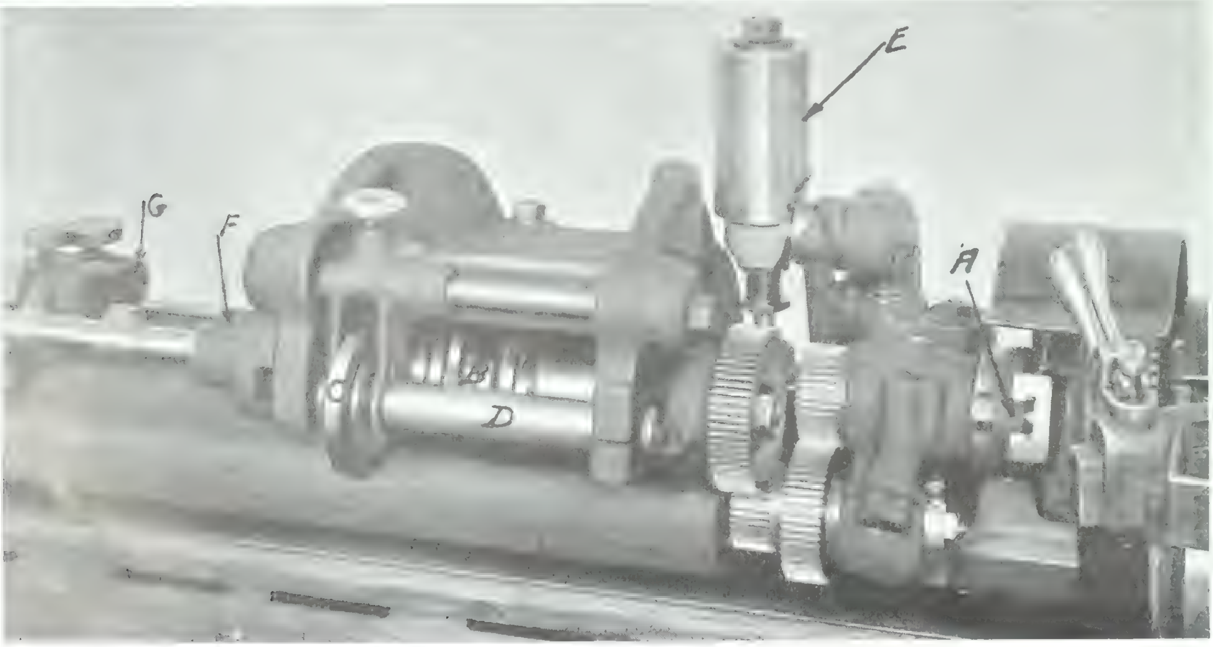


Fig. 4

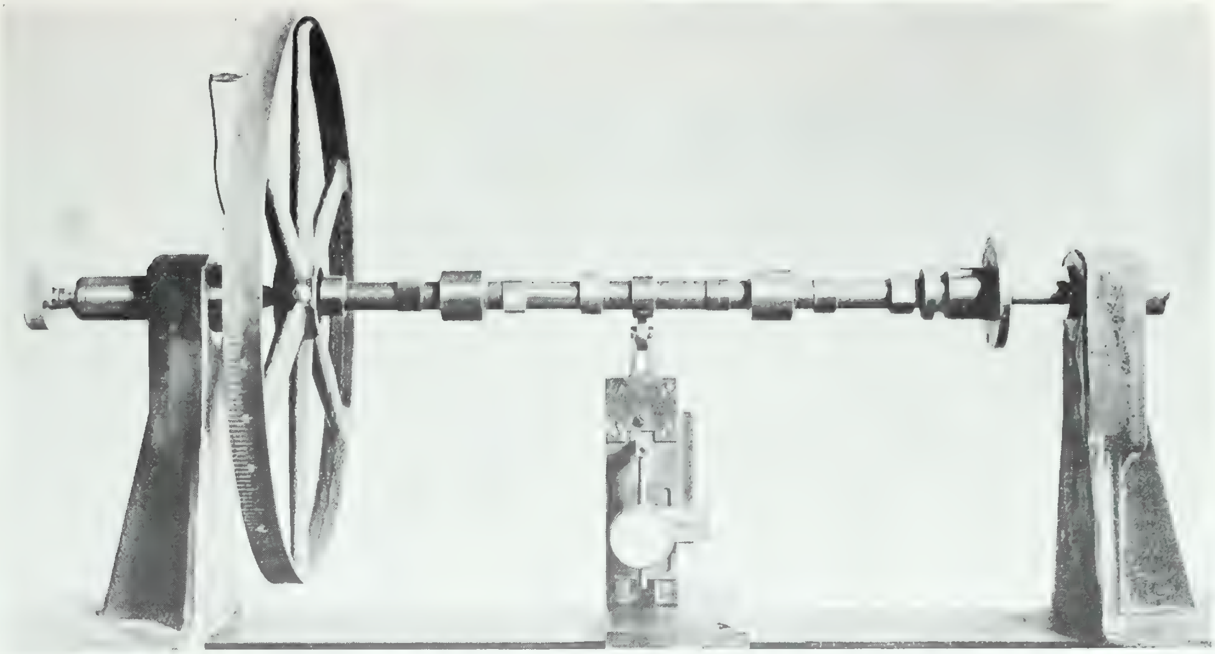


Fig. 5

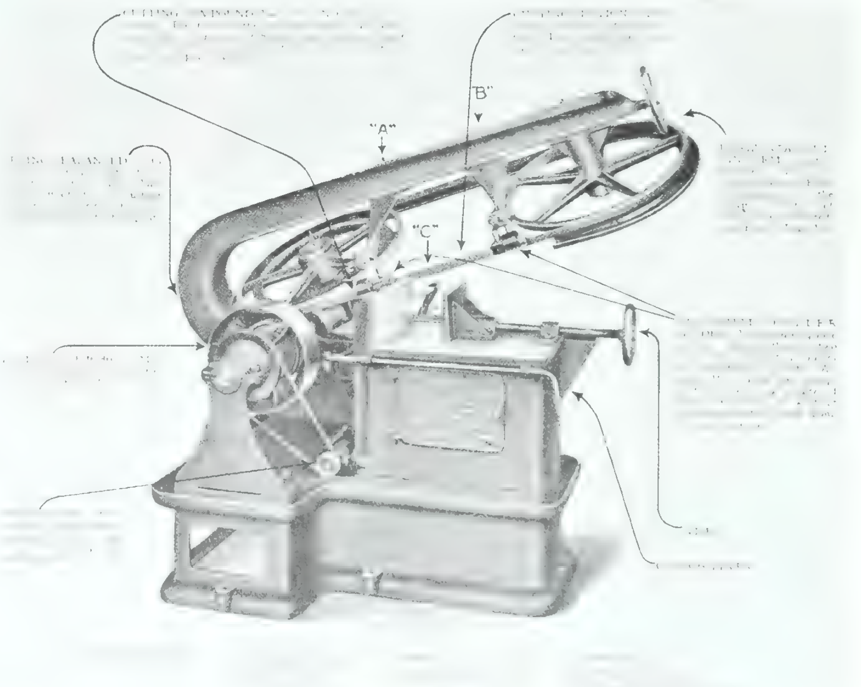
this tool is used it is possible to check results in relation to a master or model shaft, so that there will be no errors in valve timing in the completed motor.

The above are methods employed for producing a gas engine part under modern manufacturing conditions, which would be a difficult and tedious job and one where it would be impossible to obtain duplication and production if old processes were used.

Napier Metal Cutting Machine

THE oldest method of cutting metal was with a hammer and chisel. The next step was the hand operated hack saw, which is comparatively modern. Logically this method advanced to the power operated hack saw, which was soon superseded by the faster circular saw, which is still very largely in use in many manufacturing processes.

The circular saw is high in initial cost of installation and very expensive to operate on account of the enormous waste of metal. The high prices of steel, particularly in the higher grades, led manufacturers by a natural step in evolution to the band saw form of cutting machine and quite naturally the vertical type of band saw as used in cutting wood was taken as a model. The fact of copying the wood cutting saw is one of the great reasons why the band saw metal cutting machine has not been heretofore a tremendous success.



Capacity 10" x 10"

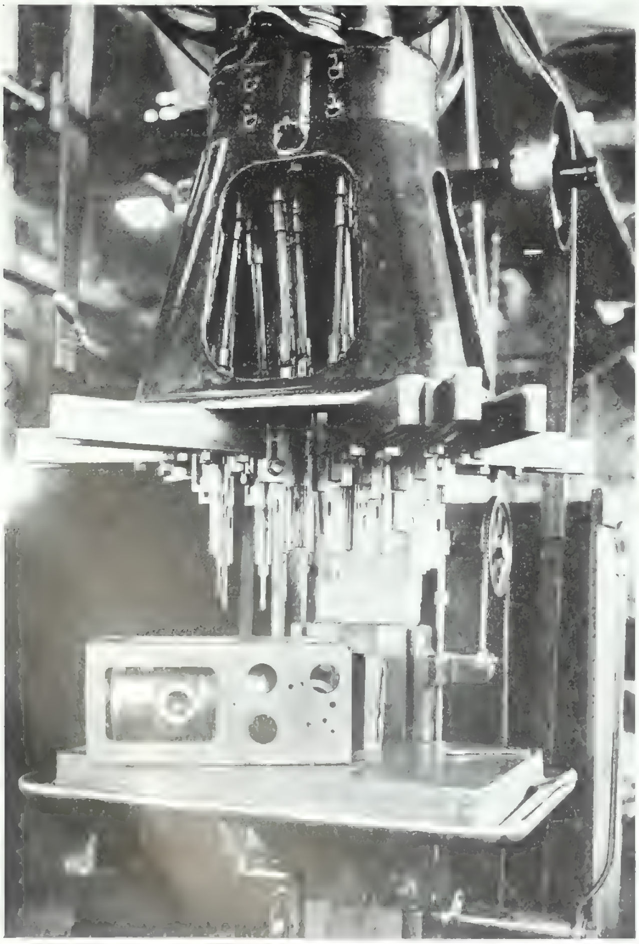
Mr. Charles Napier of [illegible] conceived the idea of a horizontal band saw machine which by certain fundamental differences of design eliminates the difficulties inherent to the vertical type of band saw and which are due to certain peculiar properties of iron and steel. The advantages of the Napier horizontal metal cutting machine are largely due to the horizontal cutting head or arm and consist of squareness of cut, variability [illegible] pressure, increased speed of cutting, and longer life of the bands. Squareness of cut is assured because the saw feeds into the work instead of the work feeding into the saw. The work being held firm and steady in a vise enables the saw to progress through the metal with the proper feed pressure, insuring an absolutely straight cut.

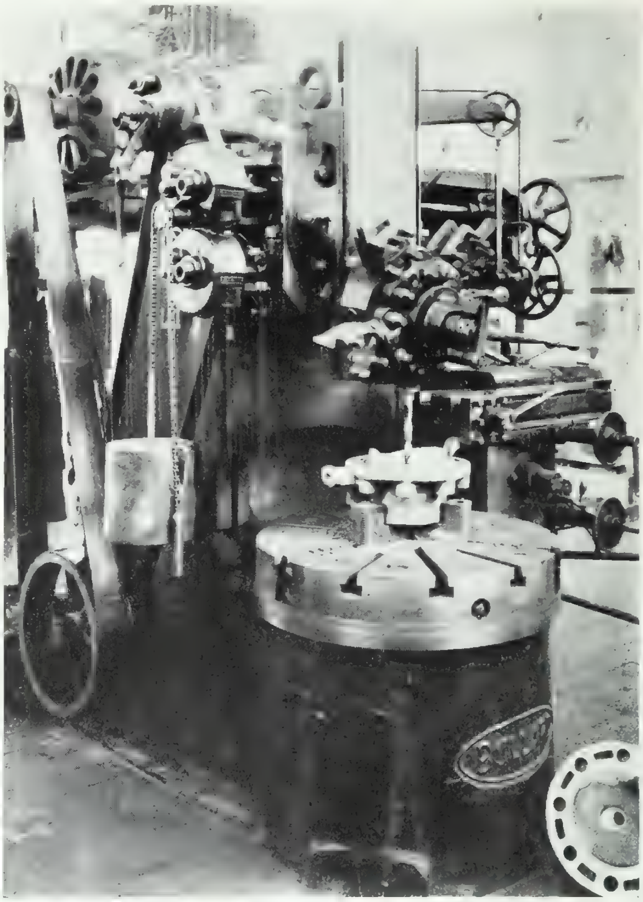
The feeding pressure is elastic, which is very essential to efficient metal cutting on account of the difference of hardness in different parts of the same section. The weight of the cutting head which supplies necessary pressure for cutting is counter-balanced by a powerful spring and the saw pushes into the work, increasing or decreasing its pressure automatically with the varying densities of the metal encountered.

The kerf of the Napier saw is only .049 inches, whereas that of a large power hack saw ranges from .064 to .08 inches and the circular cold saw of a size equivalent in capacity to the Napier has a kerf of .313 inches even if the very thinnest of these saws on the market is taken in comparison. If you assume that you are cutting six-inch high speed tool steel into discs the amount of metal saved per cut on the Napier saw over this cold or circular saw would be 2.4 pounds, which at $1.60 a pound makes a saving of $3.84 a cut. Naturally this advantage saves in labor costs because more cuts are obtained to the bar. There is also a saving in power, one horse-power being the maximum motor required by the Napier saw, while the machine under comparison above requires a five horse-power motor. The cost of a new band saw would be $2.32, including brazing, while the average 28-inch circular saw would cost $37.50.

All of these comparisons refer to the straight, one-piece, circular, cold cutting saw blade. If the comparison is made with the inserted tooth type of circular saw the difference in favor of the Napier machine is even greater.

The cutting compound on the Napier machine is supplied by a pump from the tank in the base of the machine and is applied at the point of cutting in such a way that it flows to the points of the teeth and clears the teeth of chips. The wheels of the saw blade on the horizontal cutting arm are so arranged that the returning section of the band is higher than the cutting section so that any length of bar may be cut off without fouling the returning saw. The cutting section of the saw runs through two adjustable guides between the wheels so as to insure squareness of cutting. The claim is made that taking into consideration first cost, the Napier machine will produce to greater advantage than any other form of cold metal cutting machine.


Multiple Drill at shop of the Hall Scott Motor Car Company


Bullard Vertical Turret Lathe at Gulowsen-Grei Shops, Seattle

VERTICAL TURRET LATHE

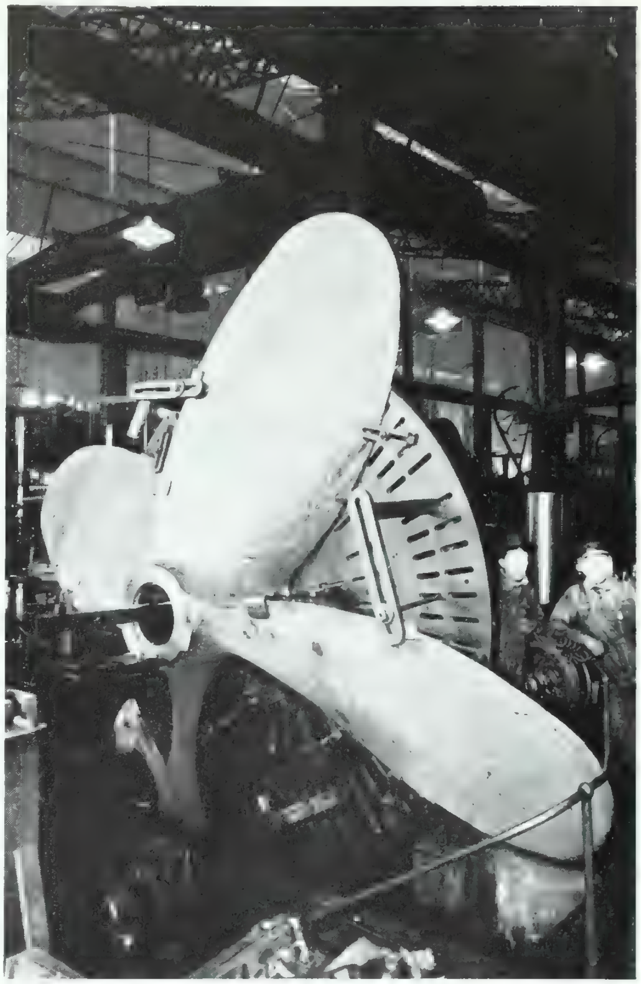
At the Seattle plant of the Gulowsen-Grei Engine Company our representative snapped the interesting picture reproduced herewith, which shows a Bullard Vertical Turret Lathe working on a Gulowsen-Grei cylinder head. It may seem a misnomer to apply the name lathe to this machine, but in several forms of work this vertical type has been found to be much more convenient and efficient than the horizontal turret type.

ADJUSTABLE MULTIPLE DRILL

At the plant of the Hall-Scott Company where many of the Liberty Motors were manufactured, the great majority of the machine work is done on a multiple production basis with carefully finished jigs.

Our illustration accompanying this article shows an adjustible multiple drill which has been found very useful in simultaneously drilling multiple holes of small diameter in cylinder walls or other parts where accuracy and interchangeability are required. The taper sockets for the various drills are driven through arms with a universal joint at each end so that within the limits of the machine these sockets can be placed at any position desired.

An Unusual Propeller Job



Boring the Hub of an 18-foot Propeller on the Pit Lathe at the Union Plant, Bethlehem Shipbuilding Corporation

THE illustration above shows an 18-foot diameter, four-bladed, bronze propeller cast in one piece and weighing twenty-two thousand four hundred and twenty pounds, being bored on the old pit lathe at the Union plant of the Bethlehem Shipbuilding Corporation. This propeller was cast at the Union plant for the Moore Shipbuilding Company to be used on the steamship Howick Hall, which was being repaired at Moore's yard.

It will be noticed in the picture that the tool rest is supported by a swivel stand so that the guides can be set at the taper required for the hole to be bored, the feed of the tool into the hole being worked by a small independent motor and screw gearing.

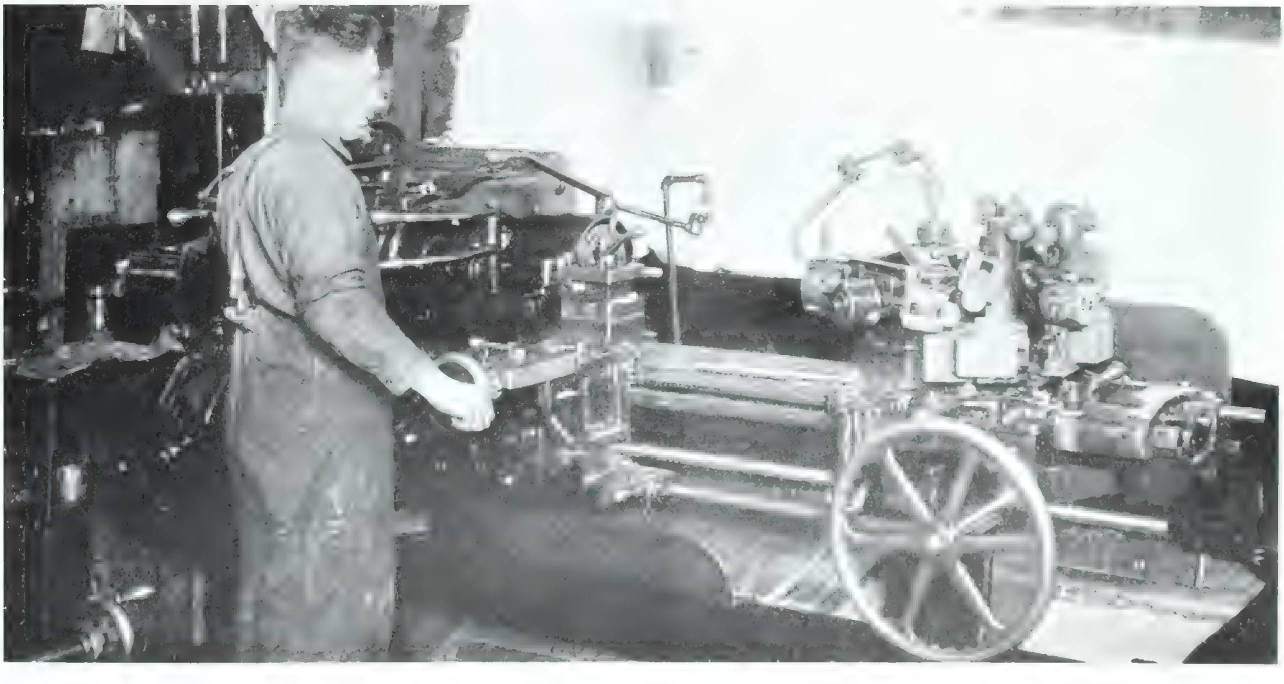
It is a rather unusual practice for a propeller of this size to be cast in one piece, and the capacity for this kind of work at the Union plant of the Bethlehem Shipbuilding Corporation is a great asset to shipping facilities in San Francisco harbor. In fact, it is doubtful whether anywhere else on the Pacific Coast this work could have been undertaken without some special machinery being set up or built for the job.

KELLY METALS COMPANY

Ray T. Middleton has resigned as general sales manager of the Standard Steel Castings Company of Cleveland to become vice-president and director of sales and advertising for Kelly Metals Company of Chicago, Detroit and Los Angeles.

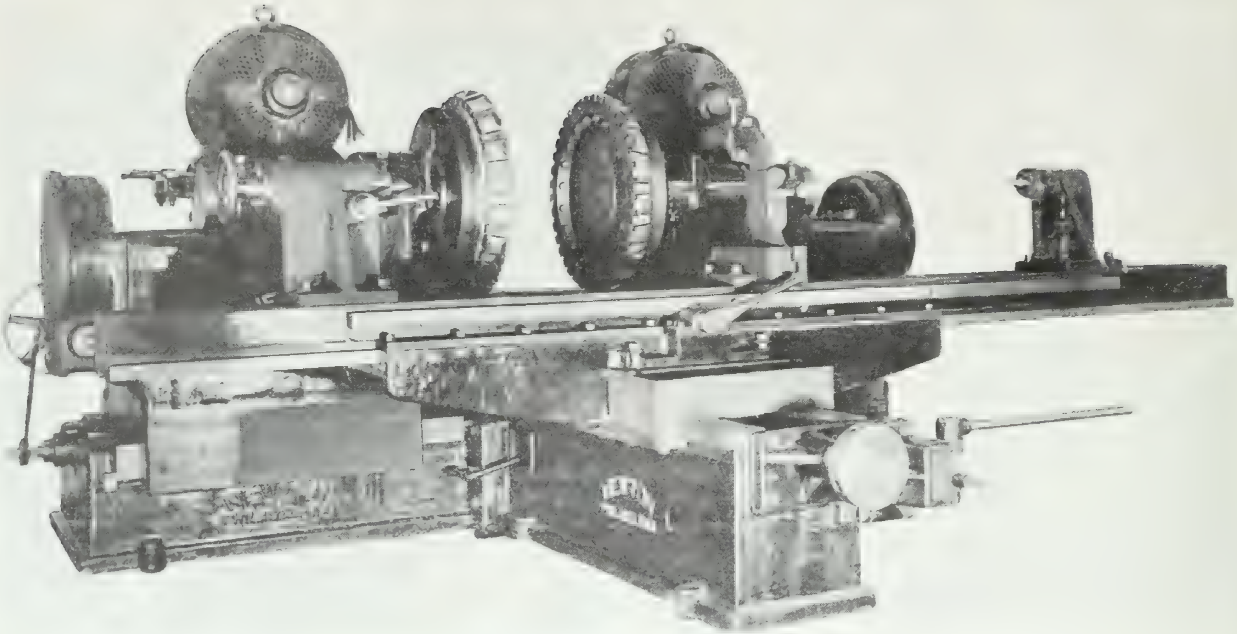
Mr. Middleton's headquarters will be Chicago, where the Kelly Metals Company will, at an early date, establish its principal production plant. The company will continue its present plants in Detroit and Los Angeles and later establish a third branch plant at a point to be selected in the East.

Manufacturing Studs in a Pacific Northwest Shipyard



Many of the Pacific Coast Shipyards have installed modern machinery for the manufacture on the premises of quite a few of the fixings and accessories which are used in building and repair processes on ships and also some of the fixtures that go into the finishing of the vessel itself.

Recently on a trip a representative of the Pacific Marine Review procured the picture reproduced herewith, which shows a Warner & Swasey turret lathe at a Puget Sound Shipyard working on screw studs.



Newton Crank Cheek Milling Machine

SPECIAL MILLING MACHINE

MACHINING the outside surfaces of the cheeks of crank shafts upon a lathe is an expensive operation, due to the fact that there is a lot of lost motion and operating expense during the time the crank shaft revolves in the lathe and no cutting is done.

To eliminate this lost motion and operating expense, the Newton Machine Tool Works, Inc., Philadelphia, have recently developed the crank shaft cheek milling machine here illustrated and described.

The machine shown has a work table 72 inches long and 32 inches wide. On this work table there is fitted the crank shaft holding fixture, the top side of which is adjustable crosswise by means of a rack and hand-operated pinion

There are six changes of gear feed to the table, obtained through sliding sleeves on which the gears are mounted in an oil-tight box and these sleeves are controlled by latch levers outside the cover.

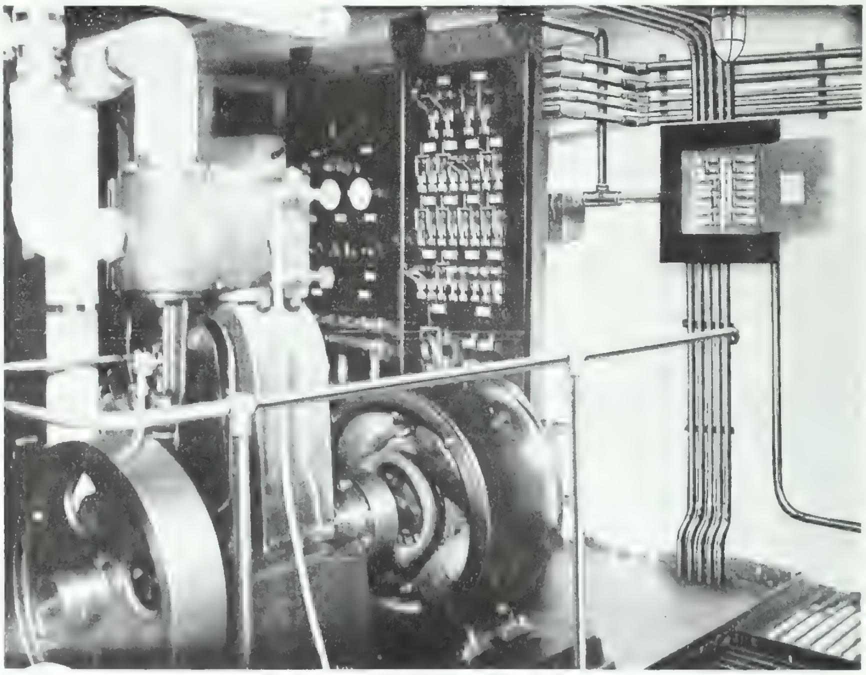
The main table has thirty inches of feed and hand adjustment along the base.

Each cutter head is forty inches in diameter over the cutting tools and each cutter head saddle has independent hand adjustment on its wing to permit the heads operating within four inches of each other, or at a maximum distance between cutters of thirty inches.

MARINE ELECTRIC INSTALLATION

IS ship wiring and installing electric lighting plants and other electric appliances the last subject which the naval architect considers when he makes his plans for the building of a ship—is a question often asked by the electrician when fitting the necessary wiring and electric equipment. The problem of installing generator sets, distributing panels, switch boxes, etc., in crowded quarters, together with placing the conduit and fittings in almost inaccessible places, is an every-day matter for the marine electrician.

The Herzog Electric and Engineering Company have made an enviable reputation for correct handling of ship wiring and electric installation jobs. The many years' experience which they have had in this work, including every variety of electric ship work, enables them to assume any electric work on shipboard. Contracts for complete electric work, calling for the furnishing of all materials, equipment, etc., are often placed with the Herzog Electric and Engineering Company. The list of vessels which have been handled by the Herzog Company include the motor steamer Faith, the steam schooners Capto and Thordis, the steamer Frank D. Stout, the motorship Katherine and many others of practically every type.



Typical Herzog Marine Electric Installation

Besides being contractors for ship wiring and electrical repairing the Herzog Electric and Engineering Company are manufacturers of some very successful electric ship appliances and fittings. Notable examples of equipment built by the Herzog Company may be mentioned the Herzog Electric Steering Gears, Herzog Telemotors, Rudder Angle Indicators, etc. The watertight deck fittings and fixtures as well as the more important electrical equipment manufactured by the Herzog Company have been the result of many years of study as to the particular requirements of ships operating in Pacific waters.

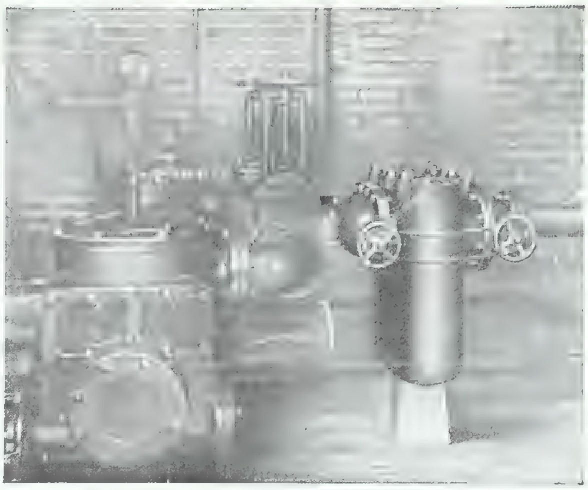
Twin Oil Strainers

Both fuel and lubricating oils contain some solid matter which must be removed from them before they can be used with any degree of satisfaction. To do this it is necessary to use some kind of a strainer, so why not use the Twin—a Strainer that can be cleaned without shutting off the supply.

When one basket of a Twin Oil Strainer is fouled with solid matter, a clean one is put into service by simply shifting two valves. The dirty basket can then be cleaned at leisure, and there is no interruption in the supply of clean oil.

Twin Oil Strainers

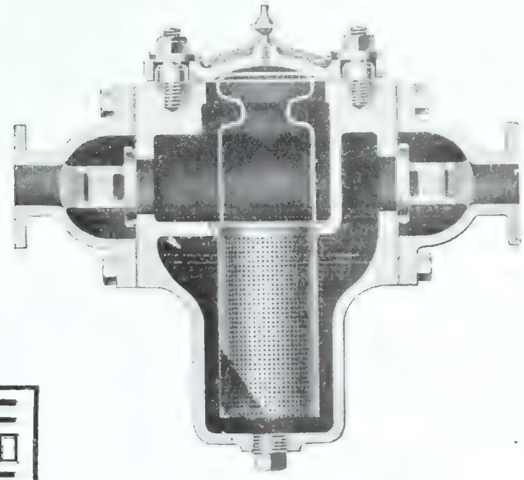
give the same service as two single Strainers, but are more convenient to operate, require less space for installation and do away with all extra valves and piping necessary to connect up. These are features that led to their being used in submarines and destroyers for the Navy and in cargo boats for the Merchant Marine.



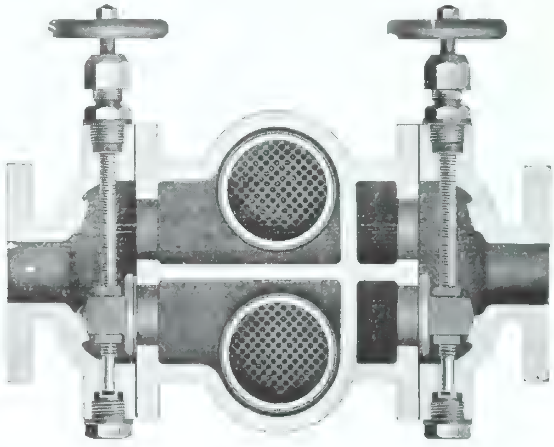
A Twin Oil Strainer in lubricating oil system of a turbine installation at Carnegie Institute of Technology. This installation was made for the benefit of engineers sent to Carnegie Tech for a course of instruction by the Shipping Board during the war emergency.

Twin Oil Strainers are furnished in sizes from 1″ to 5″ (2½″ and larger sizes have flanged connections). Baskets of any perforation from 1/64″ up. Complete information in Bulletin "AA".

The oil enters the Strainer at the left and empties into and passes through the straining basket, then up and out at the right. All solid impurities are retained in the straining basket.



When a basket is clogged the valves are shifted to direct the flow of oil into the clean basket, which is in reserve. The compartment containing the dirty basket is then opened up, the basket removed, cleaned and replaced, and held in reserve until the basket then in service needs cleaning.



ELLIOTT COMPANY

433 Grant St., Pittsburgh, Pa.

The Benson Electric Telemotor

THE American Engineering Company of Philadelphia, whose local office is in charge of Mr. James C. H. Ferguson, Monadnock building, have during the past two years furnished a large number of Benson Electric Telemotors to ships being built on the Pacific Coast for the Emergency Fleet Corporation and private owners. In fact, there are fifty-five of these installations so far contracted for on the Coast, most of which have been already installed and in successful operation for sometime. This Benson Electric Telemotor is a highly successful form of transmission from the pilot house to the automatic valve on the steering gear. The illustrations show installation plans; and (inserts) the master controller, which is bolted to the floor of the wheel house, and the telemotor as coupled to the steering engine in the fan-tail.

The principal advantage of the Benson telemotor is that it is far more convenient to run electric wires from the pilot house to the steering gear than to run shafting and gear, wire rope and sheaves or hydraulic piping, as in the case of the hydraulic telemotor.

James C. H. Ferguson

It is not possible to have leaks in the system.

The transmission from the pilot house works through an electric relay, which means that the current transmitted from the pilot house is very small and the wires are small. The wires can run through inaccessible locations.

A very small amount of current is required.

The device is independent of temperature conditions.

It requires very little attention.

It is positive in its action. By its use a ship can be accurately steered.

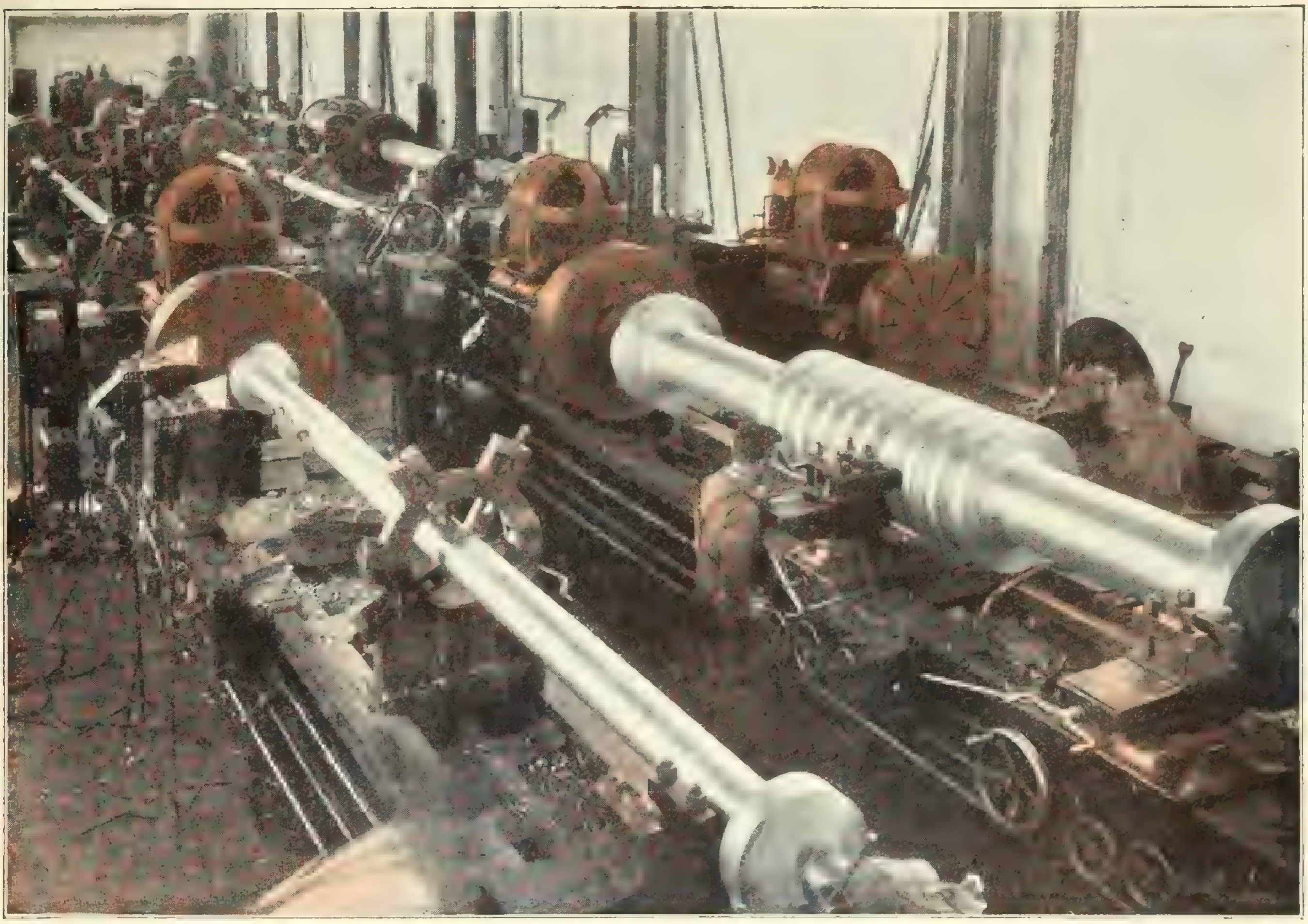
The motor is an interpolar compound wound machine, running equally well in either direction. The relays are designed and built especially for the service required and are the very best that can be produced. No cost has been spared anywhere to make the "Benson Electric Telemotor" as fine a machine as can be produced. In fact, cost has not been taken into consideration at all, as it should not be in equipment whose service is so indispensable.

On account of the large number of these telemotors now in use, and in order to facilitate supervision, Mr. Ferguson has detailed his engineer, Mr. Ayres, to give special attention to service wherever it may be required by the chief engineer or electrician on the ships using this device.

Vehisote Panelling for Staterooms

Vehisote is used for the walls and ceilings of the rooms shown on this page. The view in the upper left hand corner is particularly interesting because this Vehisote was submerged for thirty days when the Steamer Madison was sunk in the Chesapeake Bay in 1912. This soaking did absolutely no damage to the Vehisote and it is in perfect condition today. The Old Dominion Line now operates the Madison between New York and Norfolk. The other interior views show rooms recently refinished with Vehisote at the Morse Drydock, Brooklyn, New York.

CAMDEN



AN ABUNDANCE of Equipment, Operated with Experienced Skill, Makes

CAMDEN FORGINGS

GOOD TO USE

The purchase precedes the use and the inquiry the purchase.
So take with us the first step, namely, *send us the inquiry.*

BUYERS' MEMO

- High and Low Carbon Bars
- Press Columns and Rams
- Pull Back Cylinders
- Water Cylinders
- Valve Bodies
- Plungers
- Weldless Steel Rings
- Lathe Spindles, solid and hollow bored
- Long Feed Screws
- Power Press Crank Shafts
- Cam Shafts
- Eccentric Shafts
- Crusher Shafts
- Gear and Pinion Blanks
- Locomotives
  - Side and Main Rods
  - Crank Pins
  - Axles
  - Rod Straps
  - Piston Rods
  - Guides
  - Parts of frame, both in iron and steel
- Hammered Iron Bars for locomotive repairs
- Marine Shafts
- Marine Connecting and Eccentric Rods
- Rolls
  - Bending
  - Feed
  - Straightening
  - *Embossing*
- Large Wrenches
- Saw Arbors
- Steam Engine Forgings
- Pump Crank Shafts
- Generator Shafts
- Pump Connecting Rods
- Large Nuts
- Turbine Shafts
- Mill Shafting
- Trolley Car Axles
- Electric Motor Axles
- Any forging to your print and specifications, in either iron or steel

CAMDEN FORGE CO.
CAMDEN, N. J., U. S. A.

THE BABCOCK & WILCOX BOILER WITH COVERS REMOVED SHOWING ARRANGEMENT OF TUBES AND DRUMS

BABCOCK & WILCOX MARINE BOILERS AS INSTALLED IN THE MATSON LINERS.

THE STEAMSHIP MAUI, FLAGSHIP OF THE MATSON FLEET, BUILT IN SAN FRANCISCO AND EQUIPPED WITH BABCOCK & WILCOX MARINE WATER TUBE BOILERS.

BABCOCK & WILCOX

MARINE WATER TUBE BOILERS

We have boilers installed in the merchant service on the Pacific Coast in 1897, in active service today. Twelve successive orders from one company; 7 from another; 6 from a third; 4 from two others, and 3 from six others.

These boilers hold the record for economy, capacity and endurance in the Navies of the World.

They have shown the same characteristics in the Merchant Marine. Babcock & Wilcox Boilers and Superheaters in one vessel are saving more than 15 per cent over **Scotch** boilers in sister vessels.

Babcock & Wilcox Boilers have all essential parts heavier than corresponding parts in Scotch boilers, giving greater security against corrosion. They are lighter, safer, easier to clean and to operate than Scotch boilers, and much more efficient.

THE BABCOCK & WILCOX CO.

New York
San Francisco

CHAS. C. MOORE
Pacific Coast Manager

Sheldon Building, First St., cor. Market
SAN FRANCISCO, CAL.

Every Foot of

COLUMBIAN MANILA ROPE

can now be easily and positively identified on the dealer's floor or in actual use by anyone. This Rope, if a few inches are untwisted, will show imbedded in the heart of a strand a small twisted tape. Pulling this tape out and unwinding it brings to view the colors (red, white and blue) and the signature of the Columbian Rope Company.

Think what this means;- you have the tangible evidence in every foot of Columbian Manila Rope that it is made by this Company and, therefore, is guaranteed to be not only pure Manila, but equal and in most cases superior to *ANY* Rope made.

Mr. Dealer, teach your Rope customers to look for the red, white and blue marker; it means repeated orders for you.

COLUMBIAN ROPE COMPANY
AUBURN, N. Y. "THE CORDAGE CITY"
Branches: New York-Chicago-Boston-Baltimore-Houston

Send for folder "How Columbian Rope is Made" *Address Dept. C.*

Without and with the Steward Safety Roller

Making Sea Travel Safe

ONE of the most interesting exhibits which has been announced for the coming National Marine Exposition is that of the products of the Steward Davit & Equipment Corporation. This company has developed many useful devices for minimizing the risk involved in the launching of life boats at sea.

Their first and fundamental development was the Steward mechanical davit, which reduces the danger of confusion and fouling of the falls in moving the lifeboat outboard.

The next step in the launching of life boats is covered in this line of safety devices by the Steward life boat falls controller, through which the lowering of the life boat is controlled by one man, thus insuring at all times an even keel and permitting the use of simple falls which cannot become tangled.

The next device in the series is the Steward life boat roller carriage, by the aid of which the life boat is enabled to run smoothly down the side of a listed ship. As this carriage has spring bearings on the rollers, it prevents to a great degree the staving in of boats in case of violent rolling of the ship.

Next in order is the Steward life boat releasing device by whose positive action one man in the stern of the boat is able to release both falls simultaneously and at the most favorable moment.

The Steward Corporation has also developed an efficient type of life boat, called the Steward "Deadrise," which is being widely adopted by the merchant marine.

Completing their list of life saving devices is a new line throwing gun which is so designed that the center of recoil effort is very low and the gun can be discharged sitting on the open deck without danger of overturning.

The Steward Davit & Equipment Corporation has asked us to extend a cordial invitation to all our readers to visit their booth at the National Marine Exposition.

AMERICAN CHAIN BUYS PAGE STEEL

THE American Chain Company, Inc., of Bridgeport, Connecticut, has purchased the control of the Page Steel & Wire Company, with mills at Monessen, Pennsylvania, and Adrian, Michigan.

It is the intention of the American Chain Company to continue the business of the Page Steel & Wire Company as hertofore, taking only its surplus product.

The Page Steel & Wire Company's plants consist of open hearth furnaces, rolling mill, wire mills, as well as fence factories.

The new officers elected under the reorganization of the company are Walter B. Lashar, president; William T. Morris, vice-president; Wilmot F. Wheeler, treasurer; John E. Carr, assistant treasurer, and William M. Wheeler, secretary.

E. C. Sattley, general manager of the Page Steel & Wire Company, will continue in that capacity with offices in Pittsburgh, Pennsylvania.

The American Chain Company has its general sales offices in the Grand Central Terminal Building, New York City, and district sales offices in Chicago, Boston, Philadelphia, San Francisco, Portland and Pittsburgh.

BLACK AND DECKER REORGANIZE

THE Baltimore plant of the Black & Decker Manufacturing Company, located at 105 South Calvert street, has been sold to the Dieffenbach - Westendorf Manufacturing Company, which is an organization composed principally of the older members among the executives of this city plant, C. W. Dieffenbach being the former manager and William Westendorf the former superintendent. Mr. George W. Kimberley, the treasurer of the new company has been treasurer of the Black & Decker Manufacturing Company for a number of years and still will hold that position. The secretary of the new company is Mr. John Sonnenleiter, who was formerly foreman of the milling machine department. Practically all of the older employes in the plant are stockholders in the new company.

The plant is at the present time operating two shifts of workmen and has enough business booked ahead to keep them busy for a long time.

The Black & Decker Manufacturing Company will discontinue its business in special machinery and devote all of its energies to the operation of the Towson Heights plant in the manufacture of electro flaters, portable electric drills, electric valve grinders and a new product, the Loadoameter, a device for indicating at the dashboard the amount of load or overload a truck is carrying.

BOOK REVIEWS

The "Port of New York Annual." The 1919 edition of the "Port of New York Annual" came out just before the close of last year. It is bound in blue cloth, cover lettering in gold, is 12 by 9 inches in size, type pages being 9 by 6 inches. It contains over 400 pages and abounds in illustrations of Port of New York views of every kind, night scenes as well as day, and covers the New Jersey as well as the New York sections of the greatest port in the world.

The leading feature of the 1919 edition of the "Port of New York Annual," which is a reference book for the use of marine men the world over, is the salient information regarding the proposed revolutionary changes in the control and administration of the Port of New York, if the existing temporary New York, New Jersey Port and Harbor Development Commission is made permanent by the joint action of the New York and New Jersey legislatures. Statistical tables show the value of the imports and exports, at the Port of New York, how they compare with other leading world ports, tonnage of shipping entering and leaving the port, character of the leading industries of the port, history of the port, the laws, rules and regulations governing its shipping, location and occupants of piers, lighterage, anchorage and towage limits, coal bunkering piers, several of the boroughs being extendedly featured as to their industrial, commercial and maritime attractions.

Large as the first edition of the "Port of New York Annual" is there are a number of omissions of important port details that will doubtless be rectified in succeeding issues, it being the intention of its publishers to bring it out each year. The "Port of New York Annual" is published by Smith's Port Publishing Company, Inc., at 2 and 3 South street, New York, and is compiled and edited by Alexander R. Smith, who is at present editor of the New York Marine News, a monthly marine trade publication. It is sold for $3 a copy.

Quick repairs to the smashed bow of one of the United States Emergency Ship Corporation's vessels

The Rivets Have Been Burned Out

CONSIDER the ease with which Oxy-acetylene accomplishes the most trying operation that comes to any ship-yard—repair work on framing and plating.

Compare this modern method of cutting out rivets, of severing frames, of sundering plating to the obsolete method of the cold chisel, drill and hack-saw. It's like comparing the craft of Columbus to the enormous ships of to-day.

In the ship-yards, in fact wherever welding and cutting is done

Prest-O-Lite

DISSOLVED ACETYLENE

The Universal Gas With The Universal Service

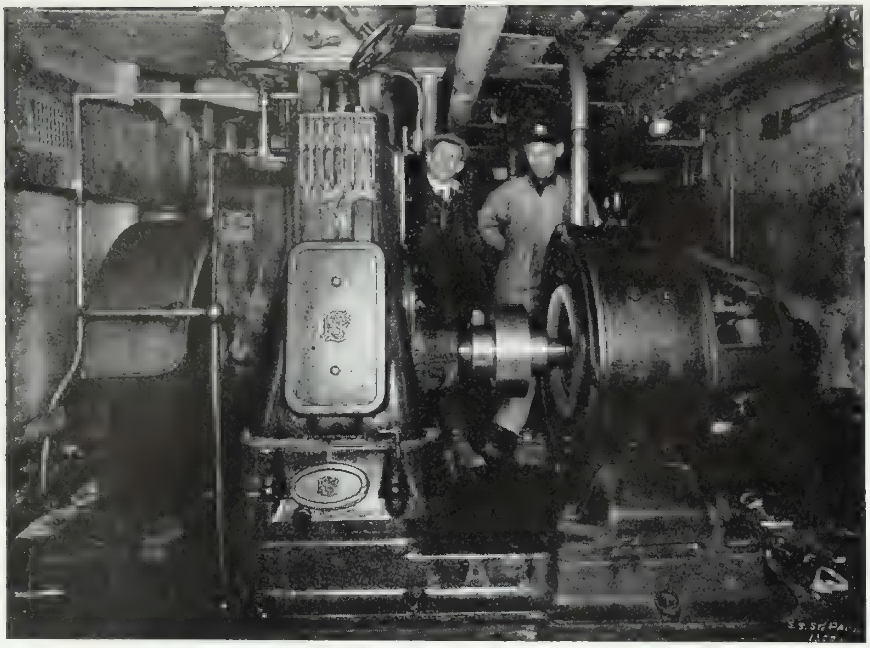
is the *one* supreme gas to use in welding and cutting operations.

And advantageous as this ease of cutting out damaged parts with the oxy-acetylene blow-pipe is, this splendid tool has also the power to join the metals together again, and the joining will have all the qualities of the metals joined.

There are so many reasons why Prest-O-Lite is especially adapted for the particular work of ship-yards that we invite you to ask us all of them.

THE PREST-O-LITE COMPANY, Inc., General Offices, 30 East 42nd Street, New York
Kohl Building, San Francisco
In Canada, Prest-O-Lite Co. of Canada, Limited, Toronto

PW 505



Electric Plant on a Modern Passenger Liner

THE S. S. St. Paul, which turned over in her slip two years ago, has been reconditioned and has now resumed her passenger service between New York and Southampton. Her rehabilitation is a splendid example of American achievement, and when she sails eastward on this, her first trip after the war, her passengers will enjoy greater comfort and service than they were accustomed to in the old days.

Owing to the demands of war, the St. Paul was taken over by the government and sent to the Brooklyn Navy Yard to be converted into a transport. On April 25, 1918, she was transferred to Pier 61, North River, and while being warped to the dock took a considerable list. This was not unusual with a vessel when light, but unfortunately a hole had been left open from which an ash chute had been removed. Water poured in and before it could be prevented the St. Paul settled on her port side and eventually rested at an angle of about 17 degrees from the perpendicular.

It was by no means a simple operation to right the ship. She had settled into the dock bed nearly fourteen feet and it was necessary to remove tons of mud. The upper decks had to be dismantled and divers working in the mud-clouded water had to close some 500 ports and openings. Pontoons, compressed air, and heavy chains were skillfully brought into service and on September 11 the St. Paul again floated right side up, but in sorry condition. Her stacks were crumpled, masts snapped off by striking the pier and her installations and equipment were badly damaged, if not rendered altogether useless. The reconditioning of the ship was placed in the hands of the Todd Shipyards Corporation. It would be too long a story to detail the entire process of reconditioning, but the installation of the lighting set will be cited as typical of the [illegible] of her new equipment.

Apart from the fact that the accident had rendered her old lighting set practically worthless, it was necessary to install units that would satisfactorily meet the increased power demand caused by the addition of several new electrical conveniences.

In order to do this, five Westinghouse engine-generator units of thirty-five kilowatts each were requisitioned. These are located just forward of the engine room and each consists of a vertical 9 by 8 inch single-cylinder Sturtevant engine, 125 pounds steam pressure, 400 r. p. m. condensing into a 26-inch vacuum. This engine is coupled to and mounted on a common base with a Westinghouse direct current 125-volt 400-r. p. m. generator, with non-corrosive parts and impregnated coils to afford protection against moisture. The five units may be operated individually or in parallel, according to the load demand.

In addition to lighting the ship, these sets supply power for the elevator, stateroom heaters and radio set and also an electric dishwasher, a dough mixer, potato peeler, toasters, plates and smoke room boiler.

As will be observed, electricity plays a large part in the comfort and efficiency of this ship and although the St. Paul has plied the Atlantic for many years, she is still in condition to hold her own as a first-class passenger ship.

THE VORTEX PAINTER

A FEW of the characteristic difficulties of paint spraying are: Loss of paint, scattering and splashing over surfaces not to be painted, uselessness in the open air owing to wind interference, and the pre-drying of the paint to a chalky consistency through evaporation of its volatile oils while in the air.

The Vortex nozzle has two openings—a central opening for paint and an annular opening around the center from which the air is discharged as a veritable blast under a pressure approximating sixty pounds to the square inch. There are separate conduits for air and paint, terminating in a right angle on each side which forms an axis for the nozzle and permits it to be operated at any desired angle.

The paint is driven from the central outlet under low velocity and is immediately picked up by the surrounding air jet and carried to the painted surface. The air jet is too powerful for the paint to penetrate. It works in defiance of wind and gravity, and while there is a small amount of spattering from the surface, this loss is remarkably small, as the whole tendency is to spread evently rather than to spatter.

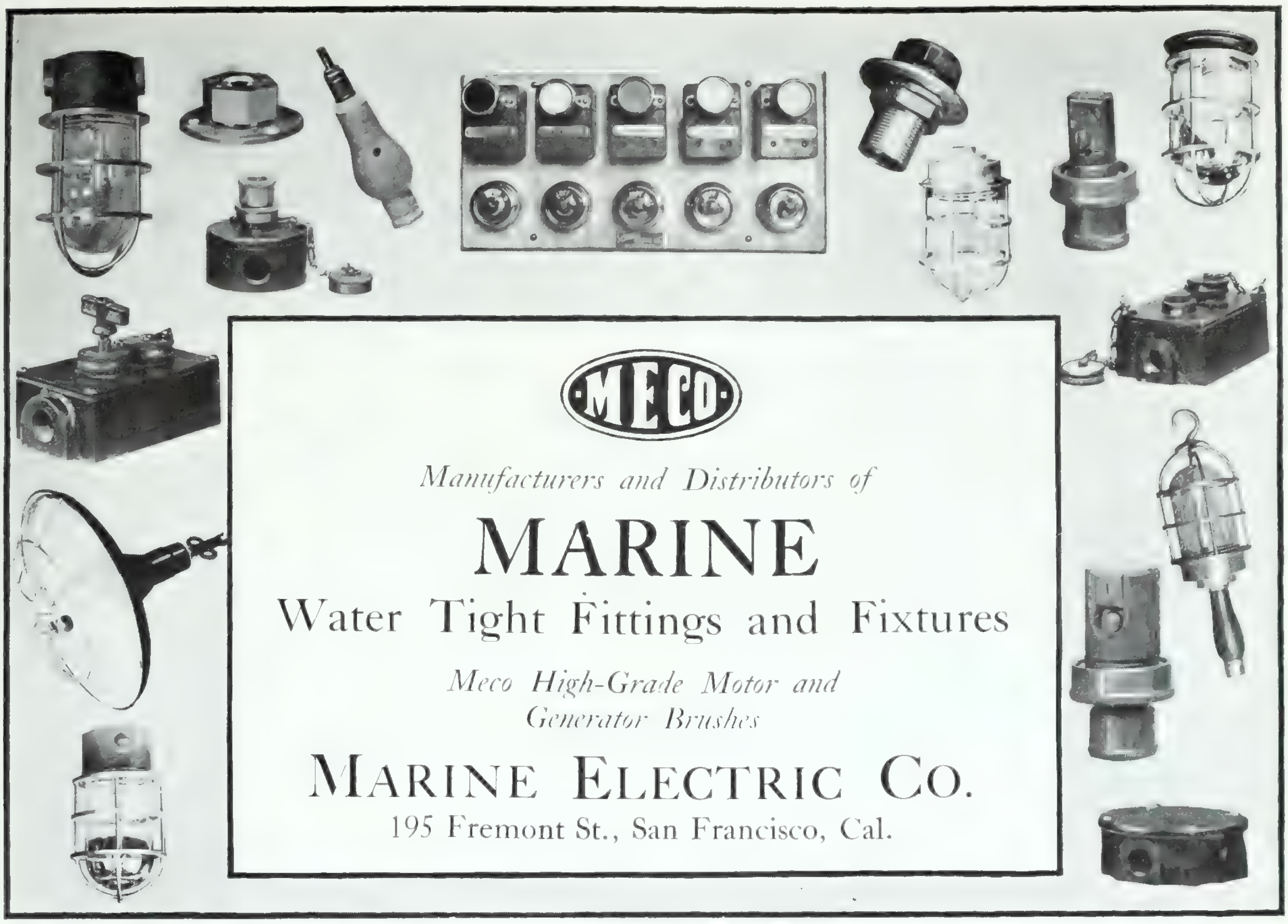
Among the claims for the Vortex painter are: 1, Carrying a greater volume of paint a minute, due to the fact that it is not finely sprayed but applied in a relatively heavy liquid jet; 2, better penetration of rough surfaces; 3, an efficient brushing action by the air jet which makes it possible to cover completely and smoothly with a single coat; and 4, dispensing with scaffolding very largely by use of a 12-foot arm, when desired.

There is also the important advantage of having a powerful air jet at the painter's command for cleaning of dirty surfaces. Its efficiency in reaching crevices and out-of-the-way corners is considerably greater than that of the hand painter's cleaning implements, the wire brush, putty knife, and cloth.

Any fairly efficient jet system should have an advantage over brushing in the treatment of rough surfaces, such as rock-faced masonry, rough lumber, etc., because perpendicular application of the paint is certain to penetrate voids better than brushing across the surface. Take the typical instance of a nail-head or bolt-head protruding a small fraction of an inch from the surface. A single sweep of the Vortex Painter films it thoroughly, front, back and all around; while a hand painter must make several passes with his brush if some part of the metal or adjoining wall is not to be left unpainted.

The Vortex Painter has consistently maintained records of 2000 square feet an hour or more on plain interior work, where conditions were wholly favorable and the operator experienced in his task. It has been quite common for interior painting jobs, sometimes performed by novices, to be accomplished at the rate of 1000 to 1600 square feet an hour. In a recent job at the East Fifty-fifth street gymnasium (Cleveland), figures had been preserved of the time spent in previous hand painting, and these make a good basis for comparison. Panels 104 square feet in size had been painted by two men at an average of 35 minutes a panel for a single coat. The Vortex appliance handled by one man did a panel every fine minutes and the single application equalled two or perhaps three brush-applied coats in cover.

Possibly a more striking demonstration was the painting of a huge storage tank on the roof of the new Overland building in Cleveland. This was given a single, but sufficient protective coating of red in 3½ hours, although the tank had 3500 square feet of surface. It rose more than 18 feet from the top of the tower on which it was located—no ladders or scaffolding were required. To make the whole test more difficult, there was a high wind at the time. One painter, with the aid of a helper in handling and arranging the hose, did the whole job.



MECO

Manufacturers and Distributors of

MARINE

Water Tight Fittings and Fixtures

Meco High-Grade Motor and Generator Brushes

MARINE ELECTRIC CO.

195 Fremont St., San Francisco, Cal.

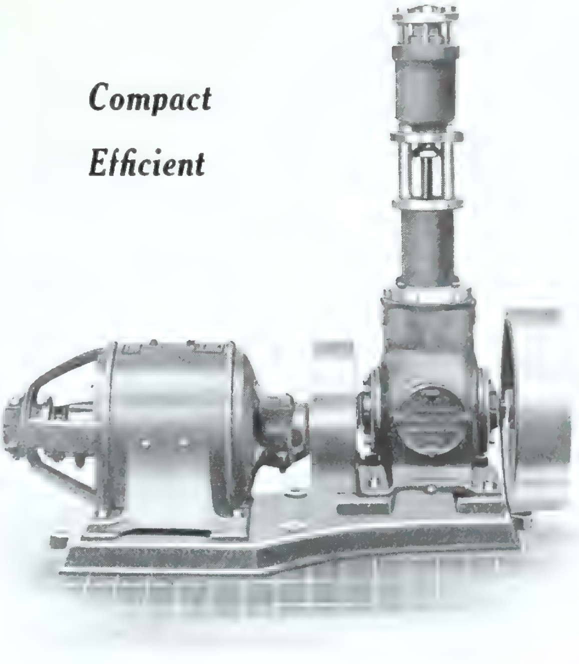
Rix Pneumatic Auxiliaries

for

Diesel Motors

Compact

Efficient



This type used on the Standard Oil Company's new Motor Tankers.

Designed and Manufactured by

RIX

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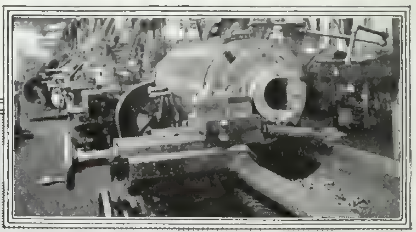
A Contest



THROUGHOUT the war emergency shipbuilding program, which is now about at its close, the shipbuilders of the Pacific Coast and the machinists in the shops working on marine machinery have made a very wonderful record in production. A great deal of credit for this record is undoubtedly due to ingenuity of men and foremen in the yards and shops. While this work was going on at top speed, no one connected with it had time or opportunity to properly analyze and describe the methods used and so spread the good knowledge around for the mutual benefit of all the other fellows in a similar line of work.

It has occurred to the Pacific Marine Review that many of the originators of schemes in shop and yard practice might like an opportunity to put their ideas into print, and we are, therefore, setting aside two or three pages each month under the above heading.

In order to make it worth while, we are offering a $10.00 prize each month for the best shop or yard "kink" sent in during that month, and a $5.00 prize each month for each of the four next best "kinks." We are also offering five yearly subscriptions to Pacific Marine Review each month for those "kinks" which may be sent in but which, not being published in full, shall receive honorable mention.

By the word "kink" we mean some unusual or new method of obtaining better production on machine tools, or of speeding up work in bolting up, or in the use of pneumatic tools in the yard, or some scheme for a better system in the forwarding of work to the ship, or any new idea that would tend to efficiency in marine work. This need not necessarily be confined to shop or yard practice. Repairs at sea or emergency shop work on board ship would be just as eligible for the prize as the other.

Where necessary to make the "kink" clear, sketch or sketches should accompany each article. Articles should not be longer than four hundred words and preferably should be confined to two hundred and fifty words. Remember that "brevity is the soul of wit" and many words make much confusion. All sketches should be made on white paper or tracing cloth with black ink.

This contest will be open beginning with the May issue of Pacific Marine Review and the names of winners will be published each month. It is hoped by this friendly competition to bring out many new and helpful ideas.

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Here is another example of Leland S. Rosener Engineering Service in the plant of the Moore Shipbuilding Company, Oakland, California. The two new 6500-ton railway drydocks, the plate and angle shops, the boiler shop, shipyard cranes and other specially designed equipment and structures are examples of the engineering service rendered by this organization.

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New Refrigerating Equipment

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THE Frigid Engineering Corporation of Vancouver, Washington, has been quietly manufacturing, installing and testing new refrigerating machinery for something over a year. Each machine is designed and produced in the company's own plant under the strictest supervision. Every compressor and every complete system installed has given the best of service under all kinds of the severest tests.

Compressors both vertical and horizontal, using either CO or ammonia refrigerants, are being turned out in any size and for any refrigerating need. These machines are put out with complete refrigerating systems involving every individual item needed in mechanical refrigeration.

While this concern designs and manufactures complete new refrigeration systems it also repairs and overhauls old systems already installed, believing that its engineering skill should be used not only to put out its own machines but also to raise the standard of service of the whole refrigerating business.

This company is ably and efficiently managed and well equipped to meet big demands for high grade machinery. Any concern wishing refrigeration assistance or suggestions are invited to communicate with them without any obligation.

CASCO PACKING

ONE of the sensitive points in engine practice among marine engineers is the choice of packing for engines and pumps, and it is therefore quite a feather in the cap of any packing manufacturer when an engineer specifies his product for any important work. This happened recently on the great transport Leviathan—when having seen its satisfactory use on a few of the pumps and valves on that ship, the engineers in charge of her overhauling specified that Casco Bar Metallic Packing should be used throughout.

Casco is a plastic metallic packing made in the form of rings or bars and solidly compressed. The bars are made in all sizes from ? inch to 1⅛ inches in thickness, advancing by 1/16 inch, and are 6 inches in length. All of the larger sizes are shaped to the segment of a circle so as to more nearly fit circular stuffing boxes. The rings are made in all sizes to fit perfectly any rod or box. Casco Packing is self-lubricating, indestructible, non-corrosive, and when warm is plastic and never becomes hard. It will stand any temperature up to 700° Fr. and has been in use for years in the hardest kind of service. This packing is manufactured by the Cassco Metallic Bar Packing Company, who are represented on the Pacific Coast by Mr. H. A. Fisher and Mr. Schneider, with offices at 268 Market street. These gentlemen also represent the Winner Company, who are manufacturing a very efficient steam trap. The principal features of the Winner Steam Trap which recommend it to marine engineers are its easy accessibility for repairs and its well-proven ability to stand up under hard service. It is as easy to provide this trap with new discs and seat as it would be on any ordinary globe valve, and this repair, which is the only one that would ordinarily be necessary, can be effected in ten minutes without disconnecting any pipe or other part of the system. Another advantage of this trap is the small space occupied and its adaptability for use outside in winter weather without danger of freezing.

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A new edition of the Parish Malleable Iron and Steel Shell Tackle Block catalogue contains blue prints which give the Safe Load for each block in its standard sizes and with the various fittings which are supplied. Complete specifications of all dimensions are also included, and these have proved to be of real service to naval architects, engineers, draftsmen and estimators.

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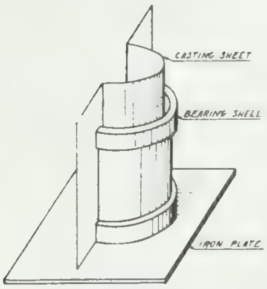

Figure 1.
Shell and casting sheet.

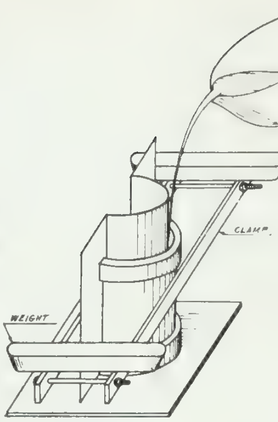

Figure 2.
Ladle too high above shell

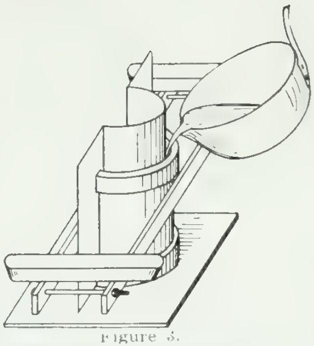

Figure 3.
Ladle in correct position

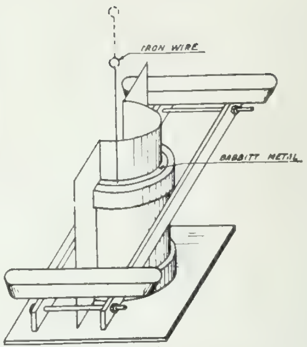

Figure 4.
"Pumping" with iron wire.

Anti-Friction Metal

THE selection of proper bearing metal always receives a great deal of attention from the designer and builder of marine engines, and probably in no other department of the science of metallurgy is there so much of the personal element involved as there is in the manufacture of babbitt metals or other alloys for the infinite variety of bearings used in the various machines, motors, engines and tools known to modern engineering practice.

The John Finn Metal Works of San Francisco has been for over thirty years manufacturing and marketing a full line of babbitt metals and out of the experience gained in these years of experiment and endeavor they have succeeded in bringing out metals for various particular requirements which have stood the test of actual service to a very remarkable degree.

A representative of Pacific Marine Review visiting the John Finn Metal Works recently obtained the following notes as to proper practice in bearing construction.

The shell of a bearing should be timed so that the liner may fit in the shell with a very close contact. This will obviate many of the difficulties which are sure to come from any looseness between the liner and the shell. The first step in the process of tinning is the removal of all grease, dirt and other foreign matter by first heating the shell and then by pickling in a bath of four parts water to one part of muriatic acid. The surface is then treated with zinc chloride soldering solution and plunged into a quantity of melted solder. The solder adhering to the prepared face is then brushed over the entire surface of this face with a soft brush. If the bearing surface is too large for the solder bath it can be warmed over a fire and a stick of solder rubbed on the prepared surface. (The illustration herewith shows some excellent suggestions for the pouring and casting of liners for bearing shells. In pouring the ladle should be held as close to the upper edge of the shell as practicable in the position shown in Figure 3. After pouring the molten metal should be pumped with an iron wire at all parts of the surface of the shell as shown in Figure 4.) Granting that this precaution has been taken and a liner of the alloy suited to the work in hand has been properly prepared any bearing should work without difficulty. If the difficulties develop in such a bearing in a great majority of cases they will be found to be due to faulty lubrication.

Lubrication should be positive and certain and so arranged as to maintain a complete film of oil between the journal and the bearing surface of the liner at all times. The friction on a journal is principally a function of the lubricant and the lubricant should be supplied continuously in sufficient quantity and should be properly distributed so that the film of oil mentioned above is maintained at every part of the bearing.

The metallurgists of the John Finn Metal Works are ready at all times to develop the correct formula for any special conditions of bearing work. Very frequently a careful study of the speed and load requirements of bearings of the engine or other machine under consideration has resulted in the development of new formulas which have produced the very highest results under practical tests. This practice of meeting special requirements by carefully formulated new alloys has resulted in an excellent reputation for Finn metal as is evidenced by the very wide and constantly increasing use of the products of the John Finn Metal Works.

Crude Petroleum Shortage

THE widening gap between the production of crude oil in California oil fields and the consumption of the manufactured products of petroleum is of considerable interest and importance to the motorist, as well as to the industrial user of gasoline. In a new statement recently issued by K. R. Kingsbury, president of the Standard Oil Company (California) it was shown that California oil production is falling short of meeting requirements by 25,000 barrels per day. In 1919 California supplied approximately 475,000,000 gallons of naphtha products, of which gasoline is the principal one. Twenty million gallons of gasoline were imported from the East, California being unable to produce sufficient to meet the requirements of the public. In California alone the number of motor vehicles operating on the highways increased 33 per cent, which naturally means that consumption of gasoline this year will be much greater. Mr. Kingsbury estimates that the 1920 demand will exceed that of 1919 by 25 per cent. With this increased demand and with production of crude oil remaining where it is a shortage in naphtha products of 150,000,000 gallons this year is indicated.

The shortage in gasoline last year was relieved by bringing gasoline from the East to certain points in the Far West which were formerly supplied with California gasoline, and which was sold at no advance in price to the consumer. Today the wholesale rates for gasoline at Eastern points of manufacture is 18 to 19 cents per gallon. If the deficiency in the supply of gasoline has to be made up by shipments from the East, the cost will naturally be the wholesale price plus at least 7 cents a gallon transportation charges and a reasonable profit to the dealers.

Prices of petroleum products, like those of everything else, are subject to the law of supply and demand. In the case of gasoline on the Pacific Coast the question of price is not the only thing; it is also a matter of getting enough gasoline to go around. In the statement from the Standard Oil Company it is pointed out that one of the remedies in the situation is conservation, and the elimination of waste, by the careful and scientific handling of petroleum and its products by the oil industry and also by the public. The average motorist is often guilty of wasting gasoline; it seems that it is no wup to him to be exceedingly careful in the use of the product.

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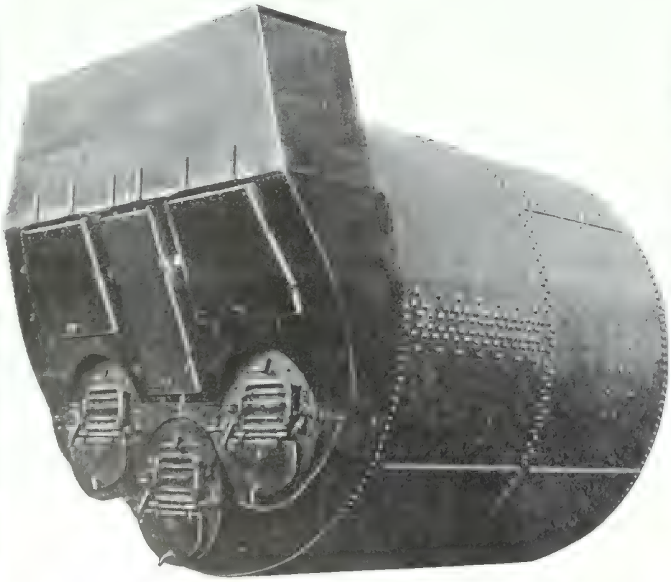

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Book Reviews and Trade Literature

PRINCIPLES of Foreign Trade, by Norbert Savay, A. M., L.L. B. Four hundred ninety-five pages, paragraphed and indexed, cloth. Published by the Ronald Press Co., New York City. $4 net.

This is a new and very ambitious manual, which aspires to cover every aspect of foreign trade from the viewpoint of the American foreign trader. It is dedicated to the chairman and members of the National Foreign Trade Council and to the officers and members of the American Manufacturers Export Association, and the primary aim of the book is to "Set forth those general principles which underlie the building up of foreign trade, not merely of such trade as is a convenient outlet for a few superfluous home products, but the trade that is a part of a permanent and national foreign policy."

All of the technicalities of the subject and all of its economic, marketing, legal, shipping and banking principles are blocked out in detail so as to give any intelligent reader the foundation knowledge upon which he can build a specialized familiarity with the handling of his particular merchandise. The commercial laws are summarized from the foreign trader's standpoint and the various methods in use for financing a shipment both here and abroad are fully explained.

Every foreign trader and every manufacturer, merchant or business man, who is at all interested in foreign trade should have a copy of this volume in his library.

Selected Articles on the American Merchant Marine. Three hundred forty-three pages compiled by Edith M. Phelps and published by H. W. Wilson Co., New York City. $1.25 net.

This is a second and enlarged edition of a book by the same title published October, 1916, as one of the volumes of the Debaters' Hand Book Series. The introduction and sample briefs have been rewritten to cover adequately the changed status of the American Merchant Marine, and the present volume published in February, 1920, includes all the finest articles and speeches written or made during what might be termed "the period of our Merchant Marine Renaissance." A large amount of properly codified and indexed information concerning Merchant Marine statistics and data is here presented in very condensed form and should prove of great convenience not only to debaters on Merchant Marine subjects, but to shipping men and merchants interested in marine law and practice.

TRADE LITERATURE

HIGH Efficiency Centrifugal Pumps. The De Laval Steam Turbine Company, Trenton New Jersey.

In a pamphlet under the above title are described official tests made by the city of Minneapolis on a 20-inch De Laval Centrifugal Pump driven by an induction motor and similar tests made by the city of St. Paul on two 12-inch De Laval Centrifugal Pumps driven by synchronous motors. The Minneapolis pump, which discharges 30,000,000 gallons per day against a head of 251.56 feet, on test showed a combined efficiency of motor and pump of approximately 82½ per cent for the unit, while the pump showed an efficiency of 86 per cent. The smaller St. Paul units pumping against heads up to 185 feet showed over all efficiencies of 78 and 78.4 per cent, and pump efficiencies of 81.8 and 82.2 per cent. These efficiencies taken together with favorable contracts for electric power have resulted in remarkably low costs for pumping water in each of these cities.

The pamphlet here described should be of interest to all who are concerned with the handling of water by electric power.

Western Electric News, Vol. 9, No. 1, March, 1920, published by the Western Electric Co.

This number of the plant organ of the Western Electric Company is of particular interest because it shows the remarkable expansion that is about to take place not only at the company's tremendous manufacturing plant at Hawthorne, but also at practically every important branch office and manufacturing branch in the United States as well as in foreign countries.

Of particular interest to western readers is the building of a new wing on the Emeryville factory branch of the Western Electric Company, which has long been known as "The Little Hawthorne on the Pacific Coast." An actual reading of article on page five of this number of the news entitled "Growing Pains Develop All Around the Circuit," would lead one to believe that a new building has just been completed or is under construction for the Western Electric Company in every town of importance in the United States, and the following article goes on to show that the same thing is true in England, where plans are on foot for the enlargement of the London plant; in Tokio, where plant expansion is under construction; in Paris, where a five-acre new site has been bought; in Switzerland, where an interest has been purchased in a well-known manufacturing firm; at Shanghai, where an old silk mill has been remodeled into a factory, and so on ad lib.

Steam Tables for Condenser Work, by the Wheeler Condenser & Engine Company of Carteret, New Jersey.

This is the fifth edition of a hand book on steam tables especially prepared for condenser work with the pressure between atmosphere expressed in inches of mercury referred to a 30-inch barometer. It also includes a description of the use of the mercury column and incorporates constants for the correction of errors which are almost always made in measuring with that gauge.

Twenty-two thousand copies of book have been printed and the Wheeler Condenser & Engine Company will be glad to distribute them to interested parties as long as the supply holds out.

Catalogue Number 10-A. Parish Supply & Mmanufacturing Company, Chicago.

An elegantly compiled and splendidly illustrated thirty-six page booklet describing the malleable iron and steel shell tackle blocks manufactured by the Parish Company.

Five insert blue print pages give complete specifications, safe loads and diagramatic plan of elevation of the various styles and sizes of the blocks described.

This catalogue should recommend itself as a convenient handbood on blocks for every ship operator's desk.

Les Moteurs Diesel, by Augustin Normand, Havre, France.

A splendidly illustrated and printed French catalogue by a well-known shipbuilder and marine engineer of Havre, in which he describes his Diesel for marine purposes. Insert plans at the back of the book show the details of the Augustin Normand type of marine direct reversing Diesel and installations of this engine on various types of ships. The largest installation shown is for a 7200-ton cargo boat with twin screws and Diesel engines, developing 1350 I. H. P. each on eight cylinders.

Bulletin No. 1120 of the Griscom-Russell Company, 90 West street, New York.

This little booklet of eleven pages describes and gives detailed specifications for the Stratton Jr. oil separator.

In this apparatus the steam entering the trap must pass through a curtain of fine water mist which is thrown entirely across the inside of the throat of the separator by a spray nozzle located in the center of this inlet steam passage. Contact with this water condenses the liquid oil and volatile gas carried by the steam and thereby enables the trap to properly separate all of the oil from the steam by centrifugal action, the lighter steam being drawn away from the inside of the whirl through a central passage and passes on into the suction, while the heavier oil and water particles arrested in their whirling motion at the outside edge of the receiver pipe suitably placed drains drop into the bottom of that combination and are drawn off in a pipe to the bilge pumps.

Bulletin No. 311 of the Griscom Russell Company, 90 West street, New York.

This booklet describes the submerged type of the Reilly evaporator. This new type of the well known Reilly evaporator is constructed with cast iron, steel, copper or composition shell, depending on the requrements. The manifolds on the shell to which the coils are attached are made of special composition of cast iron and the coils are of seamless drawn brass tubing, rolled to shape without filling. It is claimed for the coil in this new type that it is really self cleaning and that in particular instances these evaporators have run for a year at a time without removing the coils and without showing any reduction in capacity.

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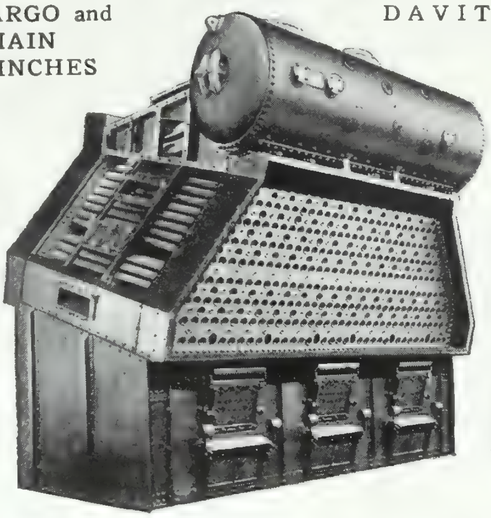

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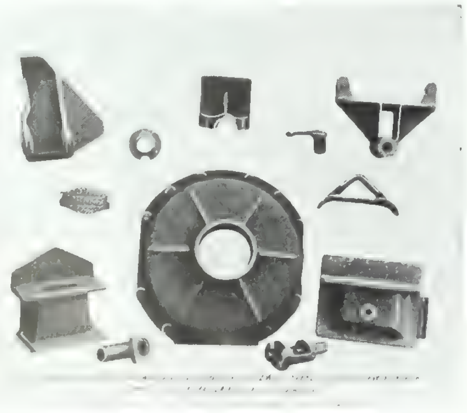

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Pacific Marine Review

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assembled at San Francisco for its
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this number of Pacific Marine Review
is respectfully dedicated ~

MAY
1920

NATIONAL FOREIGN TRADE CONVENTION,
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San Francisco, May 12th to 15th

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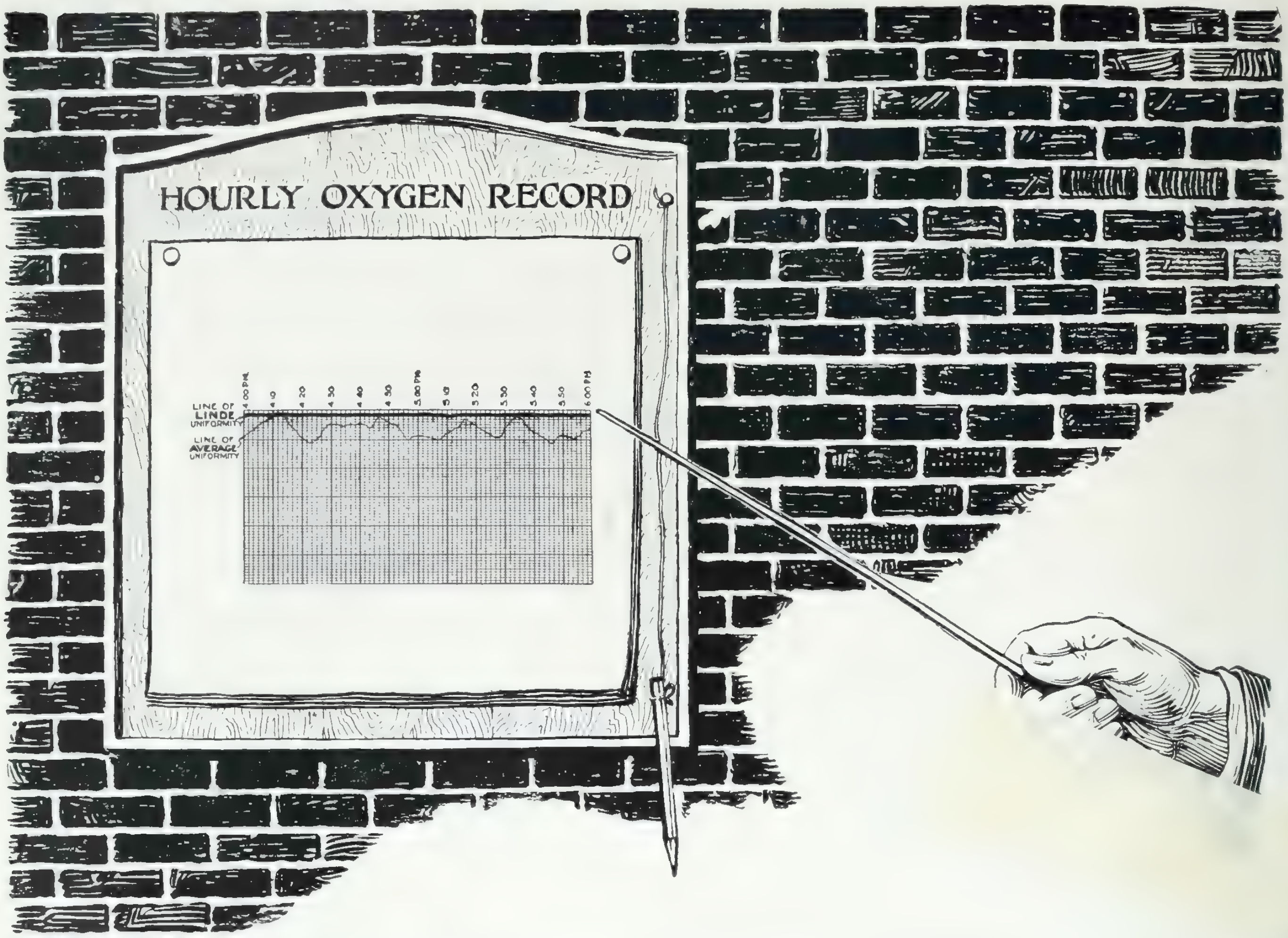

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Pacific Marine Review

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TOYO KISEN KAISHA
ORIENTAL S.S.CO.
SERVICES San Francisco to the Orient and South America
TENYOMARU

NORTH AMERICAN LINE

S. S. Shinyo Maru S. S. Tenyo Maru
22,000 Tons, 21 Knots
S. S. Korea Maru S. S. Siberia Maru
20,000 Tons, 18 Knots
S. S. Persia Maru, 9,000 Tons

SAILINGS FROM SAN FRANCISCO FOR JAPAN AND ORIENT

Shinyo Maru	May 7
Persia Maru	May 26
Korea Maru	June 8

SOUTH AMERICAN LINE

S. S. Anyo Maru, 18,000 Tons
S. S. Kiyo Maru, 17,200 Tons
S. S. Seiyo Maru, 14,000 Tons

SOUTH AMERICAN PORTS

Anyo Maru	April 22
Seiyo Maru	June 22

HEAD OFFICE, TOKYO, JAPAN

General Offices for America

625 Market Street
San Francisco

New York Office
165 Broadway

Pacific Marine Review
The National Magazine of Shipping
May, 1920
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The Seventh National Foreign Trade Convention

IN the fall of 1787 the American ship Columbia, whose picture appears on this page, sailed away from New York with the intention of exploring the northwest coast of the American Continent in a fur trading expedition.

At that time the whole of the west coast of North America was foreign trade territory to the United States and the Columbia under the guidance of Captain Robert Gray explored all of the coast of what is now known as Oregon and Washington and discovered and explored the Columbia River.

He and his associate, Captain Kendrick, built a vessel of 40-tons burden which they sold to the Spaniards of California, thus becoming the pioneer American foreign traders and American shipbuilders of this Pacific Coast.

In this year, 1920, San Francisco, the metropolis of the Pacific Coast, is entertaining in convention the foreign traders of America who now look to their outlets on the Pacific Coast and to their opportunities in trans-Pacific countries for the expansion of American foreign trade, which is necessary in order to provide markets for the surplus manufactures of America and of Europe.

The program of the Seventh National Foreign Trade Convention has just arrived from New York. This convention, to be held in San Francisco, California, on the four days from May 12 to 15, inclusive, is to have for its general theme "The effect of being a creditor nation."

On the inside front cover of the program statement is made that "letters of criticism about previous conventions have dwelt more upon the lack of discussion at group sessions than on any other topic." With this in mind the program for the coming convention has been arranged in such a way as to afford ample time for discussion at all such sessions and all delegates are urged to get ready for and participate in discussions.

SONG OF THE FOREIGN TRADER

"Feed up your furnaces, fashion your steel,
Stick to your bargains and pay on the deal;
Rich is your birthright and well you'll be paid,
If you keep in good faith with your overseas trade.

"Learn your geography, work on your sums,
Build up your commerce and pull down your slums;
Sail on a Plimsoll that marks a full hold:
Your overseas trade means a harvest of gold.

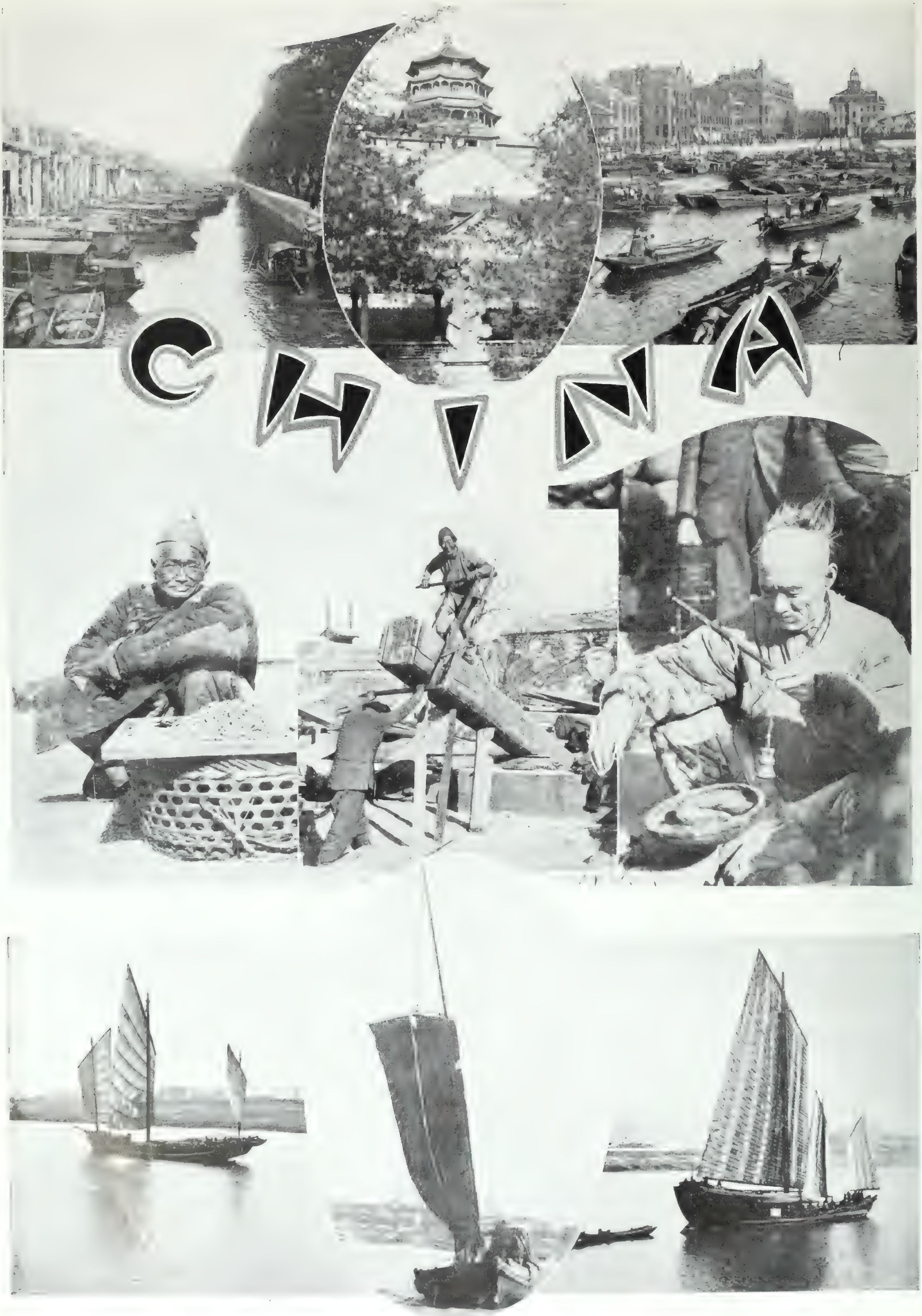
"Bring in the palm-oil and pepper you've bought,
But send out ten times the amount you import."
Increase production, eliminate shirk,
Your overseas traffic will keep you in work.

We are printing herewith the entire program for the convention so that our Pacific Coast readers will be thoroughly informed as to the subjects to be discussed at all group sessions, and may prepare themselves to take part in those discussions in which they are most interested.

A convention without adequate discussion has very much the same effect as the carefully prepared and beautifully delivered pre-election speeches of a political candidate—very interesting and edifying to those who hear the speeches and providing much good copy for the public press, but really meaning nothing in the every-day working policy of this busy world.

All Pacific Coast exporting and importing, operating, shipping and shipbuilding men should be intensely interested in bringing their practical problems and the wisdom of their experience to the discussions at this convention because there will be gathered from all that world to which we are looking for a great expansion in our overseas commerce the experts and practical business men who can give the first-hand information as to their needs and business aspirations.

So Mr. Pacific Coast Foreign Trader, Mr. Middle West Merchant and Wholesaler, Mr. Manufacturer and Mr. Atlantic Coast Shipping Magnate, sharpen up your wits, get down to the foundation facts of these problems with which you are familiar and bring to us in this convention your best thought for the solution of the many difficulties with which American foreign trade is confronted and your earnest desire to see that American foreign trading is made of great benefit, not only to yourself and your individual business, but to America and to the world whose confidence and friendship you desire to retain.


CHINA

Seventh National Foreign Trade Convention Program

Wednesday, May 12

General Convention Theme:
"The Effect of Being a Credit Nation"

FIRST GENERAL SESSION

Civic Auditorium
10:00 A. M.

Convention called to order by James A. Farrell, Chairman, National Foreign Trade Council.
Address of Welcome: Capt. Robert Dollar, Chairman, Pacific Coast Committee, National Foreign Trade Council.
Organization of Convention:
  Address of President of Convention.
  Appointment of Convention General Committee.

James A. Farrell, chairman National Foreign Trade Council

Session Topic:
Fundamentals of Our Foreign Trade"

1. Address: **The Relation of Our Productive Capacity to Our Foreign Trade.**
   James A. Farrell,
   Chairman, National Foreign Trade Council, President, U. S. Steel Corporation.
2. Address: **The Financial Situation as Applied to Foreign Trade,**
   Fred L. Lipman,
   Vice President, Wells Fargo Nevada National Bank.
3. Address: **Foreign Exchange,**
   Fred I. Kent,
   Vice- President, Bankers' Trust Co.

SECOND GENERAL SESSION

Civic Auditorium
2:30 P. M.

Session Topic:
"Exports and Imports"

1. Address: **The Function of Imports in Our Foreign Trade,**
   George E. Roberts,
   Vice-President, National City Bank.
2. Address: **The Future of Our Exports,**
   Frederick J. Koster,
   President, California Barrel Company.
3. Address: **Railway Service in Foreign Trade,**
   William Sproule,
   President, Southern Pacific Railway.

GROUP SESSIONS

Civic Auditorium
8:00 P. M.

GROUP 1. Education for Foreign Trade.

Chairman: H. R. Hatfield, Dean, School of Commerce, University of California.
Secretary: J. F. O'Hara, Notre Dame University.

1. Address: **Why and How Economics Should Be Taught in the High Schools,**
   Dr. Ernest L. Bogart,
   University of Illinois.
2. Address: **Adequate School Training in Commercial History,**
   Edmund A. Walsh,
   Georgetown University, School of Foreign Service.
3. Address: **Geography in School and College,**
   Emerson Lucas, Chattanooga, Tenn.
4. Discussion:
   Everett W. Lord, Dean Boston School of Commerce.
   Will A. Peairs, Des Moines.
   V. H. Pinckney, California Packing Corp.

GROUP II. Financing Foreign Trade.

(In co-operation with the American Bankers' Association.)

Chairman: John S. Drum, First Vice-President, American Bankers' Association.
Secretary: Frank S. Thomas, Vice-President, Alliance Bank, Rochester, New York.

1. Address: **Through Credits and Investments,**
   John E. Gardin,
   International Banking Corporation.
2. Address: **Through Foreign Finance Corporation,**
   Frank B. Anderson,
   President, Bank of California.
3. Address: **Possibilities Under the Edge Law,**
   Elmer H. Youngman, Bankers' Magazine.
4. Discussion:
   Allen Walker, Guaranty Trust Co.

GROUP III. Transportation and Communication.

Chairman: R. M. Calkins, Vice-President, Chicago, Milwaukee & St. Paul Ry.
Secretary: J. Hubbert Cullen, Detroit.

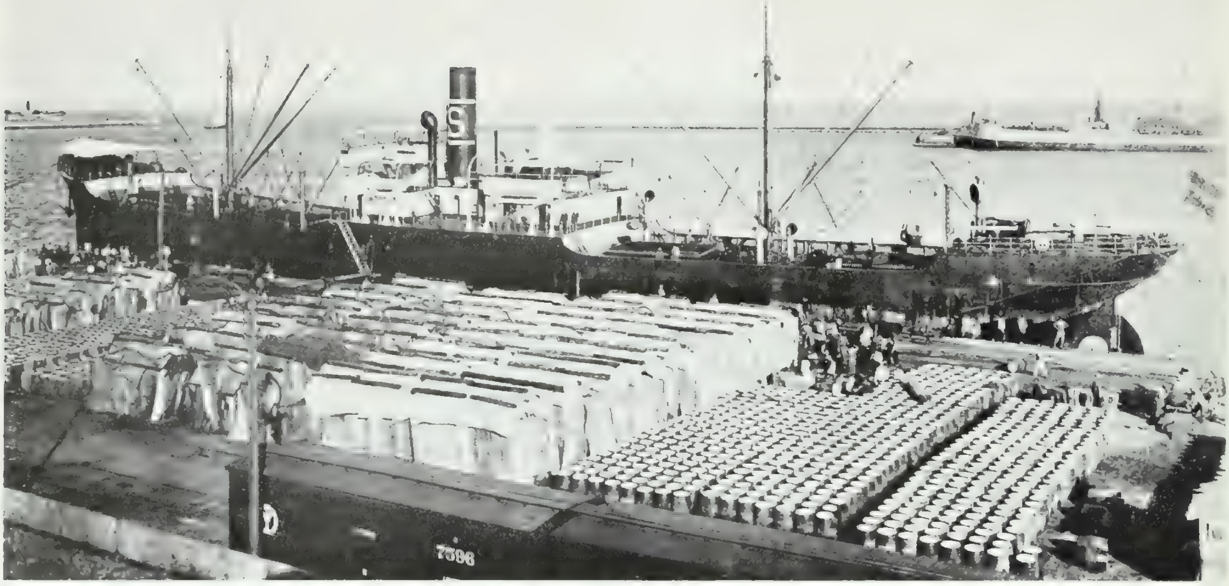
1. Address: **Export and Import Transportation,**
   R. M. Calkins,
   Vice-President, Chicago, Milwaukee & St. Paul Ry.
2. Address: **Port and Terminal Facilities,**
   B. F. Cresson, Jr.,
   New York-New Jersey Port and Harbor Development Commission.
3. Address: **Communications,**
   Gordon C. Corbaley,
   Seattle Chamber of Commerce.
4. Address: **Oriental Trade Expansion Dependent Upon Transportation Development of Asia,**
   Paul P. Whitham, Trade Commissioner, Department of Commerce.

GROUP IV. Foreign Trade Advertising.

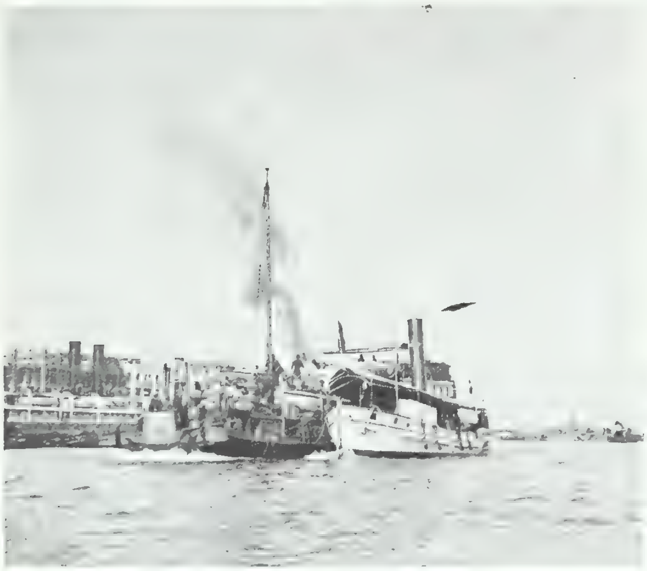
(In co-operation with the American Association of Advertising Agencies.)

Chairman: Harrison Atwood, H. K. McCann Company, San Francisco, Cal.
Secretary: Samuel P. Johnston, Johnston-Ayres Company, San Francisco.

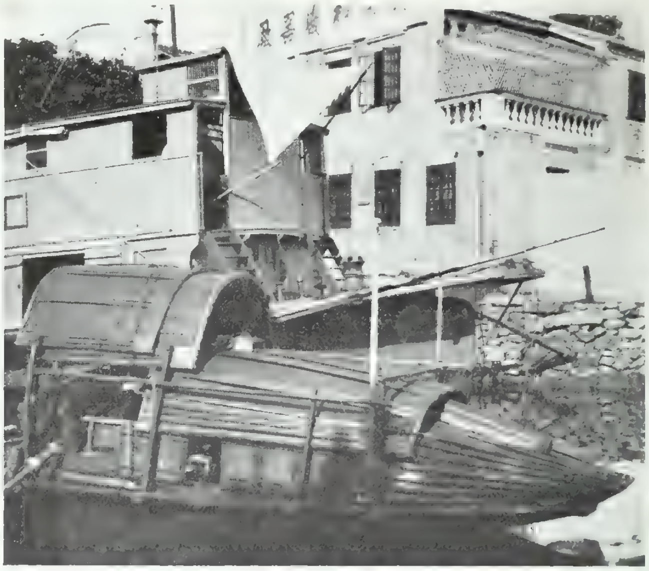
1. Address: **Advertising Results,**
   J. G. Culbertson,
   President, Wichita Falls Motor Co.
2. Address: **Agency Service,**
   Frank Arnold, Frank Seaman, Inc.
3. Address: **Consumer Advertising in Marketing Abroad,**
4. Discussion:



The steamship Mandasan Maru taking on 10,000 barrels of bean oil at the Nisshin Oil Mills, Dairen for Rogers, Brown & Company, Seattle



Freight boat and tug at Canton, China



An interesting contrast. In the foreground an ancient Cantonese slipper boat. In the background a Chinese Diesel engine factory which is fitting out the river motorboat shown in center of picture with two 50 horsepower Diesels.

Handling case oil to both piers and lighters at the Harbor Island Terminal, Seattle

Thursday, May 13

THIRD GENERAL SESSION

Civic Auditorium
10:00 A. M.
Session Topic:
"Foreign Trade Policies"

1. Address: **American Organization for Foreign Trade,**
Henry Suzzalo,
President, University of Washington.
2. Address: **The Work and Service of American Chambers of Commerce Abroad,**
C. W. Whittemore,
American Chamber of Commerce,
Buenos Aires.
3. Address: **The Need for a Bargaining Tariff,**
Robert H. Patchin,
W. R. Grace & Company.
4. Address: **Reorganization of the Government Service of Trade Promotion and Information,**
W. W. Nichols, Allis-Chalmers Company.

LUNCHEON

Palace Hotel
12:30 P. M.

The American Manufacturers' Export Association will hold a luncheon which will afterward merge into the Group Session on Direct Selling.

GROUP SESSIONS

2:30 P. M.

GROUP V. Direct Selling Abroad.
(In co-operation with the American Manufacturers' Export Association,)
Palace Hotel

Chairman: W. L. Saunders, President, American Manufacturers' Export Association.
Secretary: Robert F. Volentine, Secretary, American Manufacturers' Export Association.

1. Address: **Why Direct Selling,**
W. L. Saunders,
Chairman of Board, Ingersoll-Rand Co.
2. Address: **Sales Methods Under Adverse Exchange,**
P. S. Steenstrup,
General Motors Expert Company.
3. Address: **International Barter,**
Burwell S. Cutler, Washington, D. C.
4. Address: **Foreign Trade in Railway Supplies,**
Frank Noxon,
Railway Supply Association.
5. Discussion:

GROUP VI. Banking Service to Foreign Trade.
Civic Auditorium

Chairman: John J. Arnold, Bank of Italy.
Secretary:

1. Address: **Foreign Trade Promotion Through the Banks,**
W. E. Aughinbaugh,
New York Commercial
2. Address: **Inland Banks and Foreign Trade,**
3. Address: **Need for Standard American Letter of Credit,**
Marc M. Michael,
Treasurer, Consolidated Steel Corporation.
4. Discussion.

GROUP VII. Sources of Imports.
Civic Auditorium

Chairman: John F. Fowler, President, American Exporters' and Importers' Association
Secretary:

1. Address: **The Need for American Publicity Regarding Foreign Products,**
E. P. Thomas,
President, U. S. Steel Products Company.
2. Address (Other speakers at this session will be representatives of Foreign Business Organizations.)

GROUP SESSIONS

Civic Auditorium
8:00 P. M.

GROUP VIII. Foreign Trade and the Press.

Chairman: Andrew C. Pearson, Secretary, United Publishers' Corporation.
Secretary: A. J. Dickie, Editor, Pacific Marine Review

1. Address: **The Service of the Business Press,**
James H. McGraw,
McGraw-Hill Corporation.
2. Address: **The General Press and Foreign Trade,**
3. Address: **The Agricultural Press,**
G. Howard Davison,
President, American Publishers, Inc.
4. Address: **The Export Press,**
Franklin Johnston,
American Exporter.
5. Discussion:

GROUP IX. Foreign Credits and Credit Information.
(In co-operation with the National Association of Credit Men.)

Chairman: E. W. Wilson, Vice-President, Anglo-American & London-Paris National Bank, San Francisco.
Secretary: Felix S. Jeffries, Secretary, Credit Men's Association, San Francisco.

1. Address: **The Importance of Foreign Credits,**
Henry S. McKee,
Vice-President, Merchants National Bank, Los Angeles.
Discussion Leader: John Clausen, Vice-President, Union National Bank, Seattle.
2. Address: **Difficult Problems and How to Solve Them,**
E. G. Swift, Getz Brothers.
Discussion Leader: C. K. McIntosh, Vice-President, Bank of California.
3. Discussion: **Credit Insurance, Is It Feasible? Is It Desirable?**
Discussion Leaders: George R. Meyercord, American Manufacturers' Foreign Credit Insurance Exchange; Mark O. Prentiss, U. S. Clearing House of Foreign Credits.

GROUP X. American Trade with Russia.

Chairman: W. C. Redfield, President, American-Russian Chamber of Commerce.
Secretary: E. P. Kemmer, Secretary, Tacoma Chamber of Commerce.

1. Address: **Russia, An American Problem.**
W. C. Redfield,
President, American-Russian Chamber of Commerce.
2. Address: **Trade Possibilities with Asiatic Russia,**
David P. Barrows,
President, University of California.
3. Address: **Current Conditions in Russia,**
Jerome Landfield,
American-Russian Chamber of Commerce.
4. Discussion: Phil. Norton, New York.

Two types of the Chinese businessman

Friday, May 14

FOURTH GENERAL SESSION

Civic Auditorium
10:00 A. M.

Session Topic:
"The Merchant Marine"

1. Address: **American Maritime Policy,**
2. Address: **American Marine Insurance,**
   Hendon Chubb, Chubb & Sons.
3. Address: **Fuel Oil and Foreign Trade,**
   A. C. Bedford,
   Chairman of Board, Standard Oil Company of New Jersey.
4. Address: **Marine Securities,**

LUNCHEON

St. Francis Hotel
12:30 P. M.

The Advisory Committee on International Parcel Post will give an informal luncheon for the discussion of the international parcel post service as an aid to foreign trade. Hon. Otto Praeger, Second Assistant Postmaster General, will discuss parcel post extensions now under consideration.

GROUP SESSIONS

Civic Auditorium
2:30 P. M.

GROUP XI. Practical Problems of the Export Manager.

Chairman: C. H.Bentley, California Packing Corporation.
Secretary:

1. Address: **Training Export Salesmen,**
   W. P. F. Ayer,
   Vice-President, Walworth Mfg. Co.
2. Address: **Trade Mark Protection,**
   C. B. McElhany,
   Vice-President, American Steel Export Company.
3. Address: **Survey of New Markets,**
   E. Wilhelmi Droosten,
   The Robbins & Myers Company.

GROUP XII. Webb Law in Operation.

Chairman: E. A. S. Clarke, President, Consolidated Steel Corporation.
Secretary:

1. Address: **Webb Law Developments,**
   Huston Thompson,
   Federal Trade Commissioner.
2. Address: **Webb Law in Operation,**
   E. J. Bartells, Wood Pipe Export Co.
3. Address: **Webb Law Association Management,**
   E. E. Judd,
   Manager, American Webbing Association.

GROUP XIII. Pacific Problems.

Chairman: M. H. Houser, Portland, Ore.
Vice-Chairman: Maynard McFie, President, Los Angeles Chamber of Commerce.
Secretary: Roy O. Hadley, Seattle Chamber of Commerce.

1. Address: **Commercial Intercourse with China,**
   John Foord,
   American Asiatic Association.
2. Address: **Relation with the Peoples of the Orient,**
   Robert Newton Lynch,
   Vice-President, San Francisco Chamber of Commerce.
3. Address: **Handling Products of the Orient,**
   W. B. Henderson, Pacific Ports, Seattle.

BANQUET

Civic Auditorium
7:00 P. M.

A most interesting entertainment has been arranged by the Local Committee for this occasion. No formal speeches will be made.

Saturday, May 15

O. K. Davis, Secretary National Foreign Trade Council

FIFTH GENERAL SESSION

Civic Auditorium
10:00 A. M.

Session Topic:
"National Program for Foreign Trade"

1. Reports of Group Sessions.
2. Report of General Convention Committee.
3. Miscellaneous Business.

Adjournment.

The Dutch steamer Tjikembang taking on 3000 tons of California rice shipped to Sumatra through M. S. Cowen & Company, San Francisco

Shipping Board Allocations

THE United States Shipping Board has recently furnished us with figures showing the condition of Pacific Coast services to which Shipping Board steamers have been assigned. In a little over a year the tonnage assigned to the various services on the Pacific Coast has grown from zero to the amounts shown by the following tables, which are all in deadweight tons, and are correct to April 1, 1920. It is the avowed purpose of the Shipping Board to increase this tonnage as fast as new vessels are available and conditions warrant their use.

There is also appended a table showing the disposition of wooden steamers built on the Pacific Coast and the way in which they have been used as cargo carriers, which throws a good deal of light upon the usefulness of the wooden steamer and should be of great interest to operators who are considering buying any of these vessels from the Shipping Board.

ORIENTAL SERVICE

From San Francisco

West Selene	8,800
Archer	11,773
West Mingo	8,800
West Sequana	8,800
West Niger	8,800
West Inskip	8,800
Eastern Merchant	12,600
West Caddoa	8,800
West Calera	8,800
Hathaway	9,400
West Cajoot	8,800
Colorado Springs	9,600
West Cactus	8,800
Elkhorn	9,500
West Henshaw	8,800
West Himrod	8,800
Eastern Trader	12,600
West Ira	8,800
West Harts	8,800
West Cadron	8,800
West Hepburn	8,800
Higho	7,500
West Keene	8,800
	207,773

From Puget Sound

Iconium	9,400
City of Spokane	9,600
Cross Keys	9,600
Edmore	9,600
Eldridge	10,000
Elkton	9,600
Endicott	9,500
Wheatland Montana	9,600
Havilah	9,400
Bravecouer	9,500
Deuel	8,800
West Ison	8,800
West Ivis	8,800
West Jena	8,800
West Jessup	8,800
Delight	7,500
Stanley	9,600
Maquam	9,400
West Ivan	8,800
West Jester	8,800
West Jappa	8,800
	192,700

From Columbia River

West Nomentum	8,800
Angeles	8,800
West Nivaria	8,800
West Keats	8,800
West Hartland	8,500
Abercos	9,400
Waban	9,500
Coaxet	9,500
Montague	9,400
Wawalona	9,500
Pawlet	9,500
	91,700

From Los Angeles

Vinita	8,400
West Hixton	8,800
West Montop	8,800
West Hika	8,800
	34,800

FROM SAN FRANCISCO—SPECIAL SERVICES

India Service

Haleakala	8,800
West Neris	8,800
	17,600

Round-the-World Service

West Kasson	8,800
West Conob	8,800
Westboro	8,640
	26,240

FROM ALL PACIFIC COAST PORTS

European Service

Eelbeck	9,600
Cockaponset	9,400
Orani	9,400
Cansumset	9,400
West Cayote	8,800
Dewey	8,800
West Katan	8,800
Effingham	9,600
Bakersfield	8,800
	82,600

Hawaiian Island Service

Eastern Gale	6,650
Eastern Guide	6,300
West Nilus	8,800
Mohinkis	9,400
Dellwood	5,578
	36,728

West Coast So. Amer. Service

Wallingford	3,200
Silverado	3,280
	6,480

Australian Service

Las Vegas	8,800
West Holbrook	8,800
West Mahwah	8,800
	26,400

River Platte Service

Padnsay	7,500
Delfina	5,350
	12,850

VESSELS UNDER PACIFIC COAST OPERATION OPERATING IN WORLD-WIDE TRADING

Lake Gebhart	4,050	Western Knight	8,500	Otha	7,500
Mehanno	8,409	Gaffney	7,500	Eastern Knight	10,500
Hawarden	9,400	Ossa	7,500	Olen	7,500

West Segovia	8,800	Eastern Pilot	5,000	Eastern Ocean	9,000
Eastern Glade	8,500	Delisle	5,350	Heffron	11,800
West Kader	8,800	Eastern Belle	5,000	West Pocasset	8,800
Crown City	8,800	West Helix	8,800	West Campgaw	8,800
Nile	9,600	Lake Flynus	4,160	Diablo	9,400
Eastern Mariner	10,500	Lake Frenchton	4,160		
West Hesseltine	8,800	West Cahokia	8,800		
Eastern Moon	9,000	Bearport	9,400	Total	242,129

ORIENTAL FEEDER SERVICE

(The following vessels are operating in Oriental feeder service and serve all American vessels engaged in Oriental trade.)

Caddopeak	3,694	Lake Gilpen	4,050	Lake Fielding	4,050
Doylestown	3,800	Cadaretta	3,800	Lake Gitano	4,200
Lake Farmingdale	4,050	Glymont	3,800		
Jacox	3,800	Lake Farrar	4,050		
Lake Faulk	4,050	Lake Onawa	4,050	Total	47,244

San Francisco, April 1, 1920.

DISPOSITION OF WOODEN STEAMERS BUILT ON PACIFIC COAST

	CARGO FROM				CARGO TO			Total	Cargo
Cargo	California	Oregon	Washington	U.S.Atlantic	Europe	Cuba, Panama	Manila	Strs.	Tons
General	(37) 88,917			(34) 80,900			(3) 8,017	37	88,917
Ties	(5) 10,661	(51) 119,499	(30) 70,798	(38) 93,125	(48) 107,833			86	200,958
Lumber	(1) 2,118	(6) 11,941	(17) 35,683	(8) 16,470	(7) 15,576	(9) 17,696		24	49,742
Navy supplies	(2) 4,231			(2) 4,231				2	4,231
Navy lumber			(1) 1,756	(1) 1,756				1	1,756
Army supplies	(2) 5,587			(2) 5,587				2	5,587
Food Adm.	(2) 5,244	(2) 4,427		(4) 9,671				4	9,671
Barley	(17) 39,490				(17) 39,490			17	39,490
Copra	(3) 4,475				(3) 4,475			3	4,475
Nitrates				(8) 16,000				8	16,000
Manganese ore				(1) 2,000				1	2,000
Dyewood				(1) 1,000				1	1,000
Lost in Pacific								3	
Training ship								1	
Building								3	
Total	(69) 160,723	(59) 135,867	(48) 108,237	(99) 230,740	(75) 167,374	(9) 17,696	(3) 8,017	193	423,827

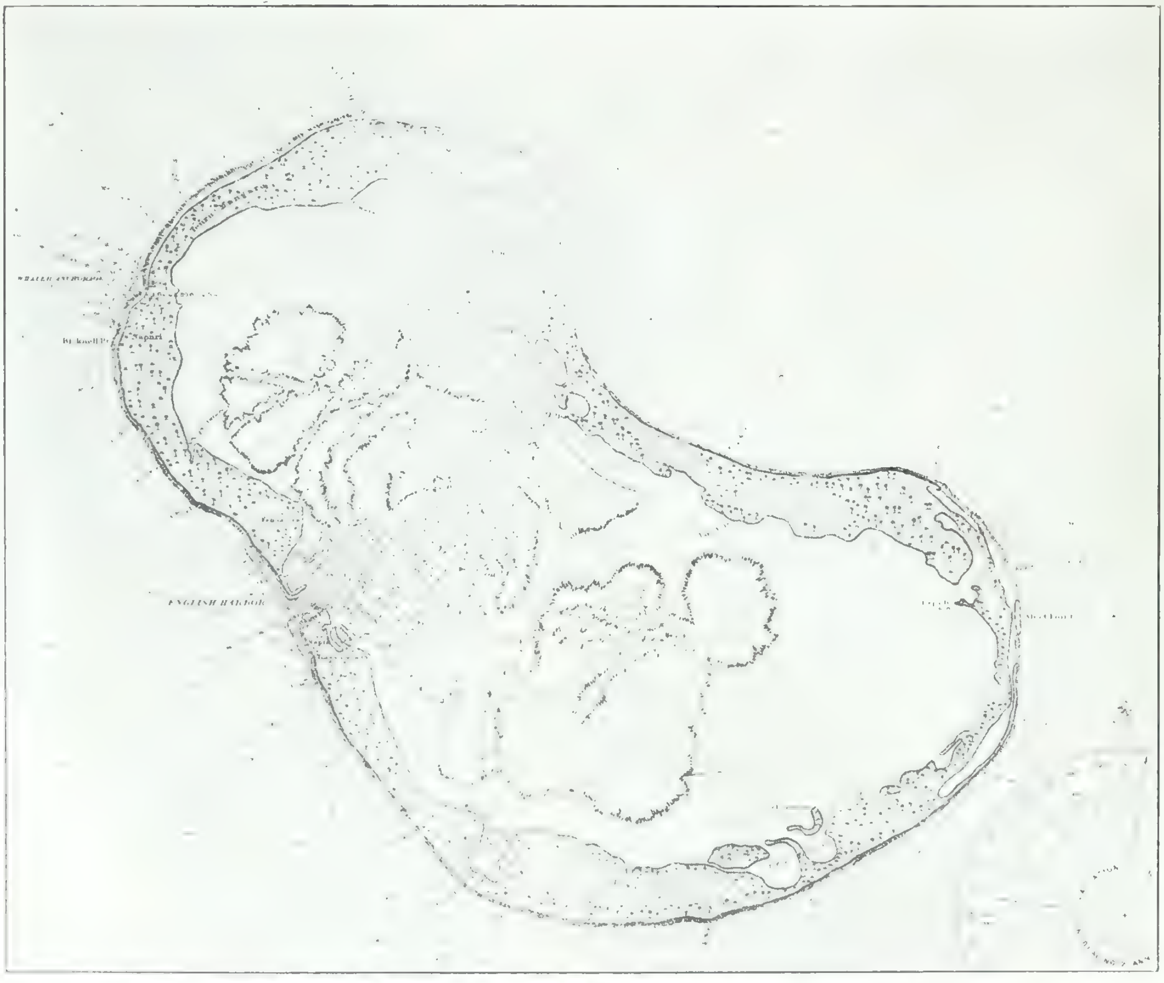


Chart showing Fanning Island and location of proposed British fueling station. Soundings in fathoms.

A New British Fueling Base

A LONG-DISCUSSED plan to make Fanning Island a British fueling station is nearer fruition than it has been at any time heretofore, and the probabilities are that the work will be carried through to consummation within a short time. Although this project had been discussed for several years, it remained in abeyance until the visit of Admiral Jellicoe to the island last year. Lord Jellicoe's report to the British Admiralty (the contents of which are of course unknown) was sufficiently favorable to the plan to cause the Admiralty to send two engineers, A. L. Perfect and S. R. Little, to Fanning. Upon their report the decision of the British government probably will rest in large part, but all indications are that a fueling base will be established, to supply both naval and merchant vessels with coal and fuel oil. Should the report of the engineers be favorable, quite a period would elapse before the station could be completed, because extensive dredging of coral reefs and sand banks would be necessary in order to create a harbor of adequate size and depth.

At no time has the British government had a fueling base in the eastern Pacific; in fact, it possesses no base east of Australasia and the Far East. The geographical situation of Fanning is such that it would serve admirably. The island lies in longitude 159:22 west and 3:15 north, approximately 1200 miles south of Honolulu; and, with two other nearby atolls (Washington and Christmas Islands), is the most easterly possession of Great Britain in the Pacific, Pitcairn and Ducie excepted. Of the three British islands of the Oceanic Sporades, Fanning offers by far the best natural advantages, to which is added the fact that it is a station of the Canadian-Australasian line of the British Cable Board, so that it has direct communication with Vancouver, and with Brisbane by way of Suva and Norfolk Island.

It is surmised that recent changes of sovereignty over Pacific islands, notably the assumption by Japan of the mandate of the Carolines and Marshalls, have had much to do with the revived interest of the British in Fanning. Questions of naval policy aside, the creation of a fueling base at Fanning would result in the virtual elimination of Honolulu as a bunkering port for British merchantmen bound from the Panama Canal to Australasia and the Southern Orient, although Honolulu or San Francisco might continue to attract vessels bound to Northern Asia. It has been no secret that the British have desired to make themselves independent of Honolulu in the Central Pacific, and, disregarding the effect of a base at Fanning on the Northern Asiatic bunkering trade, the plan unquestionably has in contemplation the creation of a convenient mid-station between Australasia and both Panama and British Columbia.

Fanning Island is a pure coral atoll, 145 miles northwest of Christmas Island and eighty-five southeast of Washington; about nine and one-half miles in length, northwest and southeast, and four miles wide; thirteen feet high in its greatest elevation; thickly covered with cocoanut trees attaining a maximum height of ninety feet, which are visible about fifteen miles from a vessel's deck. Surrounding the elevated portions of the atoll is a ledge of coral, which is highest on the north and east sides, forming in a sense a breakwater. The reefs are steep and fall away sharply, so that the 100-fathom line is 500 yards from shore except on the northern and northwestern sides, where it is about 1000 yards distant. On these sides are the best anchorages, there being sufficient width to permit of anchoring in from thirteen to twenty fathoms with swinging room to clear the reef.

Enclosing the lagoon is the atoll, only a few hundred yards wide at its maximum. This belt of coral sand and stone is broken in two or three places on the eastern side, but none of these passages can be used by craft larger than canoes, and not by canoes in rough weather. The only entrance suitable for larger vessels is that at English Harbor, which lies on the southwestern side, and near which are situated the buildings of the copra settlement. This ship entrance is about 300 yards wide between the two points, but is narrowed by a reef to a navigable channel 100 yards wide and twenty feet deep. Much dredging of this channel would be necessary before it could be made available to the larger merchantmen and warships.

A vessel drawing from sixteen to eighteen feet may enter at the beginning or end of the ebb and moor opposite the houses of the settlement; but a ship of 250 feet or so scarcely would have room to turn, and a large vessel would have little protection against the tide race.

It is in the inner lagoon that most of the dredging would be necessary. A spacious anchorage, the depth of which varies roughly from thirty to fifty feet, lies about 1000 yards from the lagoon entrance; but to open this for large vessels would necessitate the dredging of a bar from 600 to 800 yards wide and only twelve to fifteen feet below the surface. At the present time small craft alone can enter the anchorage.

Except for the inner anchorage, the lagoon is filled with coral reefs, some of which probably are growing; there are, however, some deep holes.

There is little tide in the basin. In the lagoon entrance, however, the flood tides run in at a speed of four and one-half to five knots; and the ebb has a speed of about three and one-half; both tides setting straight through the channel and making entrance or exit extremely dangerous for vessels except near slack water. For steamships the harbor is good; fore-and-aft rigged vessels can work in, having an eye for tides; but square-rigged vessels are jeopardized by the prevailing trade winds.

The spring rise of tides is about two feet; the neaps range about six inches. During one year the following were the winds: northeast trades, forty days; easterly, 114 days; southeast trades, 150 days; calms, twenty-eight days. Except in the rare (perhaps unknown) event of a westerly gale, English Harbor, therefore, is always protected by the atoll and cocoanut palms from the wind.

To what extent Fanning could be relied upon for water is mooted. Good water is obtained by sinking wells a few feet, and the water is fresh, although it rises and falls with the tide; brackish water results if the well is sunk too deeply. Whether these supplies would be sufficient for vessels is unknown. The mean annual rainfall is about 130 inches.

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J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor
G. N. SOMERVILLE. . . . . . Associate Editor
J. G. BRAY . . . . Pacific Coast Adv. Mgr.

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M. B. STEWART, Manager

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560-561 Empire Building
J. A. KENNEDY, Manager

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THE NATIONAL FOREIGN TRADE COUNCIL

FOR the first time in its history, San Francisco is entertaining the foreign traders of America in convention assembled and many San Franciscans are asking what is the National Foreign Trade Council and why a National Foreign Trade Convention.

A word of explanation is therefore in order and we submit the following. The first National Foreign Trade Convention met at Washington, May 27 and 28, 1914. It was called together by importers and exporters of the United States who saw that they were facing a crisis and that it was necessary to seek co-operation between the various parts of the country and among the various manufacturers and merchants in order to satisfactorily compete in overseas' commerce. At that time the need was recognized for some permanent body which would effect a definite organization that could co-ordinate the foreign trade activities of the nation, and so the first National Foreign Trade Convention authorized the creation of the National Foreign Trade Council.

This council was composed of merchants, manufacturers, railroad and steamship men and bankers who represented all sections of the United States and collectively stood then and are standing today for the general interest of all elements engaged in foreign trade. It has a membership of sixty, among whom there are twenty-seven manufacturers, eight steamship men, eight bankers and seventeen merchants.

This body is non-political and non-partisan and confines its activities to research and advice. It seeks at all times to effectively co-operate with other organizations towards the encouragement of sound National Foreign Trade Policy. Constantly investigating through its committees, it has from time to time issued reports which have been of very great help in the solution of problems arising in overseas' commerce.

It will be at once evident from the date of the first National Foreign Trade Convention that the crisis which was then apparent in America's overseas' commerce had nothing whatever to do with the war in Europe. It is true that at the time of this meeting the plot which led to the war was in operation, but no one on this side of the Atlantic had any suspicion that the world was about to be plunged into the chaos which has been its lot for the last five years. The crisis at that time was due to the great stimulation of American manufacturing industries and to the necessity of systematizing the outlet for our surplus products so that a proper distribution in world markets could be obtained.

Since this first convention there has been a very much greater stimulus and expansion in American manufacturing due to war conditions and we are again facing the same crisis that American manufacturers and foreign traders faced in the years 1913 and 1914, but with the added problems of reorganization and reconstruction in Europe and the added handicap of complete demoralization of world finances and world transportation. The Seventh National Foreign Trade Convention is facing a far more serious crisis than that which brought together the delegates to the first National Foreign Trade Convention.

There was a great deal of rivalry displayed between various cities in the efforts to secure this Seventh National Foreign Trade Convention. The Sixth Convention, meeting at Chicago in 1919, after carefully weighing all the advantages and disadvantages, decided that they would come to San Francisco, knowing that they could there get into better touch with the problems of trans-Pacific commerce; and that the United States must look to the expansion of its commerce on the Pacific in order to find a practical outlet for its own surplus products and those which it must take from Europe.

The Pacific Coast should derive great benefit from this Foreign Trade Convention. It will undoubtedly greatly stimulate the interest of all citizens of the Pacific Coast in foreign trading matters and it will also bring to the merchant and to the shipping man a great mass of first-hand information from his overseas' markets.

The first convention met at Washington and its outlook was largely trans-Atlantic. The Seventh Convention is to assemble in San Francisco, and its outlook will be trans-Pacific. The comparison shows advancement. The outlook is to a more distant horizon and over a wider expanse.

CAVEAT EMPTOR

IN one of his numerous addresses on foreign trade subjects, V. H. Pinckney of the California Packing Corporation has in a very happy manner described the effect of the above phrase on foreign trade relationships. His words are so apropos to the present situation that we quote them here in full:

"Many years ago there was brought forth into the world a most wonderful being. In fact, it might better be stated that it sprung full panoplied upon a business world quite ready to receive it. Its name is the same today as it was yesterday and will probably be forever—Caveat Emptor. Under this magnificent patronymic is hid a multitude of things. Translated into understandable English it means: 'Let the buyer beware.' It came over with the Colonists and found a most fertile soil in New England. When Deacon Jones got the best of a horse trade, he felt that he had been created 'Not as other men.' As a consequence he prayed and preyed upon lustily and lengthily. When he discovered that he had failed to charge a ham to some customer and had forgotten the customer's name, and decided to charge the ham against every one of his customers, the result was that this particular ham was sold thirty-six times. His idea was that those who protested against the inclusion of this ham in their statement of account did not get it; those who made no protest ought to be charged for the ham on general principles. For this transaction he gained the reputation of being a remarkably astute business man. When he found that through some inadvertence he had added the year 1789 at the head of a customer's column and had enriched him thereby in the sum of $17.89, he became recognized in the community as one of the leading business men. It never occurred to Deacon Jones that he was dishonest. The doctrine of Caveat Emptor was a shield and a buckler.

The life of our famous friend, Caveat Emptor, has not been a very smooth one so far as the United States is concerned. In fact, it might be stated that his days have been full of sorrow and vexation. The buyer got tired of having to continually beware. He came to the conclusion that there was no necessity for him to take all of the risk and so he evolved another doctrine known as the Missouri Doctrine, which means 'show me,' or, to translate it again into understandable English, 'Let the seller beware.' It is safe to say that our friend Missouri has almost entirely supplanted Caveat Emptor. We have, however, a most peculiar circumstance: Europe, which gave birth to Caveat Emptor, now keeps him at home and sends abroad the Missouri Doctrine. The United States of America keeps Missouri at home and sends forth Caveat Emptor."

We ask you, Mr. Foreign Trader, is it true that Caveat Emptor is the policy of America's overseas' commerce? Only you can answer this question and we would urge you to ask and answer in your most thoughtful mood, for upon your answer will largely depend the future of foreign trade in the United States.

GOVERNMENT OWNERSHIP

THE great majority of ship owners and operators are very much relieved to find that the tendency of the legislation now proposed by the Senate Commerce Committee is toward a definite relinquishment of government control. As far as overseas' commerce is concerned and the government operation of merchant marine in overseas' trade, this tendency on the part of our Senate should be a relief to every American citizen, as well as to the ship owners, because whatever may be an individual citizen's opinion concerning government ownership and operation of public utilities, there are some aspects of the overseas' commerce situation which make it very dangerous and embarrassing as a governmental business.

At the annual meeting of the Chamber of Shipping of the United Kingdom during the last week of March, Sir Kenneth Anderson, speaking on this subject, pointed out that practically all past wars owed their origin in either religious or trading causes. This has been particularly true of maritime wars because the sea is the highway of the world trade and its mastery is the key to worldwide possibilities.

Individual traders as a general rule, "when they have disputes, can either refer them to a Court of Law or can compromise; they may even fight it out, but the fight is one in which only guineas are split and only themselves are involved. But with governments as parties to the dispute, the point of national honor would preclude compromise and there would be no court of appeal except the ultimate appeal to arms. Not only will private quarrels be converted into national quarrels, but the occasion of quarrels will be infinitely multiplied. Hitherto, despite efforts intermittently made, all attempts by private individuals to corner any of the essential products or services of the world have failed. But what has proved impossible for individuals is possible, if not easy, for governments or a combination of governments, and if they should control some essential product such as food, or some essential service such as transportation, the temptation, either from motives of political advantage or financial gain, to withhold that product, or to extract an unconscionable price from the country to which it is essential, may be irresistible. The mere suspicion that such a thing is happening will be almost, if not equally, disastrous, and the suspicion will always be present."

In fact, Sir Kenneth Anderson even went so far as to hint that this very reason was the German excuse for her attempting to capture world trade by force of arms and he points out that Great Britain is at the present moment under grave suspicion on the part of many of her allies and others so that her actions have been misconstrued and many suggestions of profiteering have freely been made in connection with her actions as an agent for supplying the allies.

At the close of his speech Sir Kenneth Anderson moved a resolution which was passed by the Chamber of Shipping that the participation in national commerce and of state-owned merchant fleets constitute a menace to the future peace of the world.

We agree with this British ship owner and statesman in his analysis of the dangers of government ownership and operation of overseas' merchant fleets and would respectfully urge our legislators at Washington to divorce themselves from any connection with the operation of overseas' shipping as rapidly as is practicable. The only criticism in this connection which can be placed upon the tentative draft of the proposed legislation recommended by the Senate Commerce Committee is the continuation of Shipping Board control for ten years. This time limit should be made as short as possible.

WHY BILL FLAGS TRAINS

EVERYBODY said Bill McKenzie would easily rise to be foreman of the shop. There were even those who predicted he might in time become master mechanic of the railroad. Bill was clever at his work, industrious and steady, and his ready smile won him friends on every hand.

He had a young and thrifty wife and three beautiful children—always a spur to a man. The little bungalow home, half a mile from the yards, was almost paid for, and this spring it was particularly lovely in its setting of green, dotted with beds of bright red and yellow tulips.

Then the thing happened—the hideous thing that almost took the sunshine out of Bill's sky and blighted all his prospects.

One day he sat on his bench chipping a brass journal box for a locomotive brought in off the road for rush repairs. The journal box was held fast in the vise and patiently Bill plied the cold chisel. Suddenly the chisel slipped and with the force of Bill's sturdy hammer arm behind it gouged his leg.

The blood started. Bill picked up some half-dirty waste from the bench and soaked up the blood. In five minutes the wound appeared to be all right, and he went back to his chiseling.

Two days afterward the leg began to hurt. Bill went to a doctor, but it was too late. Infection had set in, and there was nothing for it but to amputate the leg.

The machine shop job was at an end, as the poor fellow discovered when he was released from the hospital several weeks later.

Everybody was awfully sorry, for Bill had been a good fellow and a faithful workman; but, of course, every one has his own worries in this world and can't be expected to shoulder those of his neighbor. The company gave Bill a crossing job, and now he earns $40 a month instead of $40 a week, which was his salary in the shop.

Today he signals vehicles and passersby with red and white flags, and his oldest boy, who gave up his ambition to become an electrical engineer and quit school at fourteen, is helping to support the family.

An elementary knowledge of First Aid would have averted this tragedy and changed the course of five lives for the better. The American Red Cross offers First Aid courses to organizations and industrial concerns and can show that the training pays employers in dollars and cents. Several insurance companies have reduced their premiums and accident rates to firms where the men are trained in First Aid and where First Aid equipment has been installed for the protection of employes.

Application to your local Red Cross chapter will bring information on how to introduce First Aid training into your plant.

CALIFORNIA DEVELOPMENT REPORT

THE report of the California Development Board for 1918 and 1919 is off the press and ready for free distribution from the board's information bureau at the Ferry Building, San Francisco. Special attention is given to the increasing industrial importance of California's ports and harbor improvements, imports and exports. Building activities, bank clearings from the principal cities and a detailed report of financial conditions for the past two years are of pertinent interest.

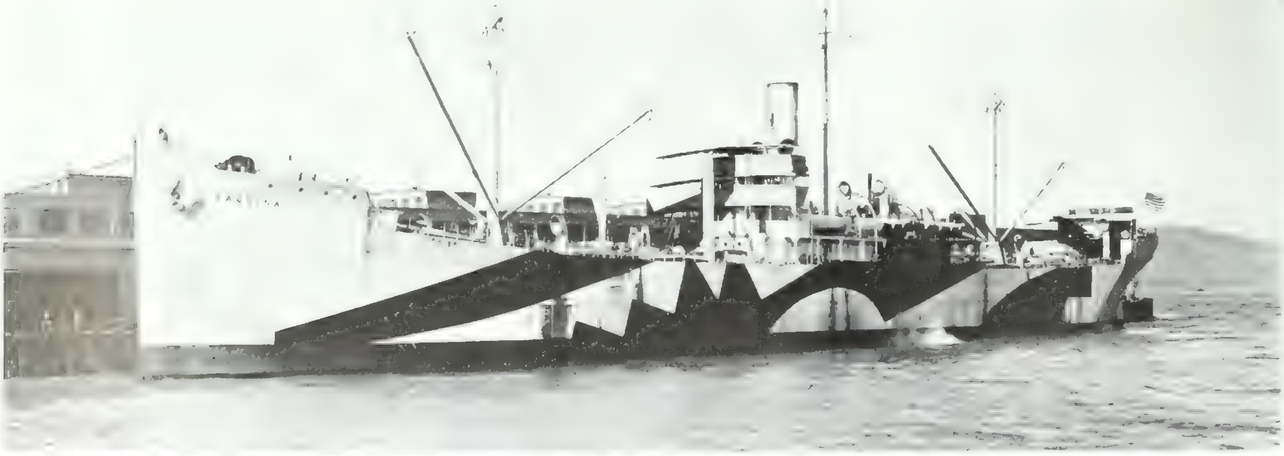
Estimated population of cities of more than 1500, or those which have enjoyed phenomenal growth since the 1910 census, are given with estimated percentage of increase since that date. When the United States census is completed, the California Development Board will issue a supplement showing actual population and percentage of increase.

In many respects this report marks a radical change from previous issues. Production, valuation and acreage of field and fruit crops are given both for 1918 and 1919, with a comprehensive table showing the estimated disposal of the commercial fruit crops and the five counties leading in number of bearing and non-bearing trees.

For the guidance of the traveler, a list of automobile stages and routes is given.

The location and installed capacity of hydroelectric plants operative in California at the present time is contained in this report.

The summary of values heretofore included in reports of the board is omitted in this issue. They would be but estimates, too elastic for real value and subject to distortion. Such compilations are often misleading when purely estimates and subject to too great differential between grower, jobber and consumer; goods in warehouses, etc., to be greatly relied upon. The California Development Board seeks to issue only such data as it can stand back of.



Steamship Yaquina on her maiden voyage loading 1500 tons of California rice from San Francisco to New York, shipped by M. S. Cowen & Company

Shipping Facts

PERTINENT EXTRACTS FROM LATEST TESTIMONY BEFORE THE SENATE COMMERCE COMMITTEE

By Traffic Manager

AT the hearing before the Committee on Commerce of the United States Senate on March 12, 1920, a statement was made by Senator Duncan U. Fletcher of Florida which should not go unchallenged. That statement appears on page 1967, Part XXXVII, of said hearings, as follows:

Senator Fletcher. One of the reasons why I was so earnestly in favor of the shipping act and of the government going into this business of building a merchant marine was because it seemed to me, after years of experience, that **private enterprise had failed us,** and I am afraid we are very much in that position now.

> **Comments:** Senator Fletcher has been a member of the Senate for eleven years. If he had been interested in an American merchant marine he must have known before our entry into the war there was no such thing as an American merchant marine. It was impossible before that time for private enterprise to become interested in an overseas' merchant marine for American ships had been swept from the oceans by the English and Germans, who could operate ships at a profit when American vessels could no longer be so operated. In fact, private enterprise for many years assailed Congress for legislation which would overcome our handicaps, but none was granted. Private enterprise feels that Congress failed the nation in this regard; otherwise we would have had a merchant marine at the time of our entry into the war.

Our Postal Department and Its Treatment of Our American Merchant Marine—Pages 1948 to 1951, Inclusive, Part XXXVII

Chairman (Wesley L. Jones). First, Mr. Rosseter, I want to ask you with reference to the carrying of our mails: Can you tell us how our mails are carried, under what arrangement, and what, if any, suggestions will meet the situation?

Mr. Rosseter. I am unable to answer that question as an expert. I could simply give you my experience and the benefit of my observation.

The Chairman. I think that will be very valuable.

Mr. Rosseter. The disposition of many officials of the postal department—and I might say quite naturally—has been to exact the best bargain they could for the carriage of mails, entirely aside from and without consideration of the fact that tied with the question of mail carriage was the very important consideration of encouraging our merchant marine, and particularly regular steamship services under the American flag with vessels of suitable class and speed on the various routes. Alaska is a marked case in point, and during the time I was director of operations the postoffice department several times called me into that question, of improving that service, and I was quite aware of a very great change in their opinion. They themselves had come to understand that to get the service required it was necessary to give private enterprise some reasonable compensation, which up to that time had not been the case. With the exception of a fixed appropriation for trans-Atlantic mail service, which has been on the statute books more than twenty years, there has been no definite policy of encouraging the carriage of foreign mail by American ships.

The practice of getting the best rate possible resulted in one instance, as I testified before, that the postoffice department, in order to circumvent—possibly the word "circumvent" might be a little strong—but in order to get around certain general regulations of the law, contracted with an American citizen, knowing full well at the time that the contract was in fact to be performed by a Japanese steamship company in trans-Pacific service. In the course of time, as I observed the working of that contract, its basis being a lump sum per ship or per sailing, the disposition of the postoffice department was, so far as possible, to accumulate mail to the Japanese ships, for which they paid a lump sum, and it was a nominal sum, more or less, $1000, as I recall, for each sailing.

The Chairman. Regardless of the amount of mail?

Mr. Rosseter. Regardless of the amount of mail; whereas under the arrangement with American ships they had to pay so much per pound. Thereafter it was the disposition of the department to keep as small an amount of mail as possible for the American ship,, to which they were paying per pound, and send as much as they could on the Japanese ship at the lump sum.

The Chairman. That is, they made a contract with an American citizen to carry the mails from this country to Asia?

Mr. Rosseter. Yes, sir; Japan and China.

The Chairman. Knowing that he could not carry it himself, but that he would have a Japanese ship carry it?

Mr. Rosseter. Yes, Senator.

The Chairman. And he pays the Japanese ship a lump sum per sailing?

Mr. Rosseter. The department pays it. The contractor was the general agent of that Japanese line, and the sum paid him was simply on behalf of the Japanese line.

The Chairman. He was known to be the general agent of the Japanese line?

Mr. Rosseter. Yes, Senator.

The Chairman. They simply said to him: "We will pay you a lump sum for each sailing that carries the mail"?

Mr. Rosseter. Yes, Senator.

The Chairman. And under that, if an American ship was sailing from the same port to the same territory, they got no mail, but it was held for the other vessel?

Mr. Rosseter. They got scattering amounts of mail, and, according to how the sailings were spaced, they would get more or less of mail if there was a considerable interval. I do not believe the postoffice department held the mail unduly. If there was a sailing as close as two days I am very well satisfied from observation that the bulk of mail was held for the Japanese ships and the revenue denied to the American ship.

Senator Chamberlain. How long has that been going on?

Mr. Rosseter. That began, Senator Chamberlain, about twelve years ago, and, so far as I know, it may be still in operation, and then again it may be that it was terminated some two years ago, at which time I know the question was mooted. The postoffice department could give you the exact date.

Senator Chamberlain. They can tell us all about that?

Mr. Rosseter. They can tell you all about that. This is not by way of any reflection on their arrangement, because, after all, I can see the department's idea of economy.

Senator Chamberlain. It may not be intended as such, but I think it is a reflection on anybody who will not give an American the advantage of that situation.

Mr. Rosseter. That is the point I am endeavoring to stress, and particularly now as we are coming seriously to the upbuilding of regular service, and it is essential to aid such enterprise.

Senator Nelson. But, Mr. Rosseter, may not the nature of the service—that is, the repeated frequency with which mail could be carried—cut some figure in that matter?

Mr. Rosseter. In that particular case, as it happened, the ships that were sailing that route under the American flag were on an exact equality with the Japanese ships.

Senator Nelson. They made as many trips?

Mr. Rosseter. They made as many trips, and made them as fast.

Senator Nelson. Made them just as fast?

Mr. Rosseter. Yes, sir.

Senator Chamberlain. It resulted in a small economy?

Mr. Rosseter. It resulted in an economy, at the cost of our maritime enterprise. It was one of the many small things which, in the course of years, have hampered American enterprise.

The Chairman. What would you suggest we do in the way of legislation?

Mr. Rosseter. I was very much impressed, Senator Jones, with the suggestions and the discussion that I had the opportunity of having with you, that the fixing of compensation for ocean mail carriage should be handled jointly by the Shipping Board, as representing the maritime interests, and the postoffice department, as representing that department, and these two branches agree as to what was fair and reasonable.

The Chairman. A just compensation for the service rendered?

Mr. Rosseter. A just compensation for the service rendered.

The Chairman. Do you think they should be directed to favor American carriers whenever they are available?

Mr. Rosseter. Absolutely.

Senator Chamberlain. I think, Mr. Rosseter, it is a fact that fifty years ago a large amount of money was paid to shipowners for European mail, far in excess of what it was actually worth to carry it. It was in the nature of an indirect subsidy.

Mr. Rosseter. An indirect subsidy, in encouragement of the service.

Senator Chamberlain. I desire to get away from the idea of subsidies, but, after all, the ships must be justly and reasonably compensated, the same as the postman on the route in cities, because, if a ship is sailing on a voyage, it is just and fair that it should be paid reasonable compensation. Again, of course, there is the very much larger question of encouraging trade communication and the protection of our own commerce, which is afforded by carriage on American ships.

Senator Fletcher. Did the Japanese line make better time?

Mr. Rosseter. No, Senator; I just testified that they were practically on an equality—fifteen-knot service.

Senator Fletcher. There was no greater speed?

Mr. Rosseter. No, sir.

Senator Nelson. Mr. Rosseter, can you tell us how much we have been paying American steamship lines in the way of extra pay for carrying mail in recent years?

Mr. Rosseter. No, Senator; I could not.

Senator Nelson. You know we have been paying a good many hundred thousand dollars every year, do you not, to American lines?

Mr. Rosseter. My impression is we have been paying the American trans-Atlantic lines something like $800,000 a year. I may be wrong on that figure. It is merely my impression.

Senator Nelson. I am inclined to agree with you.

Mr. Rosseter. Also to ocean steamships, for service from San Francisco to Australia, a considerable sum, the amount I have not in mind, but I think it was not 50 per cent of what the Australian commonwealth paid the same line.

Senator Chamberlain. To American ships?

Mr. Rosseter. Yes; to American ships.

Our Navy Department and Its Treatment of Our American Merchant Marine

In 1914 there was a demand on the part of our Navy for transportation of coal from the Atlantic to the Pacific Coast. Bids were obtained for this transportation from American ship-owners, and were promptly thrown out by the Secretary of the Navy as being too high, and bids were then asked for from foreign vessel-owners and promptly accepted, as they were lower than the American bids received. They could bid lower, for they could operate cheaper. Our coastwise laws barred foreign vessels from our coastwise trade, yet in violation of such law the Navy Department chartered such foreign vessels as the Strathberg, Strathleven, Cape Ortegal, Strathord, Virmeira, Highburg, etc., to transport coal coastwise.

The failure of our American merchant marine before the war was due to lack of government enterprise and support, rather than to lack of private enterprise.

Tramp Vessel Earnings versus Cargo Liner Earnings—Page 1954

Senator Nelson. Do you not know that the bulk of the freight of the world is carried on tramp vessels?

Mr. Rosseter. Yes, Senator; that is true.

Senator Nelson. Two-thirds of the freight of the world is carried on tramp steamers that are not sailing on regular routes.

Mr. Rosseter. I think it might even be stated in larger figures for ten years ago, but the scale is constantly shifting the other way.

Senator Nelson. Can you not see another thing, Mr. Rosseter, that a tramp vessel can better succeed in the way of earnings than one on a regular route? A tramp vessel can go from here to Europe, from there to South America, from there to Africa, and make the whole circuit and earn a good deal more money and do more business than a vessel operating on a regular route?

Mr. Rosseter. Senator, results of operations in the last ten years will not confirm your statement. The results over ten years will show that the tramp class of ships have made less money than the regular-line class. Of course, there are the usual "ups and downs," especially in tramp service, which, generally speaking, profited the most by war conditions.

Senator Nelson. That may be true in some cases but not always.

Mr. Rosseter. There are variances all the time, and that is what I would like to stress. I am very conscious as to how you are thinking about that class of ships, and I agree with you, but we cannot tie our star to the tramp ship, and we must absolutely have some good ships. If the trade of the world is two-thirds tramp and one-third regular, you will agree that we should at least have 10 per cent regular against our 90 per cent of tramps.

Sell Small, Undesirable Vessels and Build Desirable Ones with Proceeds—Pages 1958 and 1959

Senator Nelson. There is one thought that has occurred to me, that I have not found much warming up to, and it is this: It was conceded here, at least by Mr. Payne and others of the Shipping Board, that these inferior vessels, or the wooden vessels, or small type vessels, say under 5000 tons, etc., that we would better sell them or get rid of them as soon as we can, selling them in the open market. Would it not be a good plan to sell all those wooden ships and take the money we get and devote it to the building of a few big ships such as you speak of?

Mr. Rosseter. Senator, I am very warmly in accord.

Senator Nelson. I mentioned it once before, but you were the first one that ever warmed up to it.

The Chairman. I think you will find quite a number on the committee that feel pretty warmly toward something of the kind.

Senator Nelson. That would give some extra work for our shipyards here, and we could get rid of all that rubbish. I call everything below 5000 tons deadweight, wood or steel, rubbish. We can sell it in the open market and get something for it, and then invest the money in first-class ships.

The Chairman. I do not believe that all steel ships under 5000 tons are rubbish.

Senator Nelson. What do you think about the wooden ships?

The Chairman. There is no controversy about those, Senator.

Mr. Rosseter. With your permission, may I just briefly call attention to what I wrote you in respect to that type of vessel, Mr. Chairman? Reading further from my letter to you:

> All wooden ships should be disposed of as rapidly as possible, for the reason that they are unsuitable for overseas' trade and therefore have no place in the scheme of a merchant marine. To stimulate the sale of wooden ships a low range of prices should be fixed for this class in order to attract buyers who may find use for such boats in special trades.

Estimate of American Tonnage Requirements; Page 1963

Senator Fletcher. How much tonnage do you think we should have of our own in order to reasonably supply all needs in foreign commerce under our flag?

Mr. Rosseter. We talk about handling 50 per cent of our commerce. Figures like that are very hard to justify, but I think, to properly establish ourselves, a fair assumption is that our program, after the elimination of a large number of old and unsuitable ships, should stand at about 12,000,000 tons.

Senator Calder. You mean government-owned or private-owned?

Mr. Rosseter. American shipping. I am always thinking in terms of private ships.

Senator Nelson. Do you include coastwise trade in that?

Mr. Rosseter. No, Senator; overseas'.

Senator Nelson. The overseas' trade should be 12,000,000?

Mr. Rosseter. Yes, sir. It is an ambitious program, but will only be about 30 per cent of the present world's commerce.

A Balanced Fleet—Page 1970

The Chairman. I wanted to get in the record about this balancing of the fleet and establishment of routes.

Mr. Rosseter. Yes, Senator.

The Chairman. I wanted to ask you about what fund you think it would be advisable for us to establish, to use to do about what you think should be done toward balancing the fleet, over a period of four or five years.

Mr. Rosseter. I produced a definite schedule, which is included in the records of the House Committee on Merchant Marine and Fisheries. As I recall it, it totals about $260,000,000. The shortest time in which that could be spent would be three or four years. I won the approval of Chairman Good to the principle that we could use the proceeds of the sales of our old and unsuitable ships for continuation of that program, but I never could secure the approval of the Shipping Board to inaugurate the new program.

Diesel Ships—Pages 1971 and 1972

Senator Nelson. Have you any Diesel motorships in your service?

Mr. Rosseter. Yes, sir; we have operated Diesel motor service under the Swedish flag owned by friends of mine.

Senator Nelson. Were they ships of small tonnage?

Mr. Rosseter. Six thousand. They operate very successfully.

Senator Ransdell. Over what route?

Mr. Rosseter. They operate from the Baltic, by way of Central American ports, to the Pacific Coast, and back on the same route.

Senator Ransdell. A good, long route!

Mr. Rosseter. Yes.

The Chairman. Do you not think the Shipping Board could very well and very profitably experiment along lines of that kind?

Mr. Rosseter. I had thought very strongly as to the importance of that. I must qualify my statement at this time by saying that everything now in my mind is contingent on the determination to go at this thing seriously, to face the problem as it is, and to construct our legislation in accordance with it. Failing to do that, we should not build and should get out the best way we know how.

The Chairman. Your idea is that we should go out and build up a proper American merchant marine or go out of business?

Mr. Rosseter. That is right.

Private versus Government Ownership—Page 1972

Senator Nelson. There was the Hamburg-American and the German Lloyd, covering almost all parts of the globe, and those are now helpless. Now is the time when we should get into it, or rather that the government should encourage and help private operators to get into it.

Mr. Rosseter. Encourage private operators to get into it.

Senator Nelson. That is your idea?

Mr. Rosseter. Yes, sir.

Senator Nelson. That the government should not operate these vessels, but we should encourage private parties to take them and operate them over these routes?

Mr. Rosseter. I have advocated that, as I have stated, because I think that is the only way we will be successful, the only way we will succeed.

American versus Foreign Cost of Building Vessels—Page 1974

Mr. Rosseter. That is what I was going to say, Senator. Tied up very closely with this question is the matter of shipbuilding. I have from the start contended that unless we can build ships in the United States as cheap and as well as other nations we will automatically be eliminated from ocean commerce. For a long while the American shipbuilder was in dispute with me, claimed he could not do it as cheaply, but it is now generally conceded that they can.

Senator Nelson. It has been demonstrated they can do it?

Mr. Rosseter. It has practically been demonstrated they can do it, but, strange to say, at the outset they disputed with me on that principle. To have a merchant marine, we must be able to build advantageously.

Depreciation—Pages 1979, 1980, 1981

Mr. Rosseter. I think, if we put all the most difficult of our problems on the table, the one we must take up first is the question of depreciation. And, Senator Nelson, might I ask you to particularly read my testimony before this committee on that point?

Senator Nelson. Yes.

Mr. Rosseter. Briefly, it is this: Among our international competitors Great Britain and Japan stand in the foreground today. Japan has absolutely no restriction at all on the question of reducing the capital cost of the ships. Great Britain has a very liberal regulation, which seems to contemplate writing down the cost to post-war value, such writing down to be deducted from the net revenue of each year.

In my testimony you will see I have included an interview which appeared in a Japanese so-called vernacular newspaper, with the managing director of a large steamship company in Japan, and he stressed that point, and very correctly said that when we analyze all the items of operating expenses, the one that stands out the most is the charge which applies to capital cost.

In speaking before a farmers' association on one occasion I said I thought I might bring that question home to them by suggesting to consider the capital cost of a ship as similar to a mortgage on the farm.

The British mercantile fleet is capitalized at less than $50 a ton. Our ships, built during war conditions, cost us $200 per ton.

Senator Ransdell. You base your argument on two hundred dollars?

Mr. Rosseter. Yes; which is general.

Senator Ransdell. Let us see where it leads.

Mr. Rosseter. Two hundred dollars as compared with fifty dollars means four times the capital cost. Capital cost must be liquidated over the life of a ship. There is a great variety of opinion as to the length of the useful life of a ship. It must provide for insurance, because the capital investment must be insured. In the ordinary process of business, it is essential to pay the stockholders a reasonable or current rate of interest. These three items, depreciation, interest, and insurance, totaling 16 per cent figured on a 10,000-ton ship, costing, say, $2,000,000, would amount to $320,000 a year. Take off one-fourth of that, as representing the British capital cost for the same ship, and you have $240,000 a year. Three hundred service days of a ship in a year on a capital charge of $240,000 amount to $800 a day, or $24,000 a month.

We have heard at different times a good deal said about the difference in wages paid the American sailor, and the extra cost of victualing, and how it handicaps our maritime enterprise. The total cost of manning and victualing that ship—10,000-ton freight ship—under the American scale of wages, is under $7000 a month—not the difference between English scale and our scale, but a total of $7000 a month. Then the owner or operating company must set aside every month $24,000 for his depreciation on account of excessive cost, but only $7000 for the entire manning and provisioning of the ship. Above all other items of operating cost is the capital charge, as previously explained. To carry it further, the reduction of our value from a war basis or war cost to a post-war value is the most outstanding issue. The Treasury Department, under the revenue act, fixes the rate of depreciation which may be deducted before assessing ordinary and excess-profit taxes.

The Chairman. To determine as to your tax?

Mr. Rosseter. To determine the amount of tax. In the case of ships operated on the Great Lakes, the Treasury allowed a depreciation of 2 per cent a year. To allow only 2 per cent a year, it seems to me, is indefensible, but there are special conditions on the Lakes which make lake depreciation of small importance than on the seas, for these principal reasons: All of the lake tonnage was practically built prior to the war, so a pre-war value. During the war all the lake yards were busy building Emergency Fleet Corporation ships.

Senator Nelson. And they were built for about $40 or $50 a ton?

Mr. Rosseter. Yes; and even lower, I think. But even so, I think the owners have been harshly dealt with in fixing their depreciation at less than 4 per cent. Be that as it may, the Treasury Department has now said, "If we fix the lakes at 2 per cent, all we can give the foreign trade is 3 per cent." If you have a ship costing you, at war prices, $200 a ton, a depreciation of 3 per cent would reduce the valuation only $6 a ton a year. Thus in five years the capital cost would be reduced but $30 per ton. In that five years earnings would justify larger reductions and for the strength of our merchant marine the American owner should not only be permitted to reduce capital cost from earnings, but he should be required to do it. One of the arguments in favor of the ship-mortgage bill, and I have testified in favor of it—

Senator Nelson. What rate of depreciation would you recommend?

Mr. Rosseter. I would say that war values should be reduced just as rapidly as revenues will permit until we get down to a pre-war basis. If the pre-war basis is $50 and our war cost is $200, we have to reduce by $150. I should say that 15 per cent annually for five years would be a sound figure. The Treasury Department is unable to go so far without special legislation.

British Depreciation—Page 1982

Senator Ransdell. Do you feel quite sure of your premise that the British shipping is about $50 compared with $200 here? They have lost a good many ships during the war. Of course, they have been building a good many ships at practically the same cost as ours.

The Chairman. But I understand on the matter of taxation they are put on a pre-war basis.

Mr. Rosseter. Yes, sir.

Senator Ransdell. They have adopted that basis?

Mr. Rosseter. Yes, sir.

The Chairman. We want to get that in the record.

Senator Ransdell. That is very important. I wondered how you got that. Was that the average cost, or is that an arbitrary figure which the British have adopted for taxation purposes?

Mr. Rosseter. No, Senator. The question divides itself into two parts. I have studied the financial statements of several leading British steamship companies and figured out their average tonnage costs. They did lose a large percentage of their shipping during the war, and paid a large figure for replacements, but then proceeded immediately, under the ruling of the minister of finance, to apply the profit to reduce that cost. Several fleets of cargo ships which I checked up, the cost originally was $40 a ton. This is in the tramp class, which as Senator Nelson has correctly stated, comprises two-thirds of the world's tonnage.

Under the British rule, in the case of a ship purchased at war prices, it is permitted for tax purposes to write down the cost to pre-war value, and the proportionate part of such write down may be deducted from the net income. The taxpayer is permitted to take the pre-war value as a basis for deduction and consider the difference between the pre-war value and the war cost as the proper amount to be written off before paying tax.

Government Sale Prices of Ships—Page 1981

Senator Nelson. Did you know we had representatives of these big shipping lines who advocated the idea that the government ought to sell these ships that cost $200 a ton and over for $100 a ton?

Mr. Rosseter. I am entirely out of sympathy with that and have testified repeatedly that that is a very grievous error, and has confused the whole question. I am not at all in sympathy with such an idea. I think it is the duty of the Shipping Board as trustee for the people to get for these ships the best price the market will afford. Also it is the duty of Congress to assure that the people who may buy these ships will be permitted to reduce them to sound values.

Shipping Conference Agreements—Pages 1986 and 1987

The Chairman. What would you say with reference to the effect of conference agreements and what we should do to meet the situation?

Mr. Rosseter. For many years there has been an arrangement known as conference rules, built up originally by the British and latterly adopted by the Germans, which has a tremendous and far-reaching effect and is very prejudicial to our shipping enterprise. Since the war the effectiveness of conference rules has been fortified in every conceivable way, based on the experience of the British, to prejudice the expansion of our merchant marine.

That is a plain statement of facts borne out by letters written by various English conference committees, which is the very heart of the British merchant marine. Under the system of deferred rebate all shippers of any importance receive at the end of the year a rebate of 10 per cent on all the freight money they have paid to conference lines, and such rebates amount to millions of dollars annually. A shipper paying as small a sum as a million dollars freight receives at the end of the year, subject to good behavior, a preferential rebate of $100,000. It is obligatory on that shipper to use only vessels approved by the conference. None of our American ships are approved by the conference, as under our laws deferred rebates can not be paid. When our ships go to the Orient and a shipper has the temerity to ship cargo by our vessel, he will receive a notice from the British-India or the P. & O., calling his attention to the fact that they are aware of his shipment and reminding him that it voids their obligation to pay him the deferred rebate. With such a large sum dependent upon it, it takes a considerable stress of circumstances for shippers to patronize an American ship at all.

Senator Ransdell. Is that not a violation of the treaty agreement?

Mr. Rosseter. No, Senator. It is in violation of a statute on our books, to the effect that the practice of deferred rebates is unlawful.

The Chairman. Sections 14, 15 and 16 of the Shipping Act.

Mr. Rosseter. Yes; but that is not made operative against foreign conference lines.

Senator Nelson. Under the British system they favor the rival lines in their own country?

Mr. Rosseter. Right, Senator.

Senator Nelson. And the highest court in England held they had the right to do that?

Mr. Rosseter. That is the way it is done. But they have enlarged that now, and their objective is American enterprise. The next thing—and it has a bearing on the point I referred to some time back—is the necessity of a real world-wide system. I have also seen notes written by conference agents calling attention to the fact that it is known they are patronizing ships not in the conference, and reminding the shipper that the next time he applies for an allotment of space in some service where American ships are not operating he can whistle for it. In fact, I find it quite natural that they give the preference to the shipper who is supporting their lines. Those who have seen fit to support an opposition line are plainly given to understand it will be to their prejudice. Thus it is our responsibility to provide world-wide service to protect those who would patronize our ships.

Senator Ransdell. How are you going to overcome that?

The Chairman. I have been told this has occurred: If the British learn of a shipper that is proposing to ship something to the United States in an American ship, they tell him: "If you do that you can look to them for your entire service. We will not allow you to ship on our ships."

Mr. Rosseter. That is true.

American Agencies Abroad—Page 1990

The Chairman. What would you say about our need for establishing American agencies abroad?

Mr. Rosseter. It is absolutely imperative that all our steamship operations be safeguarded by American organizations at all foreign ports. Otherwise we will be the victim of every adverse condition to be found in those ports.

Apprentices and Cadets—Pages 1990 and 1991

The Chairman. What do you say about having apprentices or cadets on our ships?

Mr. Rosseter. It is very important. Coming back to a remark made by Senator Nelson a while ago, the encouragement of cadets under proper conditions would really be the building of our personnel. The Pacific Mail has for a long while followed the practice of having four cadet deck officers and three cadet engineers at their own expense, and the expense has been more than justified in results. We have twenty-eight young men who joined as cadets who are now deck officers. Several are second officers on trans-Pacific ships. Others are clerks in our agencies at home and abroad. One of the best things the government can do is to provide proper quarters aboard ship for these young men and train them to become officers.

Encouragement Needed for Successful Operation—Page 1994

Senator Calder. As I recall it, you testified here some months ago that you believed that the ingenuity of the American shipping business, and other conditions surrounding men going in that business, were such that we could compete successfully under any sort of fair conditions with foreign operation. Was that your opinion?

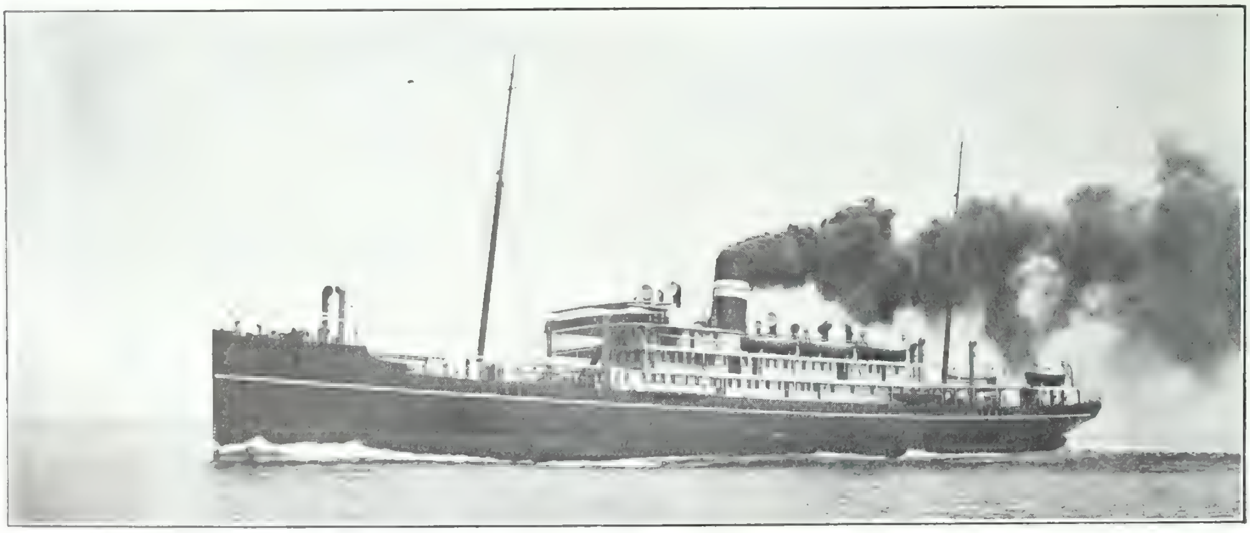
Mr. Rosseter. You correctly quote me.

Senator Calder. Is that still your opinion?

Mr. Rosseter. Always contingent on encouragement, as distinguished from discouragement.

Senator Calder. What do you mean by "encouragement?"

Mr. Rosseter. Encouragement along the line of the various arguments I have made here, establishment of regular routes, determination of what reduction may be justified in the sale price of such ships; reasonable and fair compensation for the carriage of mails, safeguarding American shipping against the menace of conference rules; reasonable and proper depreciation. I might go on with a number of them. It is all bound up in the question of how you will solve this by legislation. Legislation is essential. Without encouraging legislation we will fail.



Future of American Foreign Trade in the Orient

By C. P. Converse

ONE of the effects brought about by the great world war has been the concentration of much of the wealth of the world in the United States. This condition in its relation to foreign trade and to the future development of American international commerce is fraught with danger, unless our foreign trade policy shall be very carefully worked out so as to bring about a re-distribution of this wealth without straining to the breaking point the credit both of our allies in Europe and of our former enemies there.

The allied nations emerged from the great war with their treasuries practically empty and with a huge debt to be repaid and a staggering sum required to restore the ravages of war. A large part of the debt of these nations is owed to the United States. This debt must eventually be paid and the accruing interest alone is a very serious burden on these peoples.

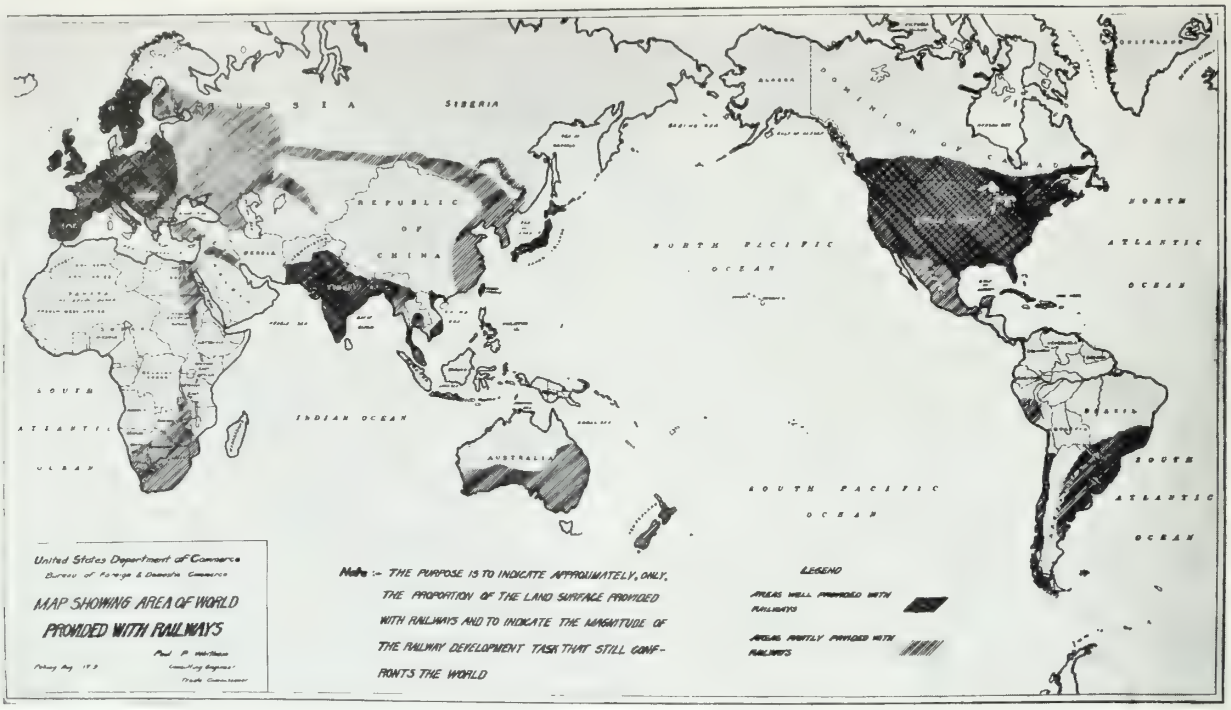
The only way in which these debts can be paid is by the sale of the products of these European nations at a price sufficient to enable them to buy the raw materials, pay the cost of manufacture and leave a goodly profit which shall go toward the liquidating of the debt.

Many kind-hearted American citizens seem to consider that if we make further loans to Europe they will be enabled to get on their feet and meet all of their obligations, but it would seem as if this were merely aggravatingly a situation already very serious, and in fact even the unlimited extension of European credit would seem to be putting a detriment in the way of their reconstruction and inviting disaster to our own prosperity as well as to theirs.

The existing trade relations very well illustrate this point. Since the armistice we have been selling a tremendous amount of raw materials to Europe and have been buying so little that the exchange situation soon reached a point where European nations could not afford to do business with us. It is very evident that should this situation continue for any very great length of time, we would find ourselves in the position of being unable to collect what is owed us from Europe; and not only that, but if we depend upon the European market to as great an extent as we have depended in the past, we would find ourselves unable to dispose of our own surplus manufactures. This would naturally lead to a curtailment in production and to serious shrinkage in values and in employment; whereas if we are to continue to be prosperous we must rather look to the increasing of production and to the reasonable expectation of a profitable return upon investments.

In order to sell our goods in Europe, we must buy goods from Europe. This seems a simple proposition, but if we analyze it we find that we are very much in the same dilemma as "the man carrying coals to Newcastle," for while the United States is very much richer in surplus of raw products than is Europe, the industrial and manufacturing strength of the United States has been during the last ten years advanced to such a point that, in order to keep our factories working on a full-time basis, we must find an ever increasing output in foreign trade for our manufactured articles. The great majority of the seaboard European countries are in exactly the same situation, so that the United States finds herself in a position, as far as finance and trade are concerned, where it may be necessary for her to buy immense

An American Foreign Trader in China—J. H. Rosseter and party on Oriental Tour


RUSSIA
SIBERIA
REPUBLIC OF CHINA
ALASKA
DOMINION OF CANADA
NORTH PACIFIC OCEAN
NORTH ATLANTIC OCEAN
SOUTH ATLANTIC OCEAN
INDIAN OCEAN
AUSTRALIA
SOUTH PACIFIC OCEAN
SOUTH ATLANTIC OCEAN
United States Department of Commerce
Bureau of Foreign & Domestic Commerce
MAP SHOWING AREA OF WORLD PROVIDED WITH RAILWAYS
Paul P. Whitham
Consulting Engineer
Trade Commissioner
Note :- THE PURPOSE IS TO INDICATE APPROXIMATELY, ONLY, THE PROPORTION OF THE LAND SURFACE PROVIDED WITH RAILWAYS AND TO INDICATE THE MAGNITUDE OF THE RAILWAY DEVELOPMENT TASK THAT STILL CONFRONTS THE WORLD
LEGEND
AREAS WELL PROVIDED WITH RAILWAYS
AREAS PARTLY PROVIDED WITH RAILWAYS

Map showing distribution of railway transportation on the land surface of the globe. Note great areas yet to be developed

quantities from Europe of those very manufactured articles of which she already has a surplus at home.

The only solution of this dilemma, then, is for the United States to open up and finance great foreign trade markets so that she may become a distributor of not only her own surplus but of a large part of the surplus of Europe as well.

Canvassing the world for such markets, it will be found that outside of British colonies, which may be considered to be legitimate British markets, the trade explorer is confined very largely to South America, China and Siberia, and it is fortunate indeed in the solving of this dilemma that these three locations are to be found what are potentially the greatest undeveloped markets in the world. Undoubtedly the greatest of these markets is that of Northern Asia, including China and Siberia, and of Western South America. In other words, the great undeveloped countries bordering on the Pacific Ocean.

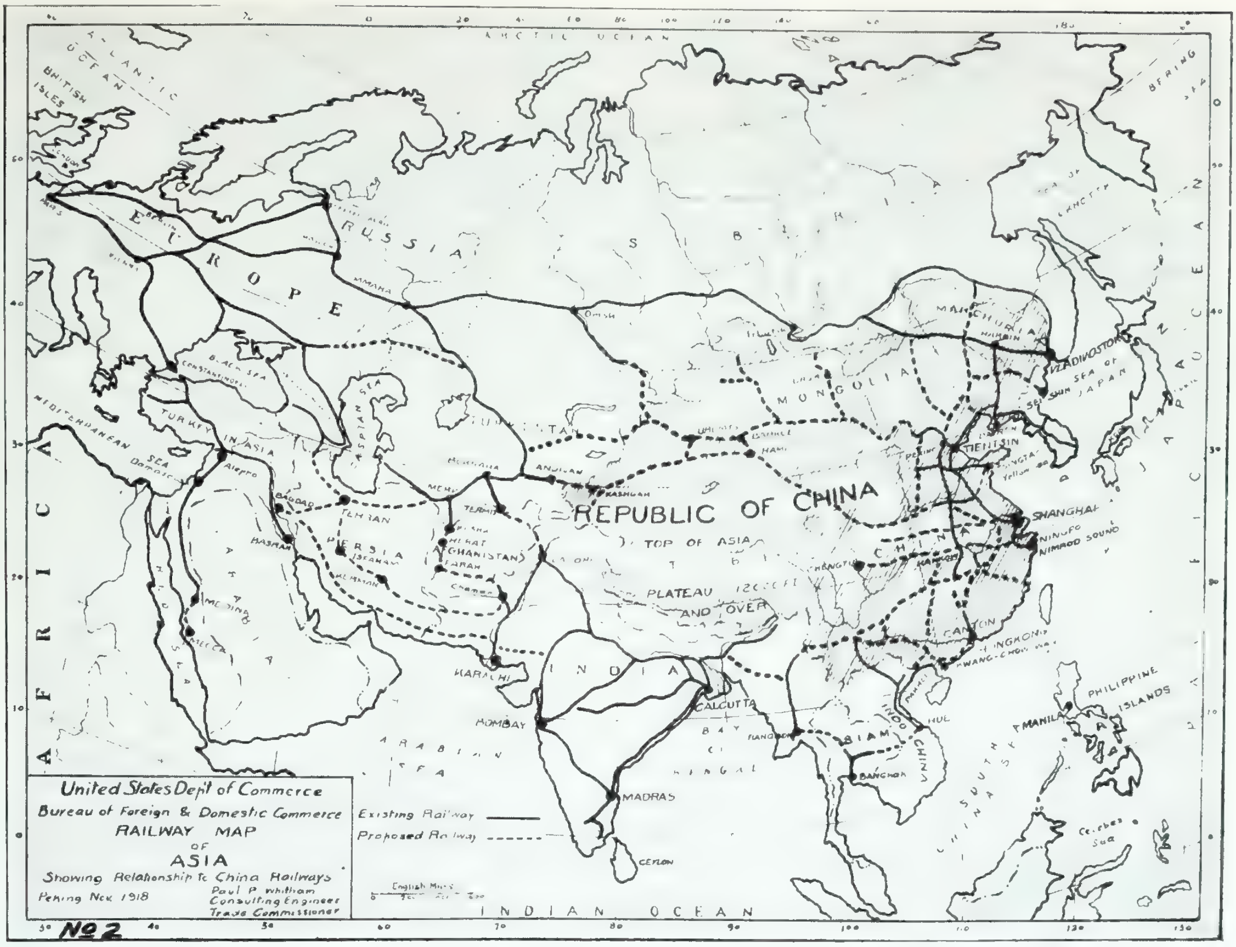
These countries are all of them exceedingly rich in undeveloped natural resources. They are all of them in a comparative sense unburdened by huge war debts, and it may confidently be said that if their resources are properly utilized and are exploited in a fair and just manner the benefits derived therefrom by the nations of the world will in a commercial sense more than offset the ravages of the great world war.

The National Foreign Trade Council in studying world conditions have taken into account very seriously the facts heretofore mentioned, and it was a consideration of these facts and a desire to get into closer contact with them that was largely instrumental in causing the decision to hold the Seventh Annual Convention of National Foreign Traders at San Francisco. This consideration also led to an invitation being sent out to all of the commercial nations bordering on the Pacific that they send representatives to this convention so that the foreign traders of the United States could get an intimate personal first-hand knowledge of conditions now existing in all of these countries.

In order that the world may have the advantage of the great opportunities which lie in the opening up of the resources and of the market in the Far East, it will be necessary that large investments be made, and there is no country at the present time so well qualified to make these investments as is the United States. The funds provided for this purpose will not only prove a profitable investment for much of our idle capital, but the

Transportation on the back of Chinese coolies

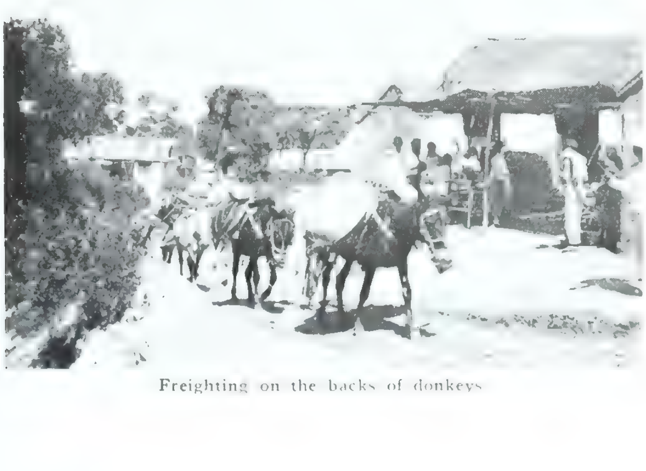
A Chinese Hand-Cart



Map showing relation of railway development in China to the Trunk Systems of Europe and Asia

proper expenditure of these funds under competent American supervision will create an interest in and demand for our manufactures which in a short time should far surpass any like demands on the part of Europe. At the same time the purchasing power of the Oriental countries would be increasing as their resources were developed, and it would be only reasonable to assume that a very large proportion of this increased purchasing power would be directed toward a greater demand for American products. Likewise, as these Far Eastern markets developed and increased our purchasing power would be increased and we could take over an increasing amount of European manufactures, thereby equalizing exchange and gradually restoring normal conditions throughout the world with a minimum amount of loss and a maximum amount of benefit.

Under present economical conditions practically all great manufacturing is conducted in the northern countries and the tropical countries provide much of the raw material. The United States produces most of the iron and cotton that it requires for its own use and furnishes much of the latter commodity to foreign nations, but for many of our raw materials we are dependent upon the Orient or upon tropical countries—amongst others may be mentioned the basic materials such as rubber, fibers, vegetable oils, etc. By developing these products of the Orient, the United States would be providing itself with an ample and stable supply of many of its elementary requirements, and would


Freighting on the backs of donkeys

Canal boats carry the larger part of Chinese freights

at the same time be establishing a growing purchasing power for many of its finished products. Thus a reciprocal exchange would be provided, which is the basis of all satisfactory foreign commercial relations, and we would be able to look forward confidently to a long period of profitable employment for our merchant marine and of an increasing output for our great industrial centers, and a consequent profitable employment of both skilled and unskilled labor; in short, a continuation and stabilization of our present period of prosperity.

There has come to my notice recently a very voluminous report on transportation developments written by Paul Page Whitham, United States Trade Commissioner to the Orient. This report sheds a great deal of light on the necessity for the use of American capital in the opening up of China and shows how the development of proper transportation facilities in China is the key to Northern and Central Asia as far as the development of the trade of that region is concerned.

A glance at any topographical map of Asia will show that practically the whole of the agricultural and mineral wealth of Southern Siberia is open to rail connection on easy gradients with the Chinese River and port system, and could, by the completing of easy connections, be made to feed its products into these all-the-year-round ports instead of being confined to the port of Vladivostok, which is, at the best, rather out of the way and rather difficult in winter.

On the quay at a Chinese port

China now has, including government lines, concession railways and private roads, a miscellaneous collection of individual rail systems totalling approximately 6740 miles. The Chinese government has contracted with various foreign syndicates or governments for railways totalling about ten thousand miles in length. China needs, in addition to this, eleven thousand miles of railways to complete the main trunks of a system which would reach and tie together all the principal sections of China. In other words, in addition to what are already in operation, approximately twenty-one thousand miles of new railways should be built. When these suggested lines are all completed, including the existing railways, China would have slightly less railway in operation than has India, which is a much smaller country with a less population. The eleven thousand miles of railway suggested above for opening up China to the commerce of the world would cost somewhere in the neighborhood of two and one-half billion dollars Mexican.

Just as America and other countries during their railway development era had to depend largely on foreign capital to absorb the securities floated to finance the building of the roads, so it will be with China, and it is highly important that this financing shall be done by the friends of China and that the railways be built in accordance with a comprehensive system designed for the development of the country and the commercial and communicational needs of the nation.

In addition to the railroads there is, of course, need for the development of highways and for the improvements of the extensive interior waterway communication which has been so wonderfully useful to the Chinese for the past several thousand years. The things which obviously should be done in this line will cost several hundred million dollars. So that it is safe to figure that the rail development, highway development, waterway development and port development necessary to make China a producing nation in the modern commercial sense will absorb somewhere in the neighborhood of four to five billion dollars of foreign funds. This expenditure would be spread over a period of twenty-five to thirty years.

A fine sea-going junk

China's credit base is broad enough and sufficiently sound to support these investments and the expenditures are of such a nature that properly administered they will continually serve to make this credit foundation broader and more sound. In order to understand the possibilities which proper railroad communication open up for Chinese expansion would require only to examine the peculiarly isolated position of the Chinese province of Sze-Chwan. This interior province of Central China forms an upper basin for the Yangtse River and has an area of two hundred and twenty thousand square miles, with a population of forty-five million. It is a high plateau surrounded by mountains running to altitudes of eighteen thousand feet. Its plains, including the famous Chengtu district, forty-five miles wide by ninety miles long, contain soils among the most fertile to be found anywhere on the earth. The Chengtu plain is perfectly irrigated by an artificial system which has been functioning for over two thousand years. It is claimed that this province will produce anything that can be raised anywhere else in China. The principal products are silk, wheat, sugar, tobacco, fibers, rhubarb, bamboo, tea, herbs and wood oil. The result of investigations of the mineral wealth of Sze-Chwan have not been made public, but it is claimed positively that in the great salt wells which have been bored to a depth of over three thousand feet, petroleum and gas have been discovered in considerable quantities. The Chinese drillers looking for salt consider the presence of these other elements a great objection to the wells and wherever they were encountered drilling would stop and location be shifted to one more favorable to getting at the salt deposits. There is great wealth in this province, but for thousands of years its only outlet to the rest of the world has been through difficult mountain trails or down the wild gorges of the Yangtse River. Everything in the way of export freight has been floated down the rapids at great risk on flat-bottomed Chinese junks and everything imported brought over the mountains on the backs of coolies or dragged up the steep rapids of the river by man power. The railroad development now contemplated includes a main trunk line up this Yangtse gorge into the heart of this wonderfully rich province and it takes no very great stretch of the imagination to conceive of the possibilities of a foreign trade for Sze-Chwan that would be similar to and perhaps equal that of such a nation as Germany before the great war.

A little congestion in the Grand Canal

These are general speculations with regard to the possibilities of the opening up of only one province in the great Asiatic republic. Coming down to actual figures for the whole foreign trade of China, we find for the year 1917 Chinese imports reached the total of $559,740,000, which represents an expenditure of $1.72 for each individual if we take the low estimate of 325,000,000 as the population.

Comparing this with all of the South American countries combined, we find that the Latin American republics imported during 1917 $874,900,000 worth of foreign merchandise, or a per capita expenditure of $14.56. Figuring export business in the same way, we find that South American exports were $22.41 per capita and Chinese exports only $1.45 per capita.

It is very easy to calculate, using these figures as a basis, the possibilities of the expansion of foreign trade which is sure to come when the light from the lamp of modern commerce begins to penetrate into the mass of China's teeming millions.

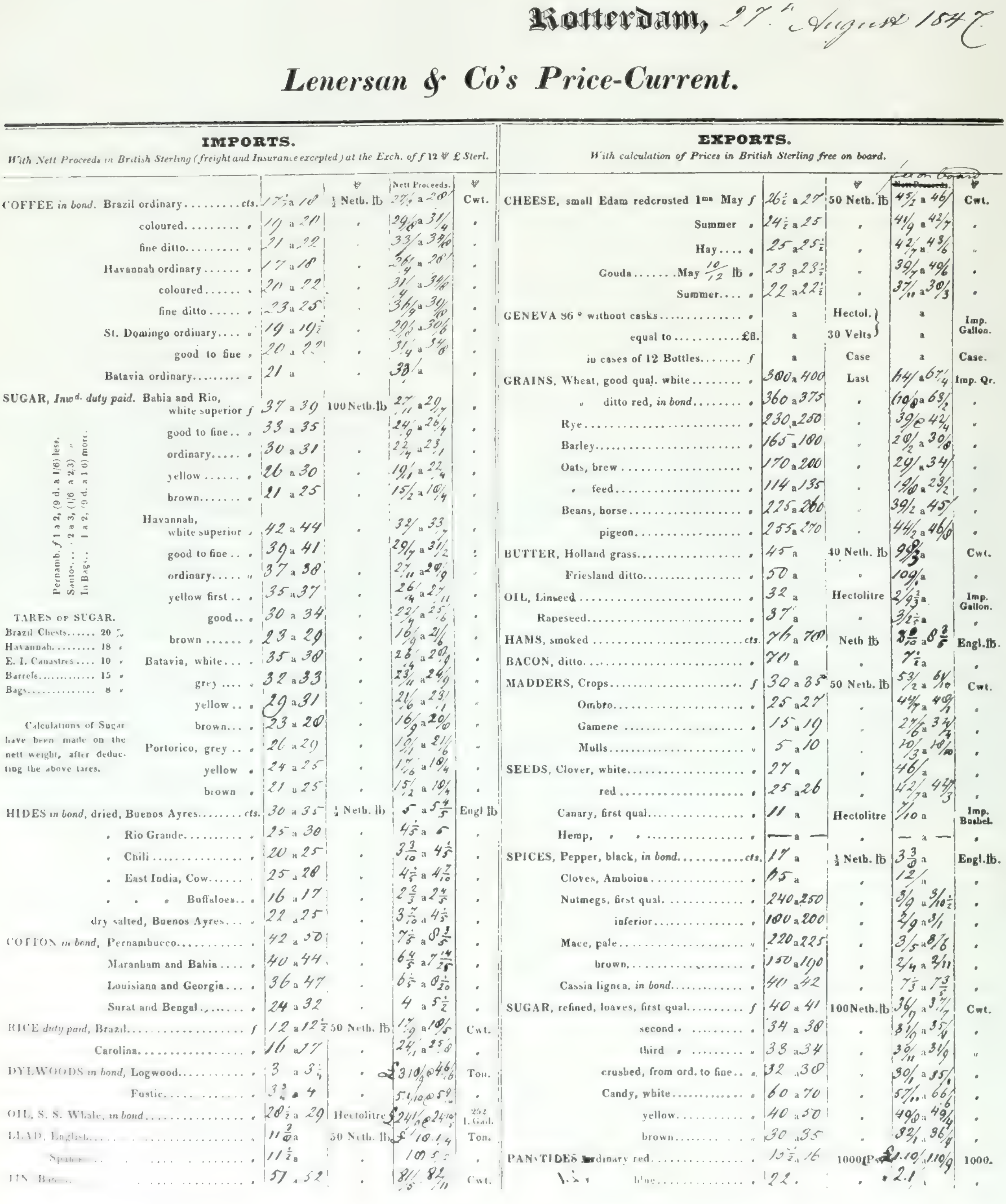
The Seventh National Foreign Trade Convention should do a great deal toward bringing about in the minds of the overseas' customers of the United States a feeling of confidence that they are to receive help from this great nation in the development of their natural resources. This convention should also create in the minds of our Pacific Coast foreign traders and shippers, ship operators and ship builders, a feeling of optimism for the future and the recognition of the fact that the Pacific Ocean is to be the great theater of future world trade. It should also convince the great number of influential delegates from the Atlantic Coast and middle western section of the United States that their prosperity is in a large measure bound up with the prosperity of this great western slope and that the resources and initiative of Pacific Coast traders and operators are to be given with a whole-hearted and single purpose to the great work of constructive foreign trade development and the opening up of the markets beyond the sea.

NEW MARINE DEPARTMENT MANAGER

MR. HENRIK GREGER, until recently senior engineer for the Emergency Fleet Corporation of the United States Shipping Board, has been appointed by the Hooven, Owens, Rentschler Company of Hamilton, Ohio, as manager of their Marine Department.

The Hooven, Owens, Rentschler Company startled the engineering fraternity of the United States by their quantity production of triple-expansion engines for marine purposes during the war emergency shipbuilding program, and their evident intention of continuing their marine department under such able management will be welcome news to marine engineers, naval architects and shipbuilders.

Foreign Trade in the Forties



Rotterdam, 27th August 1847

Lenersan & Co's Price-Current.

IMPORTS.

With Nett Proceeds in British Sterling (freight and Insurance excepted) at the Exch. of f 12 ⅌ £ Sterl.

		⅌	Nett Proceeds.	⅌
COFFEE *in bond.* Brazil ordinary……… *cts.*	17½ a 18	½ Neth. lb	27/4 a 28/	Cwt.
coloured……… „	19 a 20	„	29/8 a 31/4	„
fine ditto……… „	21 a 22	„	33/ a 34/10	„
Havannah ordinary…… „	17 a 18	„	26/4 a 28/	„
coloured…… „	20 a 22	„	31/4 a 34/8	„
fine ditto…… „	23 a 25	„	36/4 a 39/10	„
St. Domingo ordinary…… „	19 a 19½	„	29/8 a 30/6	„
good to fine „	20 a 22	„	31/4 a 34/8	„
Batavia ordinary……… „	21 a	„	33/ a	„
SUGAR, *Inwd. duty paid.* Bahia and Rio, white superior *f*	37 a 39	100 Neth. lb	27/11 a 29/7	„
good to fine.. „	33 a 35		24/9 a 26/4	„
ordinary…… „	30 a 31	„	22/4 a 23/1	„
yellow…… „	26 a 30	„	19/1 a 22/4	„
brown…… „	21 a 25	„	15/2 a 18/4	„
Havannah, white superior „	42 a 44	„	32/ a 33/7	„
good to fine.. „	39 a 41		29/7 a 31/2	„
ordinary…… „	37 a 38	„	27/11 a 28/9	„
yellow first.. „	35 a 37	„	26/4 a 27/11	„
good.. „	30 a 34	„	22/4 a 25/6	„
brown…… „	23 a 29	„	16/9 a 21/6	„
Batavia, white… „	35 a 38	„	26/4 a 28/9	„
grey…. „	32 a 33	„	23/11 a 24/9	„
yellow.. „	29 a 31	„	21/6 a 23/1	„
brown… „	23 a 28	„	16/9 a 20/8	„
Portorico, grey.. „	26 a 29	„	19/1 a 21/6	„
yellow „	24 a 25	„	17/6 a 18/4	„
brown „	21 a 25	„	15/2 a 18/4	„
HIDES *in bond*, dried, Buenos Ayres……… *cts.*	30 a 35	½ Neth. lb	5 a 5 4/5	Engl lb
„ Rio Grande……… „	25 a 30	„	4 1/5 a 6	„
„ Chili……… „	20 a 25	„	3 3/10 a 4 1/5	„
„ East India, Cow…… „	25 a 28	„	4 1/5 a 4 7/10	„
„ „ „ Buffaloes.. „	16 a 17	„	2 2/3 a 2 4/5	„
dry salted, Buenos Ayres… „	22 a 25	„	3 7/10 a 4 1/5	„
COTTON *in bond*, Pernambucco……… „	42 a 50	„	7 1/5 a 8 3/5	„
Maranham and Bahia…. „	40 a 44	„	6 4/5 a 7 14/25	„
Louisiana and Georgia… „	36 a 47	„	6 1/5 a 8 1/20	„
Surat and Bengal……. „	24 a 32	„	4 a 5½	„
RICE *duty paid*, Brazil……… *f*	12 a 12½	50 Neth. lb	17/9 a 18/5	Cwt.
Carolina……… „	16 a 17	„	24/1 a 25/8	„
DYEWOODS *in bond*, Logwood……… „	3 a 3¼	„	£3 10/9 @ 4 6/6	Ton.
Fustic……… „	3¾ a 4	„	5 1/10 @ 5 9/	„
OIL, S. S. Whale, *in bond*……… „	28½ a 29	Hectolitre	£24 1/0 @ 24 10/	252 I. Gal.
LEAD, English……… „	11 3/8 a	50 Neth. lb	£ 10.1.4	Ton.
Spanish……… „	11½ a	„	10 5	„
TIN, Banca……… „	57 a 52	„	81/5 a 82/11	Cwt.

Pernamb. f 1 a 2, (9 d. a 1/6) less.
Santos… 2 a 3, (1/6 a 2/3) „
In Bags.. 1 a 2, (9 d. a 1/6) more.

TARES OF SUGAR.

Brazil Chests……	20 %
Havannah………	18 „
E. I. Canastres….	10 „
Barrels…………	15 „
Bags…………	8 „

Calculations of Sugar have been made on the nett weight, after deducting the above tares.

EXPORTS.

With calculation of Prices in British Sterling free on board.

		⅌	~~Nett Proceeds.~~ free on board	⅌
CHEESE, small Edam redcrusted 1ma May *f*	26½ a 27	50 Neth. lb	45/2 a 46/	Cwt.
Summer „	24½ a 25	„	41/9 a 42/7	„
Hay…. „	25 a 25½	„	42/7 a 43/6	„
Gouda……. May 10/12 lb „	23 a 23½	„	39/7 a 40/6	„
Summer…. „	22 a 22½	„	37/11 a 38/3	„
GENEVA 86° without casks……… „	a	Hectol.	a	Imp. Gallon.
equal to………..£fl.	a	30 Velts	a	
in cases of 12 Bottles…… *f*	a	Case	a	Case.
GRAINS, Wheat, good qual. white……… „	300 a 400	Last	64/ a 67/4	Imp. Qr.
„ ditto red, *in bond*……… „	360 a 375	„	60/8 a 63/2	„
Rye……… „	230 a 250	„	39/ a 42/4	„
Barley……… „	165 a 180	„	28/2 a 30/8	„
Oats, brew……… „	170 a 200	„	29/ a 34/	„
„ feed……… „	114 a 135	„	19/8 a 23/2	„
Beans, horse……… „	225 a 260	„	39/2 a 45/	„
pigeon……… „	255 a 270	„	44/2 a 46/8	„
BUTTER, Holland grass……… „	45 a	40 Neth. lb	98/3 a	Cwt.
Friesland ditto……… „	50 a	„	109/ a	„
OIL, Linseed……… „	32 a	Hectolitre	2/9⅔ a	Imp. Gallon.
Rapeseed……… „	37 a	„	3/2⅕ a	„
HAMS, smoked……… *cts.*	76 a 78	Neth lb	8 8/10 a 8 3/5	Engl. lb.
BACON, ditto……… „	70 a	„	7½ a	„
MADDERS, Crops……… *f*	30 a 35	50 Neth. lb	53/2 a 61/10	Cwt.
Ombro……… „	25 a 27	„	44/7 a 48/1	„
Gamene……… „	15 a 19	„	27/6 a 34/4	„
Mulls……… „	5 a 10	„	10/3 a 18/10	„
SEEDS, Clover, white……… „	27 a	„	46/ a	„
red……… „	25 a 26	„	42/7 a 44/3	„
Canary, first qual……… „	11 a	Hectolitre	7/10 a	Imp. Bushel.
Hemp, „ „ ……… „	— a —	„	— a —	„
SPICES, Pepper, black, *in bond*……… *cts.*	17 a	½ Neth. lb	3 3/8 a	Engl. lb.
Cloves, Amboina……… „	85 a	„	12/ a	„
Nutmegs, first qual……… „	240 a 250	„	3/9 a 3/10½	„
inferior……… „	180 a 200	„	2/9 a 3/1	„
Mace, pale……… „	220 a 225	„	3/5 a 3/6	„
brown……… „	150 a 190	„	2/4 a 2/11	„
Cassia lignea, *in bond*……… „	40 a 42	„	7⅓ a 7 3/5	„
SUGAR, refined, loaves, first qual……… *f*	40 a 41	100 Neth. lb	36/9 a 37/7	Cwt.
second „ ……… „	34 a 38	„	31/9 a 35/4	„
third „ ……… „	33 a 34	„	30/11 a 31/9	„
crushed, from ord. to fine.. „	32 a 38	„	30/1 a 35/1	„
Candy, white……… „	60 a 70	„	57/11 a 66/6	„
yellow……… „	40 a 50	„	40/8 a 49/4	„
brown……… „	30 a 35	„	32/1 a 36/4	„
PANTILES ordinary red……… „	15½ a 16	1000 Ps.	£1.10/ a 1.10/9	1000.
blue……… „	22 a	„	2.1	„

This price list was printed on the back of the stationery of a Rotterdam firm, and the letter of which it formed a part was mailed from Rotterdam addressed to Silas Pierce & Co., Boston, August, 1847. Many interesting comparisons will be found here with [illegible] they are today.

Foreign Trade in the Forties

By F. W. Koch

The American packet ship Great Western of the Black Ball Line

THERE has come into our possession during the past year a number of letters written from various Mediterranean and other ports to one of the leading importing houses of Boston during the years 1839 to 1861. These trade letters, dealing with shipments of fruits, wine, nuts and oils, throw interesting sidelights on the conditions of those days three-quarters of a century ago.

It must be borne in mind that while this was during the time of the fast American clipper ships, it was also after the advent of steam vessels, and while perhaps four-fifths of freight was carried in sailing vessels, most of the duplicate mail was sent via London on steamers.

In those days Gibraltar, being the first British Mediterranean port visited, fast mail from southern Spain was sent via that place and most of the delays seem to have been encountered either before reaching Gibraltar or while waiting for the arrival of vessels. However, as the time of arrival and departure at that port was fairly regular, we find that most mail was timed so as to arrive on time and a majority of letters had postscripts added sometimes a week or more after the original writing, the date usually being the date of the postmark on the letter, showing it was mailed just in time to catch the vessel.

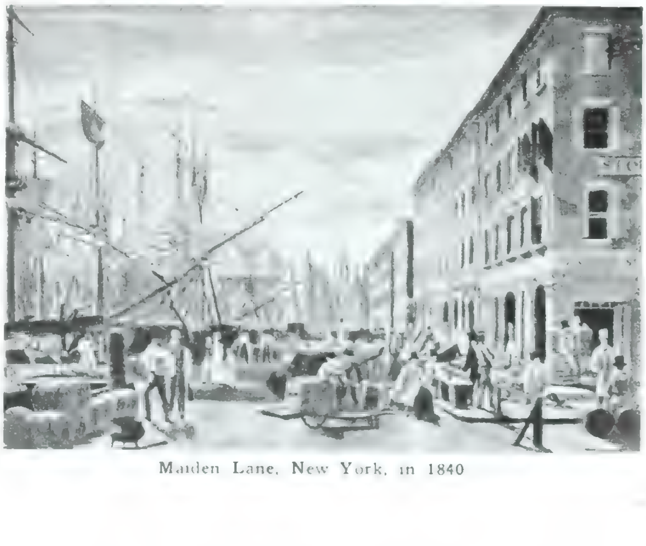
These letters are being used by the classes in economic geography at the Lowell High School, San Francisco, as auxiliary reading, dealing with the subjects of climatic and trade conditions of the Mediterranean countries which are California's chief competitors in agricultural and horticultural products at the present time.

Dealing with the matter of time necessary to make the trip from Malaga, Southern Spain, to Boston, via London, the following letter, printed almost in its entirety, will be of interest to shipping men, on offering a comparison with times of transit as we find them now. The comment on the overland route is interesting:

> "(Original p Swedish Bque Helena).
>
> Malaga—15 March 1844.
>
> Messrs. Silas Pierce & Co.,
> Boston.
>
> Dear Sirs:
>
> Above you have my last in duplicate since which your favor of the 31st inst. is received. It came to hand several days after one by same conveyance rec'd from Messrs. Lombard & Whitmore by the overland mail; yours having been forwarded via Gibraltar p steamer from Southampton. I think the earliest way for me to get your correspondence will be to send your letters to a house in Liverpool. There is a steamer leaves Liverpool on the 1st of every month for Alexandria, stopping at Gibraltar, being sometimes only 5 or 6 days out. When you write by the Halifax Boat leaving Boston on the 15th, the letters reach Liverpool before the Alexandria boat starts, and in that case, the letters should be sent by her care of my friend Geo. Cormack & Co., Gibraltar. On all other occasions while the Peninsula is quiet, the letters had better be sent overland and not via the Southampton steamer to Gibraltar which stops at Vigo, Lisbon and Cadiz.

"Letters are frequently detained at Gibraltar for several days for want of conveyance to this place, and as the Southampton boat sails only once a week to Gibraltar, if sent by her, the letter may remain in England two days between the arrival of the Halifax boat at Liverpool and the sailing of the one to Gib. The mail inland is 14 days from England." (Two letters in the possession of the writer took 13 and 14 days respectively from Malaga to London via the overland route through Paris.)

"The English houses have been in the market and have been buying (very unusual for them) considerable parcels of



Maiden Lane, New York, in 1840

such fruits as is shipped to the United States, and within three weeks have got up the price to $1.00 in the stores. They have bought injudiciously and one house has purchased more than all the rest, raising prices on themselves and they hold near 20,000 boxes, for some of which they have paid over $1.00." (This refers to boxes of raisins.)

"In mine of 1 February, I gave you a note of what you might expect from this (port) for your spring and summer sales after the September sailed, say—

Nautilus	to Boston	8,000
Margaret Ann	New York	8,600
Fame	do	16,500
Pons	Boston	7,200
Unloading		
Swed'h Bqe	to Philadelphia	14,500
Sevant	New York	5,000
		or more

"You say your markets will require 50,000 boxes, the September not included. Here you have 60,000, giving room for 10,000 boxes to be of bad quality and quickly consumed as the Swedish barque above named takes the Phila^{da} cargo intended for the Pons and which it was afterwards supposed the Margaret would come for but which by the humbugging of the Gibraltar folk she lost.

"I mentioned I thought there was a cargo for a small vessel for New York to consist partly of wines. This has been effected and the barque Sevant is now here for the purpose. She will load at least 5000 boxes. I know not if she will take casks which are exceedingly scarce. They have been sending them even to London and 400 were sold at $3.05. Some small parcels remain in the vineyards which are held at a price there which would cost $3.25 on board and at which rate the Baltic people are buying what they can collect.

Your obt. servant

GEORGE REED".

The above letter should be of exceeding interest to Californians who are now Southern Spain's chief rivals as producers of raisins and fresh grapes. The casks mentioned refer to barrels of fresh fruit which are shipped from Spain packed in sawdust.

The times of four vessels from Malaga to London were respectively 10, 14, 15 and 10 days. The difference in time between these times and the 5 or 6 named above doubtless being due to delays at Gibraltar.

The trip from Palermo to London was made in 15 days as was that from Zante, Ionian Islands, while from Messina to London, including a stop at Marseilles, took 21 days.

The following letter from the captain of the Tiber shows that there was money in running blockades even in those times. This letter was dated April 26, 1848, during the Sicilian revolution:

"Messina Apr. 26, 1848.

Messrs. Silas Pierce & Co.

Gentlemen:

I note you my safe arrival at this port after a fair passage of 7 days. I find that the political affairs are not settled as yet nor in fact is there any sign of piece by the way they still going on, they have a brush about once a day between the Fort and the City. The shipping is not allowed to say inside the harbor. We all lay anchored along the coast about one mil and half from the city jest no-harbor a tall and rock bottom with 25 to 30 fathoms water. I have broken one of my anchors and was obliged to get another her but quit reasonable I pay about $56 with my broken anchor. I have now been her 3 days today. Discharged part of my ballast and taking in some brimstone, rags, &c.

"The bark Peru stopped here on her passage from Trieste to Palermo & was offered $2500 to take a cargo of fruit to New York but would not except the offer. But it seames on her arrival at Palermo that business was on a stand, so he has written back to Mr. Castarello stating that he will go to the above port for $2000—is not wanted now.

"If I had the Tiber loaded with guns and ammunition I could make a handsome fortune. Your Obt. Svt.

JOSHUA BROWN."

Among these letters are found also several from Liverpool and from Rotterdam. These are for the most part written on four-page folder stationery, two of whose pages are occupied by printed statements of market conditions and lists of current prices.

We reproduce herewith a current price list from Rotterdam with prices marked by hand in copying ink, which can be plainly read in the reproduction and show some very interesting comparisons in prices.

Another letter of this character from Baring Bros. & Co. of Liverpool, dated October 30, 1846, shows that on that date the finest Jamaica coffee was selling at 1/- per pound with 4d per pound duty added; St. Petersburg flax was priced at 44/- per ton free of duty; American sweet new flour at 33/- per 196 pounds, duty paid; No. 1 milling wheat, 8/- per 70 pounds; East India hemp, 15/- per ton; hides from 3d to 6d per pound; best Italian and Spanish olive oils in 252-gallon tuns, £43 to £44; rice per cwt., best Carolina, 38/-; best white sugar, 58/- per 100 pounds with a duty of 14/- per cwt.

Appended to the bottom of this price list is a statement of the imports for the seven days ending October 30, 1846, as follows:

Annatto	40	casks
Ashes	129	bbls.
Cochineal	70	serons
Coffee	654	bags
Cotton	5219	bales
Dividivi	110	tons
Dyewoods	817	tons
Elephants' Teeth	60	
Flour	14515	bbls.
Guano	500	tons
Hemp	935	bdls.
Hides	6911	pieces
Horse Hair 9 bales,	66	sacks
Mahogany	110	logs
Palm Oil	156	casks

Sperm Oil	96 casks
Miscellaneous fish and vegetable Oils	397 casks
American rice	100 casks
Saltpetre	190 bags
Clover Seed ....50 casks and	388 bbls.
Raw silk	7 pkgs.
Bengal Sugar	5432 bags
European tallow	3670 casks
American tallow......110 casks,	164 bbls.
European tar	215 bbls.
Tea	34 chests
Tobacco ....672 hhds.,	61 tierces
629 srns,	126 bbls.
Bees' Wax	8 pkgs.
Wheat	9075 qrs.
Wool	171 bales

This shows quite a considerable trade and the indications are that from yearly returns this was by no means a record week.

This freight was carried to Liverpool by one vessel from Sydney and Lima; one from Calcutta; one from Africa; one from Zapote and Carthagena; one from Rio Grande; one from Laguayra and Puerto Cabello; one from Savanilla; one from Honduras; one from Hayti; one from Jamaica; three from New Orleans; one from Philadelphia; five from New York; one from Boston; one from Quebec; one from Newfoundland; six from St. Petersburg; and one from Kasko.

It is safe to hazard the assertion from what we know of the American merchant marine in those days that the eleven ships listed here from American ports were all of American registry, and it is also safe to assert that a goodly proportion of the others were of American registry.

The letter from which this data is taken was forwarded from Liverpool on board the American packet Great Western; it is stamped as a ship letter leaving Liverpool October 31 and on the reverse side appears the New York stamp November 17, showing a very creditable passage for a sailing ship.

A rather interesting postscript added to a letter dated Malaga, Spain, September 8, 1847, gives a list of vessels arriving and clearing for American ports. A glance at the list of names gives us an opportunity to see the proportion of American vessels in the Mediterranean trade of the day:

Sailed

Columbia	New Orleans
Undine	"
Globe	"
Sp. Brig Presidente	"
Chatham	New York
Petrel	"

To arrive

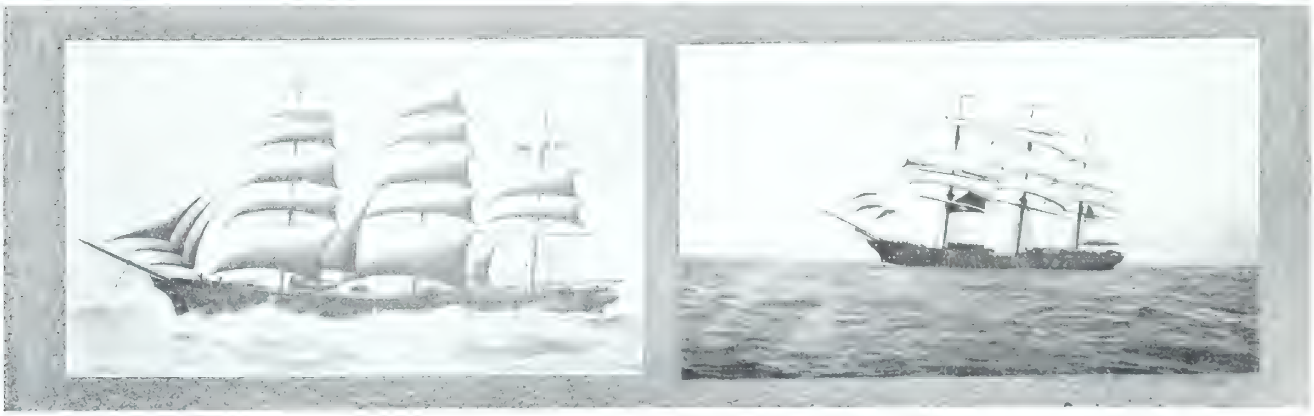
M. W. Britt	New York
California	Gone to Marseilles
Reindeer	Uncertain
Nautilus	Boston
Albert Fearon	Philadelphia
Amazon	Baltimore
Baltimore	Boston
Allorf	do
One more	do

In port

D. Godfrey	New York
Margaretta	"
Mary Kendall	"
Carlota	"
Montserrat	"
Edw. Henry	New Orleans
Algona	"
Camelia Brown	Philadelphia
Beris	Boston
Maria	"
Taranto	Quarantine

What visions of the past these lists bring before us—visions of the times when American vessels sailed the seven seas and of the times when an American, no matter where, looked upon the arrival of the American vessel as a matter of course.

Somehow, as I look back on the years just passed when the sight of the Stars and Stripes floating from the stern brought a thrill, I cannot help feeling, more than ever, that it was a curious thrill such as one has on seeing the last of a vanishing race, rather than a thrill of pride in the greatness of my country. Have the times really changed—has the great war put us once more in the forefront—are we once more to feel that it is to be expected that the stranger arriving at our gates will fly the American flag—and finally, will the time come again when some other writer will tell of the days of 1920? Will he be able to put down a long list of American arrivals, and know that they were chosen from among many because they were better, faster, finer than those of any other nation? Ask yourself the question—and answer it.



Notes from the East

By "Americus"

DO you want to buy a good American ship from Uncle Sam? Now is the time to get one under very favorable conditions. You can, by paying 2½ per cent of the price down in cash, charter a good ship from the Emergency Fleet Corporation at the new bare boat charter rate of $5 per deadweight ton per month and get the use of the ship immediately. After you have paid an amount in chartering plus the 2½ per cent cash you paid down equal to 40 per cent of the price put on the ship, you can secure title to the ship, and then pay Uncle Sam the remaining 60 per cent of the purchase price in six years at a carrying charge of only 5 per cent.

In the meantime your Uncle for self-protection takes a mortgage on the ship for the amount still due him. In other words, the government will allow you to gamble on the future. If you find your chartering experience does not pay you as well as you had anticipated, you can drop all ambitions to become an owner, and console yourself with the fact that you had operated a chartered vessel for a period of months at the going rate. Further, if you are satisfied to take a ship which has already been operated by the government itself through agencies, you will be allowed a liberal depreciation deduction of 10 percentum a year.

Incidentally the government through its Shipping Board arm seems to have a different idea of depreciation, than it does through its tax-collecting arm, whereby only 3½ per cent per annum is allowed in computing your taxes. It has been suggested that the purchase of a ship a year or so old would be preferable to purchasing a brand new vessel, from a monetary standpoint. If a ship has been operated a year or so it is a safe bet that any latent defects which may have developed, due to her hurried wartime construction, will have been remedied by the Shipping Board, so that, in addition to the 10 per cent annual deduction for depreciation, you are getting a ship with all defects remedied. After all, the depreciation of a ship a year old is not very much, and certainly not 10 per cent of her value, as that rate would put her out of the running in only ten years. With these liberal terms of purchase, not a few ships are being disposed of, while everybody is waiting for the passage by Congress of a policy to be adopted for the disposition of the government-owned ships.

The Jones bill, which from its preliminary form as issued, indicates very closely the attitude of the Senate towards the merchant marine, has now been on the firing line for several weeks. Of course in its final form there will be some minor changes, but as a whole it is being well received by the shipping interests in the East. The bill to be regularly introduced indicates a sincerity of purpose towards the merchant marine on the part of the Solons, as it crystallizes in its terms the results of the best thought of competent persons who have appeared before Committee on Commerce in its intensive hearings on the subject. Its preamble is so intensely patriotic and high-minded that it is worthy of repetition, so here it is:

> "It is necessary for the national defense and for the proper growth of our foreign commerce that the United States shall have an American merchant marine of the best equipped and most suitable types of ships sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by American citizens, and it is hereby declared to be the policy of the United States to do whatever may be necessary to develop and encourage the maintenance of such a merchant marine, and in the disposition of ships and shipping property as hereinafter provided, and in the making of rules and regulations this purpose and object should always be kept in view by the United States Shipping Board as the primary end to be attained."

That sentiment is certainly broad gauged enough to satisfy the most exacting proponent of an American merchant marine and it might well be termed the Maritime Declaration of Independence, on the part of the United States. "To do whatever may be necessary" is a very comprehensive clause, and if followed out by this and future Congresses there need be no apprehension as to the ultimate results of our reappearance on the seas.

It is confidently predicted by those in a position to know that the bill will be reported out and passed by the Senate before May 15, and that it will be a law before the expiration of the present session of Congress, some time in June. "So mote it be."

With that legislation out of the way, all eyes will then be turned towards the much-discussed and hoped for revision of the navigation laws.

Upon good authority it is learned that the Franklin committee appointed last fall by the Shipping Board has been plodding along under very adverse conditions. Composed as it is of representative shipping and labor men, who have had an unusually busy season owing to strikes and severe weather, it has been difficult for them all to spare as much time as they would have otherwise desired, to devote to this important and voluntary duty. They have considered and disposed, by recommendations to the board, of the principal bones of contention. It was found, however, that our laws and regulations are so intermixed and confusing that they should be re-codified by legal experts. Senator Jones has written a letter to the Shipping Board recommending that this be done as quickly as possible in order that the new code may be presented to Congress for action, at its December session.

The National Marine Week has opened here with a bang, and under the most favorable auspices. Admiral Benson, Secretary Alexander, Congressmen Green and Rowe and Commissioner Donald were among the notables who journeyed from Washington to be present at the opening ceremonies and showed their intense interest in the event.

Secretary Alexander himself gave the whistle card on the Seattle-built steamship West Alsek a vigorous yank and sounded a long blast, which was repeated on all Shipping Board ships in the harbor as a signal of the opening of the first merchant marine exposition ever held in this country. An elaborate luncheon was served to 150 guests, representing many branches of the merchant marine movement, at Pier 86, N. R., the finest of New York's new piers. The Oriental Navigation Company was the host of the occasion. A cordial speech of welcome was delivered by Dock Commissioner Murray Hurlburt on behalf of the mayor and the city. The principal speakers were, of course, Secretary Alexander of the Department of Commerce and Chairman Benson of the Shipping Board. Secretary Alexander reviewed the progress already made in tht development of the merchant marine, supporting his statements by carefully-prepared statistics. His whole address was replete with encouraging news for patriotic Americans and he was very liberally applauded.

Admiral Benson made his initial bow to a New York shipping audience, since he has thrown his fortunes with the merchant marine, and from an impartial standpoint, it must be admitted that he made the hit of the day. His entire remarks were addressed to merchant marine matters, as the former chief of operations did not once refer to his erstwhile important naval connections. He fairly exuded patriotic Americanism throughout his address. He wanted it distinctly understood that, although he had been accused of being anti-this and anti-that, he was anti-nothing, but in every drop of his blood pro-American, first, last and all the time. For this sentiment he was loudly applauded. He urged that all shipping people help out the board of which he is the head, by constructive suggestions, wherever and whenever it was deemed necessary. He warned his audience to be on their guard against insidious propaganda of foreign rivals, tending to discredit our maritime efforts. The exposition itself is worth traveling a thousand miles to see. There are marvelous displays made by leading ship and engine builders, splendid models of ocean steamships, dry docks, davits, dynamos, pumps and all kinds of auxiliaries and fittings used by the merchant marine.

New shipbuilding contracts are as scarce as hen's teeth, owing to the stringency in the money market. The Pacific Coast figures in the only real talk of new construction—that is, that the Northwest Steel Company at Portland has seven new tankers for the France & Canada Company and that prince of hustlers "Dave" Rogers of Seattle is to build ten tankers for a New York firm.

The Shipping Board and the Small Operator

By Ernest L. McCormick

THE Shipping Board at the commencement of the war, at which time they assumed active control of the government merchant vessels, manifested an inclination to favorably consider the newer shipping concerns. This in a way was a necessity, as there were more ships than there were competent people to handle them, but it was also in line with the policy of creating a new interest in our maritime affairs by offering opportunities in a field of business which had heretofore been occupied almost entirely by shipping concerns operating their own vessels in old-established trade routes.

The advantages of this opportunity were quickly realized and as a result new firms came into existence, some of whom proved competent and others inefficient. During the war and for a long period after the armistice, the Shipping Board had the almost insuperable task of directing the requisitioned vessels and allocating the new ones for management and operation as they were completed at the shipyards. The principal thing, then, was to get the vessels in commission and started in a service from which the greatest benefit could be derived. There was little time then to investigate the qualifications of the business concerns to whom the ships were allotted. The director of operations and his assistants did the best they could and it was not until a long time after these vessels were started in various trades that they had an opportunity to obtain an intelligent check on the service being rendered the Shipping Board by the various operating and managing agents. This work, however, is now being accomplished and the various departments have gathered data which will show those shipping firms best qualified to continue as agents for the government.

If any changes are necessary, the recently organized shipping concerns should be given consideration equal to that accorded those of longer standing, and any who merit recognition should be retained even in preference to older firms which might prove less efficient. These new concerns have been facetiously referred to as "mushrooms," and while it is true many were made possible by circumstances resulting from the war they were encouraged to go into business by the assurance of support from the government who in this way hoped to revive and continue an interest in foreign trades and shipping in general.

Some of these new concerns, composed of men who were formerly connected with other steamship lines, have been adequately trained for the new work they are now undertaking on their own account, and while they may not be shipowners they are competent ships agents and that is what the government wants. It is hoped that this point will be given careful consideration because at present there is some talk of eliminating all agents who are not also owners of vessels themselves. If this were ever done it would entirely defeat the purpose of our government to encourage and foster the shipping business; it would give control of the government vessels to the larger shipping interests, and by eliminating the smaller concerns would tend to confirm the too often erroneous belief that because a firm is a new one it cannot be much good.

The efforts of new shipping concerns should not be disparaged, and those who had the courage to leave other employment and go into business for themselves with little capital other than their experience and the promised support of our government, should, so long as they are capable, be given every possible support and encouragement.

The New Matson Freighters

OUR insert shows the inboard profile and deck plans of the new freight steamers now under construction for the Matson Navigation Company at the yards of the Moore Shipbuilding Company. These ships are to be of standard Matson type with straight stems and eliptical sterns, and with the machinery located as far aft as possible, giving a free open hold and tween-deck space for the stowage of cargo. They are to be of 100-A classification in the American Bureau of Shipping and in Lloyd's Register, and it is noteworthy in the specifications that in a very great number of instances in the parts of the ship where strength is important the explicit direction is that the dimensions and fastenings shall exceed the requirements of the American Bureau of Shipping and of Lloyds by amounts ranging from five to fifteen per cent.

The principal dimensions of these steamers are:

Length over-all, feet	497
Between perpendiculars, feet	480
Molded beam, feet	62
Molded depth to shelter deck, feet	42
Height between decks, feet	10
Rise of floor, inches	9
Deadweight tonnage in long tons at 30 feet draft, tons	14,000

In designing these freighters the prime consideration facing the naval architect of the Matson Navigation Company was the turn-around of the ship at each end of her run. The Matson Navigation Company handle tremendous quantities of miscellaneous freight from San Francisco to Honolulu; and mainly sugar, canned pineapple, bulk molasses and bunched bananas from Honolulu to San Francisco. The vessels, therefore, were designed primarily for the unobstructed stowage and handling of freight in the holds and tween-deck spaces, and to this end are supplied with as many cargo hatches as possible and with numerous sliding ports between the main and shelter decks, and hinged ports between the main and lower decks. Two steam cargo winches are provided for each cargo hatch. These hatches and ports have been located so that every square foot of floor in every one of the cargo spaces can be reached with the least possible movement of the freight intended for that area. The two central cargo hatches are made longer than the others and their dimensions are sufficient for the easy handling of all bulky packages. One of these is 18 feet by 32 feet 8 inches, and the other is 18 feet by 28 feet, over each of which there is a steel boom installed with capacity for 50-ton weights. The ordinary booms are of wood of eight tons' capacity each and one is provided for each cargo winch.

The fuel oil storage is in the fore peak and in the double bottoms, and the oil pipes are carried back to the engine room through the tanks with copper expansion bends in each compartment. These double bottom compartments throughout are five feet deep and those which are used for fuel oil storage extend to the bulkhead just forward of the boiler room. The two compartments under the boiler room and the two under the turbine engine room and the after peak tank are used for fresh water storage.

Each of these double bottom tank compartments is provided with an expansion trunk extending from the tank top to the shelter deck and watertight covers are provided for these trunks on that deck. From these expansion trunks ventilating pipes are carried for each compartment and these pipes leave the trunk under the shelter deck and are carried up through the hollow steel masts to a point well above the hounds, where they exhaust into the atmosphere. It will be noted on the inboard profile that the hollow steel masts are stepped on the main deck, the bottom of each mast resting on top of a bulkhead.

The arrangement of the columns at the hatches is rather unusual in that two columns are provided for each hatch at the side of the hatch. These columns will probably be of a deep channel section and not round as shown in the plans. The ladder rungs will be embosomed in the channel. This arrangement of the columns is ideal for the handling of freight on the hold floors.

The arrangement of the sliding and hinged ports is such that after the ship has been loaded to a point where for safety's sake the hinged ports will have to be closed, freight can still be handled through the sliding ports and carried through hatchways by chutes to the decks and holds below without interfering with the operations of the main cargo hatch.

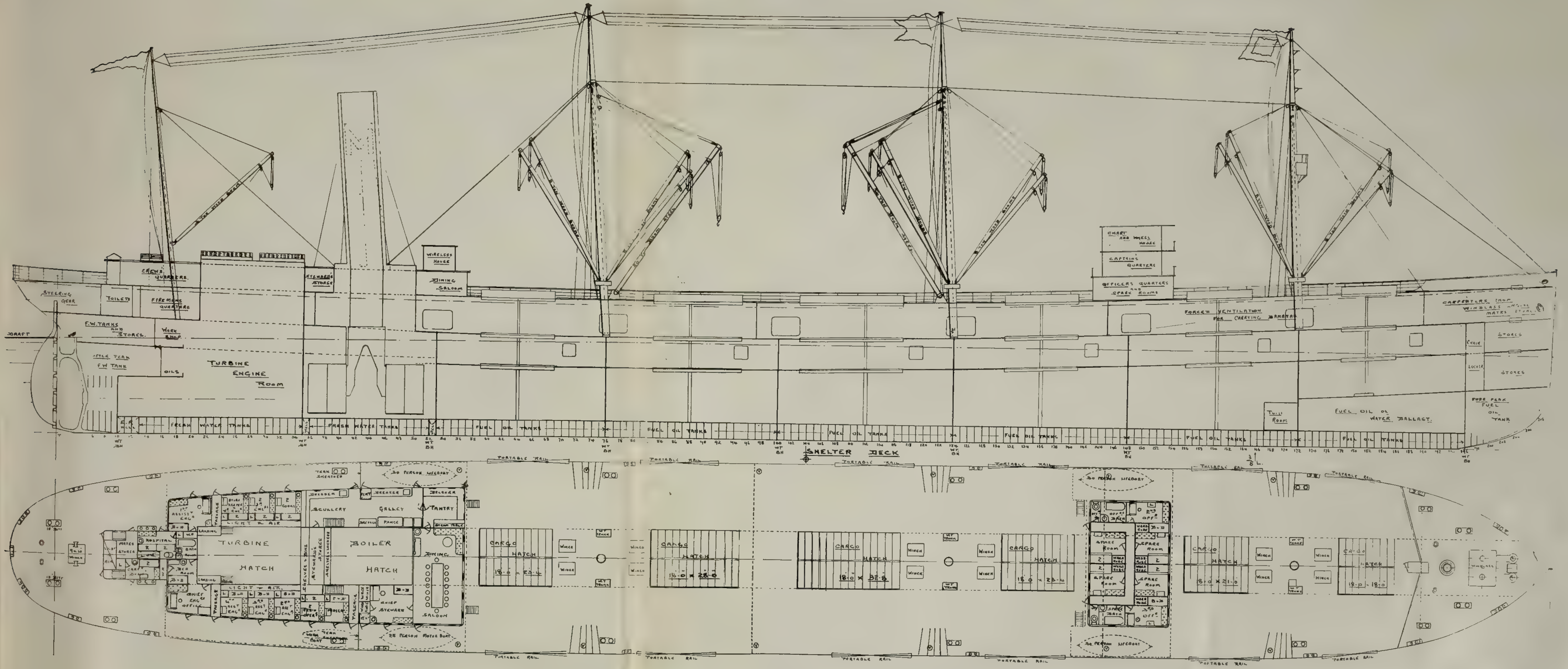
It is common practice for the big liners of the Matson Navigation Company, after unloading their passengers, to discharge partly at San Francisco, but mainly at Crockett, nine to ten thousand tons of cargo, refill the fuel oil tanks and take on ten thousand tons of miscellaneous freight at San Francisco all in eight days' time.

It is believed that with the arrangement of the present freighters, 28,000 tons of freight, coming and going, will be handled in a similar time. In order to insure this as an actual operative fact, these freighters have been designed with six cargo holds and twelve winches having a freight handling capacity of 50 per cent in excess of the proportionate capacity of the present Matson ships.

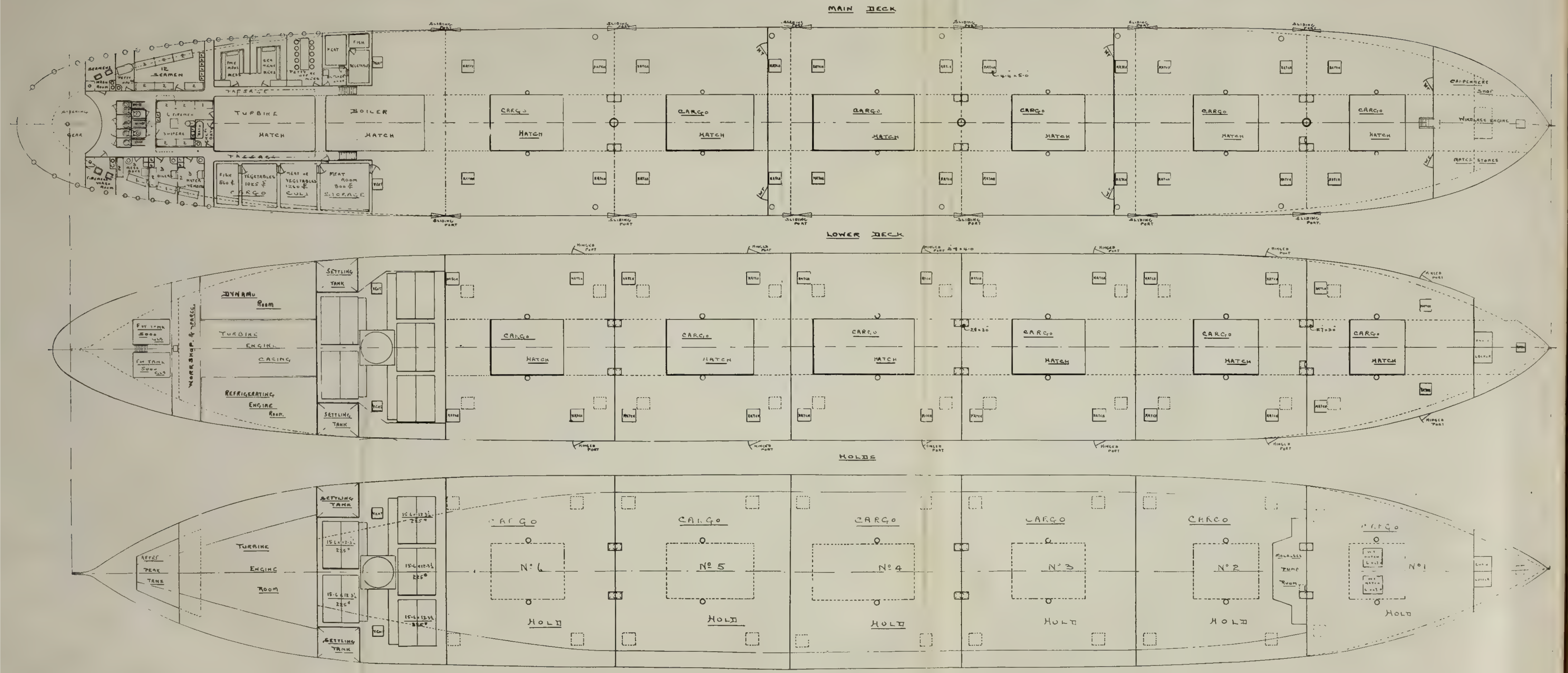
The propelling machinery is to consist of single screw double reduction gear of the Westinghouse-Parsons make, supplied by steam from five Scotch marine type boilers, each of which is fitted with four Morrison suspension type furnaces, the two central furnaces in each boiler having a common combustion chamber. The top of the stack is 107 feet above the keel, and was figured to supply ample draft on a natural draft basis, but to insure a normal supply of draft under all climatic conditions, Howden mechanical force draft is to be installed with Foster super heaters for fifty degrees super heat.

The boilers will carry a working pressure of 225 pounds per square inch and are to be fitted with fuel oil burners for mechanical atomization. Steam from this boiler plant will be supplied to a 5500 s. h. p. Westinghouse-Parsons cross compound turbine running at 3500 revolutions per minute and connected to the propeller shaft through Westinghouse double reduction gearing, so as to drive the single four-bladed propeller at ninety-five revolutions per minute. The propeller is to have a cast steel hub with bronze blades and will be so designed as to drive the ship at a speed of 12½ knots on her loaded draft.

The New Matson Freighters—Outboard Profile and Shelter Deck Plans



The New Matson Freighters—Plans of Main and Lower Decks and Hold



Foreign Trade Expansion in Latin America

By V. H. Pinckney

FOREIGN trade is interwoven with the life history and development of the world. Every man, woman and child in the United States is either directly or indirectly affected by foreign trade. No nation can exist upon the commodities produced within the confines of its own boundaries. It is dependent upon foreign trade. Foreign trade is so vital to our national trade that every factor of industry must be contributory thereto.

In the case of the farmer, upon whose shoulders rests no inconsiderable portion of the life and prosperity of this nation, the productivity of the soil depends upon fertilizers, and these fertilizers are brought from foreign countries. We must have ships to bring fertilizers to the farmer, and we must have return cargoes, since ships cannot be successfully operated in ballast.

Among the primary commodities which the United States is compelled to import is tin, from which that magic container known as the tin can is made. What wonderful stories of world-wide adventure, romance and achievement the genie of the tin can might whisper in the ears of a modern Scheherazade!

One of the largest, if not the largest manufacturing industry of the Pacific Coast, is the canned and dried foods industry. These commodities form part of the necessary diet of the civilized world. Their use made possible the completion of the great engineering feats of our present civilization. They made possible the great enterprises of exploration and of discovery which culminated in the discovery of both the North and the South Poles, and that they were necessary in the conduct of the great world war is self-evident.

Any limitation placed upon, or any impediments placed in the way of the development of foreign markets for canned and dried foods, tend to decrease the stability of American industry as a whole.

Unfortunately for the canned and dried foods industry of the United States, many foreign markets regard these wholesome commodities as luxuries, and so classify them in their tariff schedules. Because of this seemingly erroneous classification, a great many natural markets are practically prohibited to the United States. The effect is to prevent this great industry from participating in foreign trade to the extent it should. A further effect is to deny the use of reasonably cheap and wholesome commodities to a large number of people who would be most benefited by their use.

That the matter of tariffs has a great deal to do in the developing of foreign markets is evident from the case of Cuba. Prior to 1903 the total quantity of canned fruits exported by the United States to Cuba was not in excess of $12,000 annually. Following the favorable tariff revision of 1903, this market has steadily increased until today Cuba imports over $1,000,000 of canned fruits from the United States annually.

Another important example is that of Great Britain, where the tariff is favorable. In the calendar year of 1919 Great Britain imported from the United States $35,000,000 of canned fruits. These figures are from the statistics published by the Bureau of Foreign and Domestic Commerce of the United States.

By way of comparison, the countries comprising South America imported, during 1918, which is the latest year for which detailed statistics have been published by the United States government, less than $150,000 worth of canned fruits.

The following figures from the statistics of the Bureau of Foreign and Domestic Commerce are of interest:

Total Exports for the Fiscal Year Ending June 30, 1918

Condensed and evaporated milk	$68,045,944
Canned fruits	7,054,738
Canned vegetables	6,003,544
Canned salmon	16,570,834

Total Exports to South American Countries, Fiscal Year Ending June 30, 1918

	Condensed and Evaporated Milk	Canned Fruits	Canned Vegetables	Canned Salmon
Argentina	$ 205,881	$ 64,509	$ 57,523	$ 61,428
Bolivia	81,849	3,162	1,485	24,478
Brazil	460,072	21,323	14,694	26,245
Chile	200,241	13,995	7,861	330,244
Colombia	28,198	4,467	4,805	11,479
Ecuador	4,810	3,972	2,709	28,360
Peru	364,876	20,606	18,976	158,794

View in the Harbor at Valparaiso, Chile

Uruguay ...	9,875	4,493	887	1,509
Venezuela..	12,196	5,428	4,106	26,834
Total......	$1,367,196	$141,955	$113,046	$669,371

The total exports of all commoditits during the same fiscal period from the United States to South America were $314,558,794; imports, $567,418,257, leaving a trade balance in favor of South America of $252,855,463.

It is significant that of the imports by us from South America, 93.09 per cent was admitted by the United States free of all duty.

Thirty-five million bunches of bananas were imported by the United States from Latin America during this fiscal period of 1918. Bananas are on the free list. Despite the favorable treatment of the great fruit industry of tropical Latin America, our own fruit industry receives far from equitable tariff treatment.

The farmer, the rancher, the dairyman, the gardener, the orchardist, the fisherman, the manufacturer, the financier and steamship and railroad companies are all vitally interested in the development of foreign markets on canned and dried foods.

Once our friends and neighbors realize that canned and dried foods are necessaries and not luxuries, tariff schedules will be reclassified; tariff duties will be made more equitable, and markets will be immediately opened to canned and dried foods. Our nation needs foreign markets. The canned and dried foods industry particularly needs them, since the time is not far distant when production shall have been so increased that additional foreign markets must be found; otherwise, the industry will be face to face with a most serious problem.

Foreign trade expansion in Latin America sounds formidable. It is as though somebody was suggesting a trip to a fairy realm. There come to mind half-forgotten stories read in by-gone days of buccaneers and bold, swaggering pirates, who flew the black flag and plowed the Spanish Main. We inhale the aromatic fragrance wafted from luxuriant tropical islands; we hear the low mumur of some guitar throbbing with the soft tones of love; adventure and romance become companions and ordinary horse sense and level-headed business judgment go aglimmering.

View at Port of Buenos Aires

The presence of a foreign order has the effect of throwing a money-wrench into the economic machinery of most American business houses. Such an order is scrutinized most carefully and regarded as a curiosity; it is presumed to be full of hidden pit-falls and snares. The merchant bold enough to fill the order is simply inviting financial disaster because it is a foregone conclusion that the buyer does not intend to pay for the goods, or, lacking such intention, will pay for them only if pressed to do so.

Foreign trade expansion means the developing of markets other than domestic. It is self-evident that there are certain principles underlying a domestic market which must be used by those who seek to exploit it. The same principles underlie the exploitation of a foreign market, but their application differs. There is a difference between adapting a business to conditions and adopting those conditions. Foreign trade means both adapting and adopting.

The business man who believes he can conduct foreign business as he would his local activities may wake up one morning to discover that in the midst of business life he is in financial death. To those who have been engaged in foreign trade expansion for many years has come the full realization that it is the one enterprise in which theory abounds. It is doubtful whether any other enterprise is so much talked about, and so much written about, and so much of a furore raised about. You may pick up any large metropolitan newspaper or some rural journal and you will daily find articles written concerning commerce. Many an ordinarily level-headed manufacturer freely gives his representation to some man whose only qualification is that he learned Spanish while working for some mining company, and he will enter into the most absurd contractual relations, only to subsequently find that his goods and his reputation have become by-words throughout Latin America. Many a man who, because he knows Spanish, is certain that he can make a fortune as a manufacturer's agent in Latin America, or as a salesman. He has had no commercial training, has no knowledge of the psychology of selling; he knows next to nothing of the temperament of the business man of Latin America, and believes that the small retailer, for argument's sake in Guatemala, is on the same basis and has the same code of ethics as the big wholesaler in Buenos Aires. To him Latin America means that each country comprising this magnificent field is on a par with the other. To him Honduras and Chile have the same racial, political, sociological and economical development. The manufacturer or business man eager and anxious to extend his business presumes that because the applicant for his representation speaks

Spanish he is a veritable "Daniel come to judgment."

Grain Elevators at Buenos Aires

The ability to send what you have manufactured to a foreign market; to do so with the minimum of interference and with the certainty that you will be paid for what you have shipped, are the primary fundamentals which underlie foreign trade expansion. These same fundamentals underlie any commercial transaction in the domestic markets. It is obvious, however, that there is a difference between the means of transportation to a domestic market which may be purely by rail, and shipment to a market several thousand miles away. Means of communication in many of the Latin American countries are not so highly developed as they are in the United States. It is possible to find almost every kind of a conveyance and in some countries transportation is limited to the backs of the llama, an animal which is found in the higher altitudes of the Andes. Each market may require a specific form of marking goods and the metric system must invariably be used. It is self-evident that packages must be more strongly made than they would if used in the domestic market. Some knowledge must be had of marine insurance. Many an exporter takes out an insurance policy to find that his policy does not offer him any protection. It must be borne in mind that the present marine insurance policy is more than one hundred years old and was written at a time when there were no steamships and when the markets of the world were not so closely knit together.

Until recently, goods shipped to South America, presumably fully covered by marine insurance, were practically at full peril a few hours after the arrival at the shipping port.

The financing of a foreign shipment demands great care. Such financial documents as letters of credit are susceptible of many an interpretation and an irrevocable letter of credit gives no assurance to the shipper that he can secure his money at the time he is ready to make shipment. In terms of liability a bank in the United States is devoid of all liability in an irrevocable credit. An ordinary letter of credit is merely an advice without any guarantee. Sight drafts may be on a document against payment basis or merely on an acceptance basis. A recent shipment was made to Latin America on a sight draft against document basis was the cause of considerable misunderstanding. As the sum involved represented a very large amount, it was found necessary to send a special representative to that particular market in order to straighten matters out. Upon his arrival there he found to his amazement that the merchant had interpreted sight draft to mean sighting the merchandise and not the documents. Some consideration must be given to the difference between sales made on f. o. b., c. i. f., c.& f. basis, etc., for each carries with it a different obligation.

The business man who contemplates entering the field of foreign trade should know something of international law. If not, he should at least make it a point to confer on occasions with a lawyer who has specialized in international law. A business man has generally a clear understanding of what is and what is not a contract, although he may not be versed in the technicalities of the rules governing its interpretation. Most business men are fully as competent as the average lawyer to handle matters involving commercial law, but it is not altogether wise to try to be your own lawyer in the domain of international law. In California and many of the states of the Union a married woman is capable of transacting business. The status of a married woman should be given careful consideration in granting credit in Latin America, for as a rule married women are under disability, although the business man in the United States takes no unusual risks in transacting business with them.

Of vital importance are tariff laws and regulations. A study of them is most useful to the business interests of the United States. Many of the Latin American tariffs are most complicated. In many markets the application of the tariff to certain articles is sufficient to practically prohibit their introduction. Take, in the case of fruit canning, which is not a protected industry in Argentine, yet the tariff schedule imposes a valuation of over 150 per cent on the c. i. f. Buenos Aires valuation. Because of this excessive taxation, canned fruits have been placed, on account of their necessarily high retail prices, in the category of luxuries and beyond the purchasing power of the average consumer. It naturally follows that the demand must be limited to certain restricted classes who are able and willing to pay such retail prices. Canned fruits are not generally considered as luxuries, but tariff regulations have made them so throughout Latin America. It must not be overlooked, when we find fault with or criticise the tariff system of a foreign country, that there are a number of merchants in the United States who find fault with our own system.

Island Wrecks

By Andrew Farrell

Square riggers in Honolulu Harbor

IN presuming to write of Island Wrecks I find myself in much the situation of a school boy to whom is assigned as a subject Life, Death, Immortality, or something equally large and magnificent. Neither of us possesses the requisite knowledge or art. For Island Wrecks demand all the art that any man can muster, so remarkable are the events with which he has to deal; and his knowledge must be not less than encyclopedic. Adequately to tell the story he would have to go back through the centuries, to the day when the first outrigger canoe hurtled over a coral reef and a torn survivor dragged himself ashore to see that the land was good. And then the writer would have to tell of a Japanese junk of the long ago, bearing two or three wasted scarecrows, that grated on some sheltered beach; and so on, down through the stories of the early-coming whites, explorers and traders, to the recent huricane that cast ashore a steel steamer, the funnel of which is to be seen today through the palm-fronds on a lonely atoll. For the history of Island Wrecks is the history of man in the Pacific—a history more vivid and human than that of trade and spheres of influence, which, in a day that takes its narratives seriously and with regard for the fate of the dollar, have more than their share of the printed page.

Christmas Island alone, to choose one of thousands, has a story to move one who has a vast respect for the sea but is not averse to writing of it. Many tales might have been heard of that great eastern bight, a nest of deadly whirlpools no matter how the currents run. But to hear those tales today? There are few left to speak of them, a weather-beaten mariner here and there; and for the most part the stories are buried in old files of the Sydney and Honolulu newspapers.

And scores of wrecks never have been reported. Marine insurance companies wrote the vessels off as losses; and for the crews gravestones were erected in Down-East churchyards. To illustrate that: In 1889 (a year that made history in the Pacific) the great hurricane that shattered the German and American fleets at Apia swept over 12,000 square miles of sea. Wrecks were many and disastrous. Upon arriving at Sydney, Captain Turipe, of the London Missionary Society's bark John Williams, said that the year had been the worst of his thirty-four years' experience; and he cited having found in the Gilbert group a hull partly submerged, her topsides missing and both bow and stern washed away, so that her identity could not be made out. But the topsides were on another island 400 miles to the north.

No: the subject is too large. In writing of Island Wrecks I have in mind only those of Hawaii.

The Old and New Navy in Honolulu Harbor

and of them but a few. Yet they are not the least remarkable of the hundreds that have occurred in the Pacific. The chart tells why.

In the vast expanse of the North Pacific, the Hawaiian Islands have a position of singular isolation. If they were erased from the sea, one might sail from Socorro to Japan, from the Aleutian chain to the scattered atolls that cling close to the Line, almost without encountering land. Especially in the island-studded Pacific is the situation of Hawaii noteworthy; for to the south of the Line there are isles, unnumbered if not innumerable, high and low, volcanic and coral, reef, rock and shoal; lands rising, lands quiescent, lands subsiding; archipelagoes that house active volcanoes and even now continue to grow; other groups that are but the weathered bodies of cones once great; and atolls that crown the summits of peaks sunk incredible fathoms beneath the sea. But Hawaii, to the north, has no place in that insular mob.

Yet that Hawaii is not the Hawaii of the casual traveler, who sees at most five or six islands. The group extends through twenty-four degrees of longitude, from 155 west to 179, and in latitude from 19 north to 28:30. These are enormous stretches of sea. And not only is there a great range longitudinal and latitudinal, but the chain presents, progressively from southeast to northwest, the curious geologic phenomena of the South Seas, passing from the 14,000-foot mountains of Hawaii through stages of greater erosion, to scoured rocks, elevated atolls, atolls of the pure type, and huge shoals and reefs that scarcely break. So it comes that Hawaii not only has been the haven of hundreds of castaways but also has been the scene of many a disastrous wreck, particularly on the leeward shoals.* Both these facts have given rise to some of the most amazing voyages in the history of the sea—journeys of thousands of miles in open boats, wanderings that lasted for days, weeks and even months of suffering. And in the Islands themselves wrecks have led more than once to swims of almost incredible length and duration before the survivors reached safety. Into these two categories fall the more remarkable Island catastrophes.

II.

There are some wrecks, however, vivid and curious and picturesque, that demand their story, even though they are included in neither of these classifications. A few of these stories I would narrate briefly.

First of all peoples to be wrecked on the Islands, so far as speculation goes today, were of the great flood of Malayan immigration that spread across the Pacific centuries ago. After them doubtless came the Japanese, travelers of necessity and not altogether of choice, for many a Japanese junk has been blown across the Pacific in historic times. That these people sailed far eastward is attested by the unmistakable infusion of their blood in Micronesia. But such catastrophes as those early sailors suffered in their outrigger canoes and junks have left not a memory, although one may discover analogous mishaps today. The bark John Williams (to which reference has been made), on touching at Manihiki in June, 1889, learned that two boats, each bearing eight persons, had sailed from Rakahanga for Manihiki, but a storm coming up had been blown away in the crossing. Captain Turipe saw nothing of the boats; on arrival at Samoa, however, he found that both had arrived there after eleven days at sea.

But one must seek in the comparatively recent seventeenth century for the first wreck of tradition. Somewhere about 1625, according to native lore, a vessel known to the Hawaiians as Konalihoa was lost at Kealakekua, where, 150 years later, Captain Cook was to meet his death. Probably this craft is that which appears in other dim tales as having had two survivors (presumably Spanish), a man and his sister, both of whom married natives. This wreck at best is half-legendary; and it was not until 1790 that the schooner Fair American, flying the flag of the United States, was destroyed by Hawaiians at Kawaihae, offering an indisputable, even if man-made, catastrophe.

In 1796 a British brig, the Arthur, Captain Barber, was lost on Oahu, giving Barber's Point its name. During the next few years wrecks became more frequent. The American schooner Lily Bird grounded off Honolulu in 1804; and the first Kamehameha bought her, got her off and fitted her with guns for his expedition against Kauai. Eight years later a Russian vessel was lost. In the next year, 1813, John Jacob Astor's trading ship Lark, dismasted by storm, became a "drifting hulk," peopled by starving men. "But there was a Sandwich Islander aboard, an expert swimmer, who brought up enough liquor and raw pork from below to save our lives." She stranded on Kahoolawe. Kamehameha relieved her crew, but claimed the wreck for himself.

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*Leeward Islands of Hawaii:

Nihoa, or Bird, Island; 23:06 N.; 161:59 W.; 903 feet high; discovered by Captain Douglas of Iphigenia in 1789. No reefs. No wrecks.

Neckar Island; 23:35:30 N.; 164:39:58 W.; 300 feet high; discovered by La Perouse in 1786. No reefs. No wrecks.

French Frigate Shoals; 23:45 N.; 166:16 W.; central rock 120 feet high surrounded by an atoll ten feet high; number of islands has varied greatly, year by year, from sixteen to five; discovered by La Perouse in 1786; central rock resembles full-rigged ship, which has decoyed vessels upon reefs; one of most dangerous of leeward islands.

Gardiner Island; 25:01 N.; 167:59 W.; 170 feet high; two rocks; on bank seventeen to twenty fathoms deep, extending five to twelve miles from rocks; no fringing reef reported; no wrecks.

Dowsett's Reef; 25:20 N.; 170:30 W.; several reefs; discovered by Captain E. Wood of the Hawaiian brig Kamehameha V, July 11, 1872; wrecks have occurred.

Maro Reef; center about 25:30 N.; 170:35 W.; extensive reefs; discovered by Captain Allen of American whaler Maro in 18[illegible]; wrecks have occurred.

Both Maro and Dowsett's reefs break, but amount of breaking is uncertain, and vessels have struck almost as they sighted surf.

Laysan Island; 25:42:11 N.; 171:44:06 W.; [illegible] feet high; discovered by Captain Stanikovitch, Russian, in 1827, and named for his vessel; elevated coral island with fringing reefs, lagoon-lake in center, unconnected with sea; wrecks have occurred.

Lisiansky Island; position doubtful, about 26 N.; 17[illegible] W.; as late as 1859 this island was reported one full degree out of charted position; discovered by Captain Lisiansky of Russian ship Neva, which struck island October 15, 1805; complete loss narrowly averted; elevated coral island, 4[illegible] feet high; long outlying reefs, very dangerous; known variously as Lisiansky, Loasian, Pell, etc.

Pearl and Hermes Reef; 27:[illegible] N.; 17[illegible] W.; [illegible] many low islands surrounded by maze of reefs 50 miles or so in circumference; British whalers Pearl and Hermes discovered reefs by being wrecked on same night, April 26, 1822, ten miles apart; few other wrecks, if any.

Midway Island; 28:13 N.; 177:22 W.; discovered by Captain Brooks of the Gambia, July 5, 1859, and a possession of United States since, never having been under sovereignty of Kingdom and Republic of Hawaii; circular atoll; 44 feet high, height changeable; several wrecks, both inside lagoon and on fringing reefs.

Ocean, or Kure, Island; 28:26 N.; 178:30 W.; discovered by early American navigators, confirmed by Stanikovitch in 1827; atoll, 20 feet high; height changeable; several wrecks.

Of the above, Bird, Neckar, French Frigate and Gardiner are lofty rocks; Laysan and Lisiansky are elevated atolls with fringing reefs; Pearl and Hermes, Midway and Ocean are pure coral atolls; Maro and Dowsett are reefs with visible breakers. French Frigate Shoals also is surrounded by an atoll. There are also three shoals: Frost, 12 fathoms least depth; Brooks, 14 fathoms; Gambia, 14 fathoms. Captain Brooks of the Gambia discovered the last two.

Two Brothers Reef appears on some charts, but its existence is doubtful. The Two Brothers was lost about 18[illegible] on some reef to leeward, but it has been believed since that she was wrecked on Dowsett's.

The United States Coast Guard cutter Thetis in 1910 observed, in the vicinity of Maro and Dowsett's, dangerous and irregular set of currents. The vessel was set [illegible] miles to the northward [illegible].

Palmyra Island is not of the leeward chain. It lies about 115[illegible] miles south of Honolulu, [illegible] N., 162:1[illegible] W., one of Oceanic Sporades; discovered by Captain Sawle of American ship Palmyra in 1802; claimed since by United States, Hawaii and Great Britain; now American; atoll; made up of from 34 to 58 islets (number variously reported); wrecks have occurred.

The leeward islands, except for Midway, are in the Hawaiian Bird Reservation and are unpopulated. Midway is a station of the Commercial Pacific Cable Company.

In 1824 occurred the famous loss of a famous vessel. Hiram Bingham wrote of this affair, and his account has been recounted a thousand times; however, it will endure another thousand repetitions.

Cleopatra's Barge was launched in 1815 for Captain George Crowinshield, of Salem, Massachusetts. In that year he retired from business as a shipmaster and merchant in China and the East Indies, having accumulated a fortune, and he determined that he would have an unusual vessel. She was most luxuriously fitted, to the wonder of the peoples of the Mediterranean, whither she voyaged; but finally she found her way to Hawaii, where King Liholiho paid for her $90,000 in sandalwood (three times her cost, it was said), and renamed her Haaheo o Hawaii (the Pride of Hawaii).

Registered tonnage, 191½; 83 feet long on the waterline; 23 feet in beam; 11½ feet deep; rigged as a hermaphrodite brig—such was the Pride of Hawaii. Through the mismanagement of a "drinking" captain and crew, says Bingham (the word "drinking" has become "drunken" in most accounts), she was wrecked at Hanalei, Kauai, and there she lay on the beach, dismantled and ruined. The natives took on shore her spars, rigging, and what else could be salved. This done, they determined to bring up the brig herself, their effort being, said Bingham, "the most striking which I ever saw made by unaided human muscles."

Having collected an enormous quantity of hibiscus bark from the woods and river banks, the natives, with their hands, unaided by any machinery, made several thousand yards of a strong rope. Twelve folds of this were twisted into a cable; and three cables were made. All were attached to the mainmast, a few feet above deck, and led some distance inshore, toward the mountains, as nearly parallel as possible. Along the cables ranged the multitude, as close together as they could sit or stand conveniently. They were instructed to rise at the signal, to lean inland, to gaze and draw straight forward, without looking backward at the vessel.

The brig was in ten feet of water, near a reef, and lying partly on her side that was farther from shore. It was proposed first to roll her over the reef. At a passage in the song, chanted by the priests, the crowds rose as one and strained on the ropes.

Slowly the brig rolled up; she stood on her keel, until her side met the rock, and there she stopped instantly. Not so with the human teams: undaunted, they moved on, and the mainmast broke off and fell with the shrouds, whereupon the bark instantly rolled back. The effort having failed, she was abandoned as a hopeless wreck.

In that same year was the first loss of a whaleship, the British vessel Royal George, which struck at the entrance to Honolulu harbor; and in 1828 the American whaler Paragon sank at sea, a few days out of Honolulu, with 2000 barrels of sperm oil. What apparently is the first authenticated wreck of a Japanese craft in the Islands was in 1832, when a junk stranded on Oahu, four of the crew being saved. In 1846 occurred the first of a series of fires aboard whalers in Honolulu harbor, which is worth chronicling because the work of incendiaries became more and more evident and was continued for fifty years, for in March, 1895, the whaler Gayhead, commanded by the only negro master in the Pacific, had two misfortunes: while lying outside the harbor she was set on fire, presumably by a member of the crew who wished to avoid an impending long voyage to the North Sea; and two weeks later it was discovered that holes had been bored in her hull in an effort to sink her.

In 1855 a French whaler, the Marquis de Turrenne, of Havre, was lost on Barber's Point; and the first wreck of a self-propelled vessel was that of the steamship West Point on Kauai in 1856. And in this survey of early disasters must be included the schooner Flibberty Gibbet, lost on the Kona Coast of Hawaii in 1861 by running her bow into a cave while all hands were asleep, so it was said, but the more plausible explanation is that she was destroyed by her name. In 1911 (to include one more) the Inter-Island steamship W. G. Hall, on a voyage from Kauai to Honolulu, was thrust by a sword-fish a foot or more of the sword penetrating six-inch planking and causing the vessel to leak.

Driven Ashore

AMERICAN BOYS FOR AMERICAN SHIPS

Sea-Training and Its Relation to American Foreign Trade and the American Merchant Marine

THE Sea-training Bureau of the United States Shipping Board is now functioning on a normal basis in the preparation of material for the personnel of our huge merchant marine fleet. During the war emergency period and for some months thereafter a great stress was laid on the turning out of recruits as speedily as possible, but through the efforts of some of the more experienced heads of this department there has been brought into the training an element of commerce which not only bids fair to make the department largely self supporting, but also imparts to the young men under training the stimulating idea that the business in which they are engaged is not simply that of a school but is as well a part of the great business life of the nation.

A little diversion at the Shore Station

This has been accomplished first on the Atlantic Coast by the allocation to the Sea-training Department of four of the Shipping Board wooden freight steamers which are now regularly engaged in runs out of Boston, New York and Baltimore to the West Indies and return, carrying miscellaneous freight. The Atlantic division of the Bureau centers around the work at Camp Stuart near Newport News, which is the shore station for the entire Atlantic and Gulf Coasts and all of the states of the Union east of the Mississippi River.

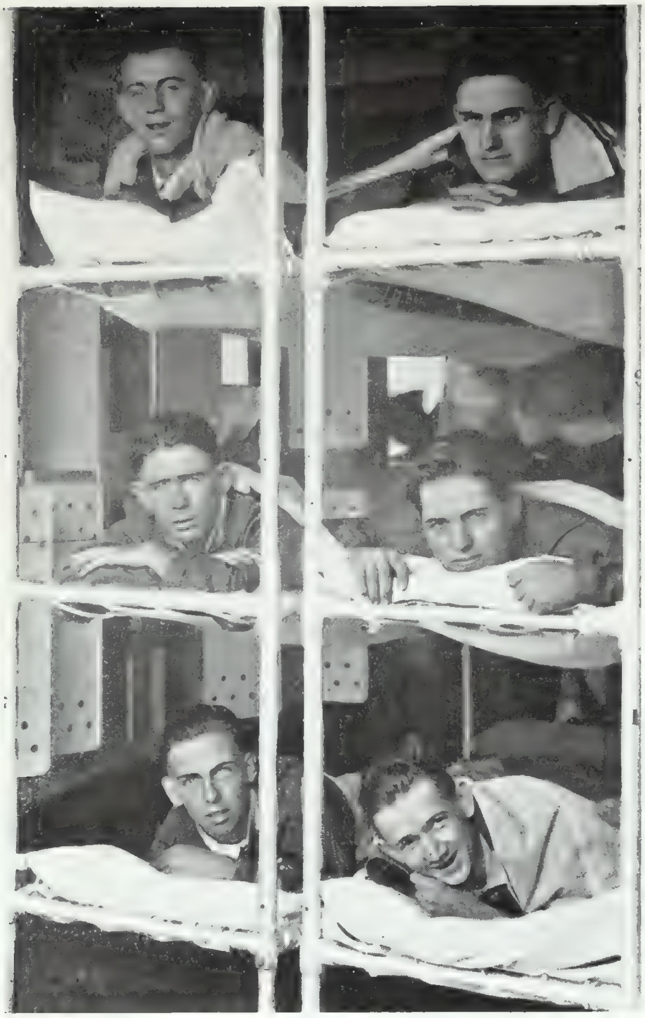
Each one of the four wooden ships is fitted out between decks with accommodations for some one hundred and fifty cadets and will carry in her hold spaces from 2000 to 2500 tons of miscellaneous cargo. In a voyage of this kind the cadet is trained not only in the ordinary duties of the seaman, but in the operation of deck machinery, in the stowage of cargo, in the slinging and handling of miscellaneous freight, and in the various needs of foreign trade in the way of packing, clearing and delivery methods.

The Pacific Coast division has two shore training stations—one on Puget Sound at Seattle, and the other at San Francisco. The Seattle station has for a sea-training boat the Shipping Board wooden freighter Brookdale, which operates from Puget Sound to Honolulu, frequently touching at San Francisco on either the outbound or return trip, and carrying freight in her holds in the same manner as is done with the four training ships on the Atlantic Coast. The San Francisco station has the steel steamer Iris for a training ship, and the space in this steamer has been almost exclusively given over to the accommodation of cadets. The Bureau has now in contemplation the remodleing of the Iris so as to use only the tween-deck space for the cadet accommodations, utilizing the holds for cargo, giving her a capacity for about 2000 tons and using her on the Honolulu run commercially; or, if the expense of the changes are excessive, they will secure a sister ship to the Brookdale.

Records carefully kept of the experience of graduates of these training schools show that from returns coming into the Pacific Coast offices there are 50 per cent stick up to and including the third sea voyage. Inasmuch as numbers of these young men are transferred on the Atlantic Coast, the heads of the department estimate conservatively that 75 per cent of the cadets stay at the seafaring life for at least two round-trip voyages. There is a great mass of interesting correspondence at the various recruiting offices showing that many of the cadets who have gone back to life in the interior states soon show a disposition to return to the seafaring life, so that on a statistical basis the training schools are making themselves well worth while in providing an all-American personnel for our American merchant marine.

The following table shows the placement of men from all stations during the month of July, 1919, proving that for that month 60 per cent of the total had stuck for their second voyage:

Totals	First Placements	Second Placements
346	188	158
30	13	17
51	241	51
444	8	203



Bunkies

32	18	24
91	65	73
170	73	105
8	......	8
342	...	269
1514	606	908

Report San Francisco from July 1, 1918, to December 31, 1919

Recruits accepted	3431
Recruits rejected	248
Recruits placed	1960
Recruits placed second time	973

In addition to this statistical showing it must always be remembered in judging the value of this service that it has an indirect bearing on the bringing about of a state of ship-mindedness among the American people of the interior, which is almost inestimable in its value and which will have a tendency to make permanent the maritime lessons learned by Americans through their experience in the late war.

It is interesting to note in this connection the distribution of the successful applicants as to home states for the months of June and July, 1919, in the Atlantic division, are as follows:

North Carolina	30
Oklahoma	1
Wisconsin	83
New Jersey	19
Rhode Island	49
New Hampshire	6
Illinois	122
Maine	8
Texas	4
Pennsylvania	424
Tennessee	6
Georgia	2
Michigan	32
Virginia	95
Ohio	178
Missouri	117
Vermont	1
Connecticut	31
Florida	3
New York	401
Maryland	78
Indiana	1
Iowa	3
Massachusetts	301
Louisiana	1

Our legislators in Washington are now considering bills for either compulsory or voluntary military training and there is every indication that they will incorporate in these bills a clause making the choice optional between straight military, naval or merchant marine branches for a limited number of young men annually. Several of the state legislatures have already placed their approval on mer-

United States Shipping Board Training-Ship Newton

Lessons in Rope Craft at Snug Harbor, New York

chant marine service by resolutions directing that all high schools should carry on their curriculum optional courses directing the minds of pupils toward navigation, foreign trade, and other subjects relating to sea life. The state legislature of Virginia in passing such a resolution incorporated therein a clause providing that each legislator should have the privilege annually of designating two young men from his constituency, graduates of the high school courses, as cadets for the sea-training service. This was done at the suggestion of sea-training officials and is proving a very efficient method of creating state-wide interest in merchant marine matters. It might be well for other legislatures to take similar steps in the different states of the Union.

The sea-training service may now be considered to be on a very firm foundation. Its vessels are more than paying their own way on the training cruises and the service is turning out monthly six to seven hundred young Americans ready to take places as ordinary seamen. Many of these young men are shrewd, intelligent and ambitious, and in numbers of instances have been able to pass their examinations for officer's papers in less than a year from the time they were graduated from the sea-training course.

There is no part of the Shipping Board work of greater importance to the future welfare of American maritime affairs than is this work of sea-training. When we consider that this service each month is placing six hundred active, open-eyed American youths in actual contact with diversified phases of American overseas' commerce, we can then form an estimate of the importance of this work to the future foreign trade of America. We have here the potential material for American representatives in foreign trade centers; for engineering and deck officers for the ships that are to carry our foreign commerce; for the operators who manage the dispatch of the ships; for the freight forwarders and freight brokers who manage at our home ports the forwarding and distribution of foreign cargoes; and for the future executives of our great exporting and importing companies.

We make this prophecy and draw this conclusion without any apology because we know that the love of adventure and the willingness to take hazards which have always characterized the men who love to go down to the sea in ships, is also one of the most potent factors in the mental make-up of all our great captains of industry and business executives; and therefore we class this merchant marine sea-training service as one of the most important branches of the work of the government of the United States if we are to maintain that place on the sea which has been pointed out as our destiny by the lessons learned in the conflict through which we have just passed so successfully.

United States Shipping Board Training-Ship Iris

California Rice in Europe

By W. T. Welisch

RICE GROWING in California is now classed as one of the most important industries of the state. Its growth during the past seven years, although phenomenal, has been healthy and built on solid foundations. Lands that ten years ago were considered practically worthless are now planted in rice and considered among the most valuable agricultural holdings, and the industry is furnishing healthy and remunerative employment to thousands.

California rice is favorably known in European markets, and bids fair to become one of the biggest exportable products of the state. Realizing the constant growth and importance of the rice industry in this state, and with the end in view of carrying the message of California rice to the importers of Europe, I left San Francisco in September, 1919, and spent five months on the European continent, visiting all the rice-consuming centers and establishing twenty-four new agencies for my house that will help to sell California rice in Europe and Africa.

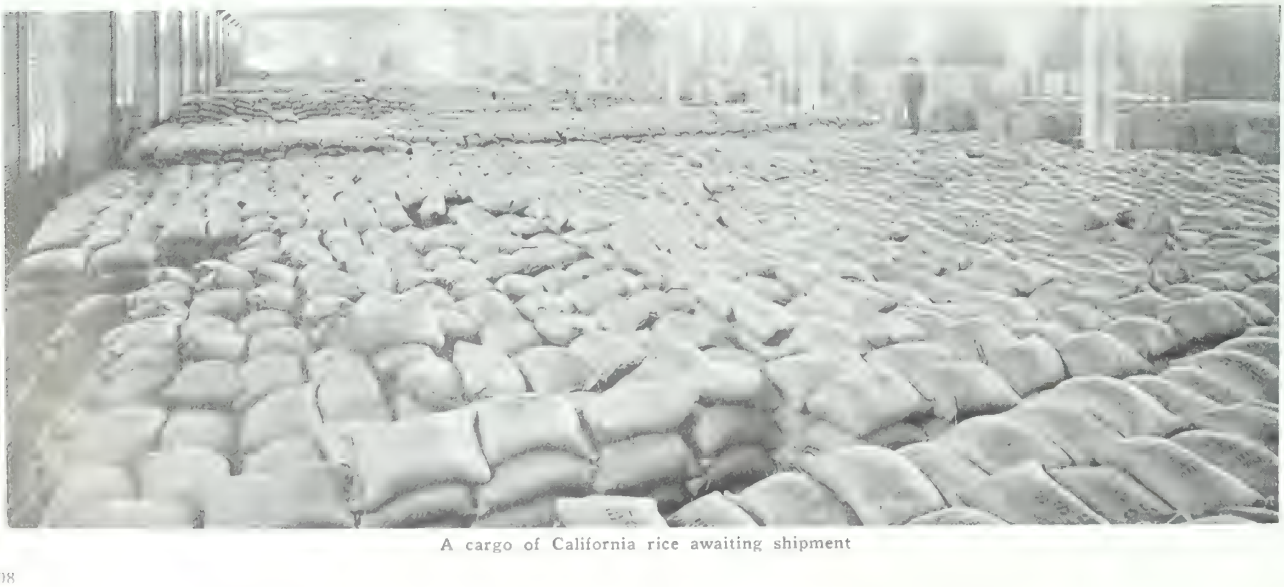
W. T. Welisch

Feeling that the knowledge gleaned from my journey, in addition to being of inestimable value in the future expansion of W. T. Welisch & Company, would be of interest and service to its friends, there is herewith set down a brief summary of conditions, as I found them, for the readers of Pacific Marine Review.

To my American contemporaries contemplating a business trip to the continent, I wish to state that throughout my entire visit I was most courteously received, being given kind consideration and helpful advice in each city visited. In London and Liverpool particularly I was most graciously treated, and found the prevailing idea that the Briton is difficult to approach an absolute fallacy.

In connection with business with the United Kingdom, American firms should endeavor to quote in sterling and English hundredweight. Their ability to meet these two important conditions is sure to lead to a marked increase in business with the British importers, a business conducted on much smoother lines than has been the case heretofore. In the financing of sales of American rice in London, be advised that the jobbers there are decidedly opposed to putting up letters of credit in favor of the seller in this country.

In a number of instances I found the importer skeptical of the integrity of the American shipper of rice, due largely, I am informed, to a deplorable incident of a year ago, when a large parcel of rice of miserable quality was sold and delivered to the British government. I feel satisfied the shippers who establish a reputation for fair dealing will be given a preference on business when others are quoting a shilling or two under them. It would be to the interest of the American shippers to establish standards, to be submitted to the British buyers, guaranteeing that shipments would not be inferior to samples in milling and separation, it being understood, however, that there could be an allowable variation as long as shipments were fair average quality of the season.


A cargo of California rice awaiting shipment

The rice brokers in London whom I had the pleasure of meeting I found to be, without exception, most courteous. They frankly gave me all the data possible regarding rice conditions in their market, and I feel greatly indebted to them for much valuable assistance.

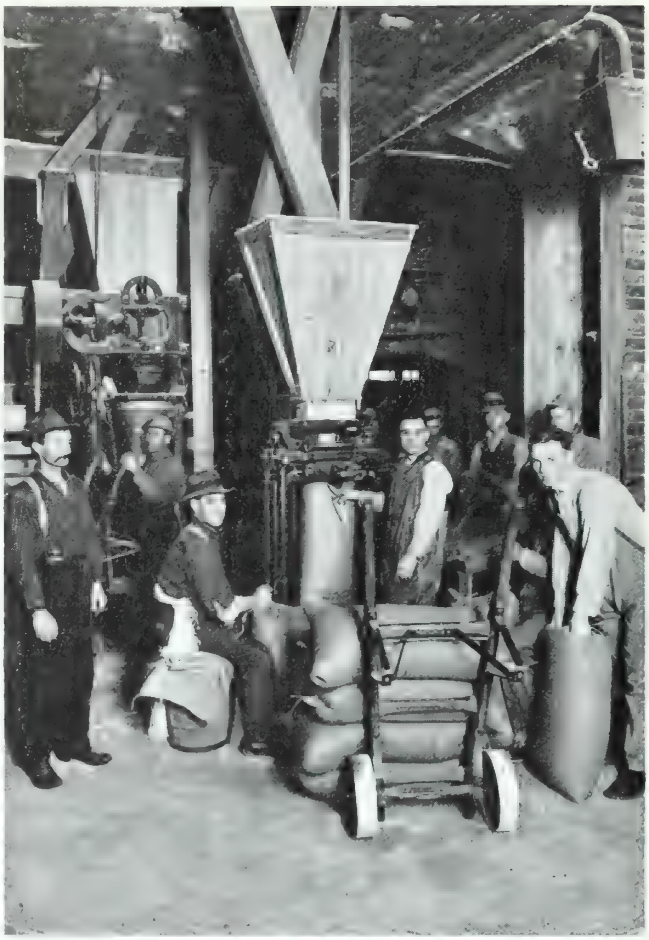
In Norway, Sweden and Denmark conditions were found to be very similar. Swedish consumption of rice is greater around Christmas time than during the entire balance of the year. Sweden has but two rice mills, and Norway one. Norway imports about 4000 to 5000 tons annually, although last year about 6000 tons were imported to meet an existing shortage in other foodstuffs. I found it almost impossible to secure hotel accommodation in Denmark, even where one wired in advance. Upon arrival at your hotel you are almost invariably confronted with the stereotyped information, "Nothing vacant." At the suggestion of an ingenious fellow traveler, however, I succeeded in surmounting this difficulty. Upon entering a hotel I would approach the hotel clerk and offer to lay him a small wager he did not have a vacant room. In almost every case my bet was accepted and, strange to say, I always lost.

A spirit of optimism for the future characterized the commercial atmosphere in Germany, particularly among the rice millers. At the time of my visit, due to the low value of the mark, the importers were interested only in the cheaper grades and screenings, the other grades being practically prohibitive at prevailing exchange. Pre-war imports in Bremen were approximately 300,000 tons annually, and into Hamburg about 500,000 tons for table use and 130,000 tons for manufacturing purposes.

Upon my arrival in Holland I found a quantity of rice being held by the Dutch government and sold at fixed price, lower than could be obtained by the millers for import into Holland. The export of rice was prohibited except "in transit." Regulations created during the war for the handling of rice were still in existence, but indications pointed to early changes, making possible open competition among the dealers.

The situation in Belgium was on about the same plane as Holland. The old-established mills in Antwerp seemed to be moving slowly, advisedly, and with a spirit of uncertainty as to the future. The newer concerns who had entered the rice field appeared to be doing the business. France appeared to be transacting a nice volume of business with her colonies on the very cheapest grades and screenings. In Marseilles there were 12,000 tons of Saigon No. 2 in the hands of the government, selling at an average of 140 francs per hundred kilos, whereas the importer's price was 275 francs per hundred kilos; exportation of Saigon rice being prohibited. France is not a large rice consuming country, buying largely for manufacture or re-export.

Italy grows a native rice of its own in the province of Lombardia. The rice supply in Italy is under government control, the maximum price for same being 105 lire per hundred kilos. The duty on imported rice is 11 lire per hundred kilos. Trieste, now an Italian port, was at the time of my visit there receiving rice from the Italian government at a cost of 105 lires per hundred kilos, at prevailing rates of exchange at that time. American-grown rice would have cost them about 400 lire per hundred kilos.


Weighing and sacking California rice

Spain is a large rice-consuming country, growing abundant rice in the Valencia and Taragona districts to meet its internal requirements and the consuming needs of its colonies. The sun-kissed hills of Valencia remind one very much of sunny California.

In Switzerland, on my return trip, I found the government the only possible purchaser of rice, as at the time of my arrival it was selling rice to the wholesale grocers at prices much below cost. Previous reports indicate the normal importations of rice into Switzerland to have been approximately 30,000 tons annually.

In writing this summary the writer has endeavored to give a brief general idea of conditions encountered in each market, and regrets his being unable to go into details on account of limited space. The one obstruction to business between the United States and Europe on rice or any other commodity is the unfavorable exchange. At the prevailing exchange rates in converting prices into European moneys, the goods become practically prohibitive. As exchange conditions become normal, which they are already doing in Great Britain as this is being written, I feel California rice will take its place in the cupboards of Europe, and the best efforts of the writer and his house are now and will continue to be devoted toward this end

The Geographical Meaning of "Direction"---A Subject Which Is Not So Simple As It Seems

By B. J. S. Cahill, F. R. G. S

DURING many years' study of the puzzling problems of world map projection, I have found that the quality known as "direction" is, in general, the least understood because it sounds so simple. The word projection itself sounds rather mathematical and people untrained in geometry will frankly avow their ignorance of the subject. The word "orthomorphism" has an almost metaphysical meaning and no one seems ashamed to admit profound ignorance here also. Likewise the term "scale," although quite familiar to men who can read a blue print, is admittedly rather technical to exclusive readers of black print. But the notion of "direction," meaning north, south, et cetera, why any child of course can grasp that. Now as a matter of fact there are many different and distinct varieties of meaning to the word "direction" when applied to maps and diagrams, or, for that matter, to the actual world itself, as we shall see.

The average real estate dealer in presenting a piece of property to a client will, nine times out of ten, place his little diagram on his desk in such a way that what is north on the plot is also north in the room. If in a strange place your dealer will first glance out of the window to make sure of his bearings and he will then place his diagram in what we may call its true orientation.

Now this is the local and realistic sense of "direction," in which a real estate dealer is necessarily an adept. It is his business to know the lay of the land he is selling.

But the engineer or architect accustomed to scale drawings and capable of thinking in the abstract, is quite indifferent to the real direction of north so long as it is indicated on his drawing. His sense of "direction" on a blue print is quite dissociated from the actual north of the room he is working in. Here, then, we have a second or abstract idea of direction on a plan, diagram or original map. In studying the pages of an average atlas we regard direction in much the same sense, except that we usually conceive the north as being placed at the top.

And this brings us to a fourth sense of direction, meaning that on this planet due north and south lie in the plane of intersecting meridians which converge towards and meet at the poles. And then we have a fifth sense of direction at the equator, where north and south directions do not converge but are parallel to one another and to the earth's axis and point to Polaris, the pole star, or, more accurately, to infinity. And here we might add angles to north and south at the equator and become merged in the plane of east and west.

Now regarding east and west it might readily be supposed that they indicated cross directions in the same sense as north and south. Strange to say, and I've no doubt to the surprise of many of my readers, the directions east and west are not right angled reciprocals of north and south, but contain a sixth intrinsic quality in that they lie in parallel and not intersecting planes; they do not converge to single definite points like the north and south poles, and, while traveling east or west on the equator, we turn neither to the right nor left; on all other meridians in so traveling we turn, in going east and west, either to the left or right in arcs of circles which get smaller as we approach their centers at the poles. This becomes very clear if the reader imagines he is at the north (flag) pole planted by the late Admiral Peary. If it is accurately placed, all he has to do is to hold the flag pole with the right hand at arm's length and walk around it, when he will be going due west and at the same time turning to the right on an arc whose radius is the length of his arm. N. lat. 89 deg. 59′ 59″, etc.

That one should walk due north or south over the earth in straight lines which nevertheless converge to two fixed points, or on the other hand that one can travel on lines that are parallel to the equator and yet curve away from it on arcs that get smaller and smaller, appear to be most astonishing paradoxes. Indeed they seem analogous if not distinctly related to the amazing concepts of non-Euclidian geometry, and the modern theories of the parallel postulate. The above paradoxical conditions suggest problems of Lobatschewskian hyperspace and Riemannian pseudo-space, which we shall not go into here other than to state that these problems both concern what is meant by "direction" and "geodesics" and prove how intensely complicated the problem may become as intimated at the outset.

To come back to earth, the explanation of the seeming paradoxes stated above is easy after all when we allow for certain illusions induced by the force of gravity which keeps the body at right angles to every spot on earth and induces mental confusion as to problems of absolute and relative direction. Thus to all intents and purposes a house fly walks independently of gravity. Let us consider the fly and the wheel fable in a new sense. A fly walking along the flat outer rim of a two-

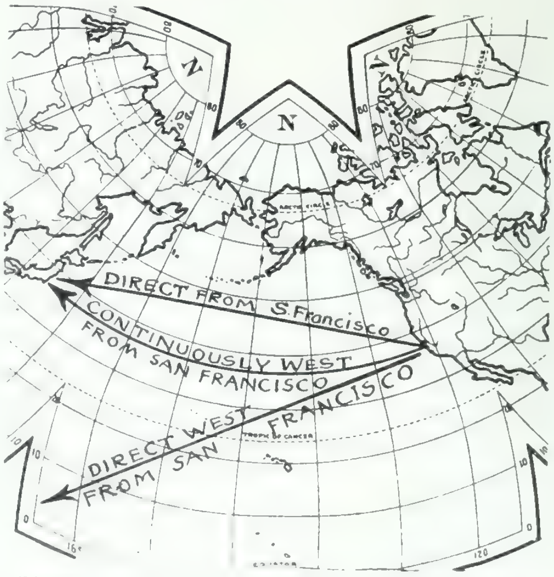

N
N
DIRECT FROM S.Francisco
CONTINUOUSLY WEST FROM SAN FRANCISCO
DIRECT WEST FROM SAN FRANCISCO
TROPIC OF CANCER
ARCTIC CIRCLE

Diagram showing directional paradox—upper curve is due west at vertex only, or about at its center; middle curve is due west all the way, and lower curve is due west only at the start.

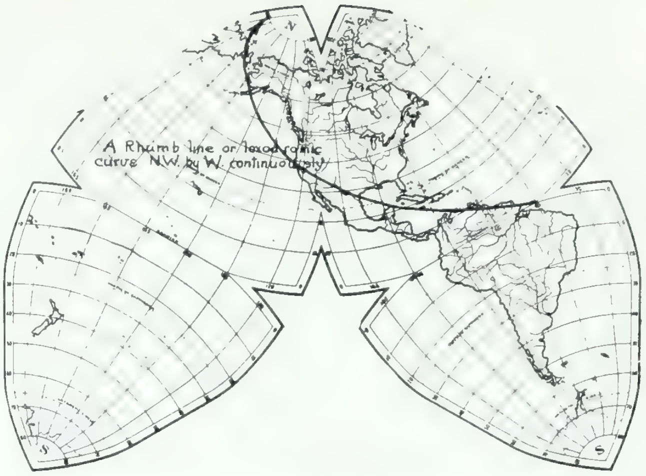
foot diameter wheel is going due east or west with respect to the axle, in the sense that the fly turns neither to the right nor to the left. But suppose the rim of this wheel has a chamfer or bevel on each edge set at an angle of 45 degrees. If the fly should walk on either of these bevelled edges it would kep turning to the right or to the left the whole way around and describe an arc in so doing whose radius would equal the square root of 2. If the fly should walk on the side of the rim it would walk in a circle whose radius was one foot.

To make still clearer why gravity seems to make us turn to the right or left in going due west or east, except at the equator, one can conceive a trench running along the tenth parallel of latitude south of the equator, somewhere in what was once German East Africa. If the floor of this trench slopes at an angle of ten degrees—that is, down towards the north, as it were, for drainage—and the north wall of the trench were at right angles to the floor and battered as if for strength, a man by walking squarely with the sloping floor and leaning parallel with the battered or sloping wall could very easily make progress due east without turning the least bit towards the right. Whereas if he walked erect he would have to bend slightly to the right all the time. On the same principle a man might go around the world due west at Peary's north (flag) pole, supposing that it was planted on a patch of smooth ice. But he could only do this without turning sharptly to the right by lying down on his left side with his feet on the base of the flag pole and an assistant pulling his body around on a rope, in which position he would be parallel with the leaning man in the trench or an erect man at the equator.

The problem of "direction" has further complications when we consider globes, charts and maps, or begin to deal in problems of mixed "directions" between due north and south and due east and west. For instance, I know for a fact that teachers of geography and even experts imagine that good "direction" on a map means that the top, bottom and sides of the atlas page must stand for north, south, east and west, respectively. This notion comes from the habit of looking at local or county maps or maps of single states or small countries. It is a sort of provincialism in geography and is eloquent of the lack of a really worldwide grasp of the subject.

Seeing that north is an actual point on the sphere, is it not absurd to expect that all lines leading to it should be parallel when we know they must converge, or that the top of the page should all be equally north.

Standing by the surf a mile or so below the Seal Rocks and facing the vast Pacific Ocean, it is interesting to Californians to realize that in going directly west you would eventually come to the coast of far-off Japan and pass a few miles north of Tokyo. If you were telling this to a visiting friend from the East you might explain this by pointing your cane at the setting sun, and at the right time of the year you would indeed be pointing due west. But it would be even more interesting to know that if you really followed the correct direction indicated by your cane you would certainly never reach Japan. You would, instead, finally fetch up somewhere on the big island of New Guinea, below the equator and nearly three thousand miles south of Tokyo! On the other hand, due east from San Francisco along a parallel of latitude would take one a little south of Lisbon, Portugal, but if you pointed a cane due east and followed in a straight line you would land eventually in Cape Colony, South Africa, five thousand miles south of Lisbon.



A loxodromic curve on a continuously northwest by west direction

This means that to go due west and reach Japan, or due east and reach Portugal, one must travel continuously due west or due east in a curved direction at right angles to successive meridians as they keep on converging towards the north pole. In other words, since the meridians radiate from the poles, to cross them all at right angles is to describe an arc of a circle.

Now putting ourselves by the oceanside once more, we note four distinct and different directions that seemingly should or somehow would finally reach Tokyo, which is due west. (1) We go due west from where we stand and go all wrong, or (2) we follow a parallel of latitude and reach Japan by a long, round-about curve. Before the art of navigation was perfected and before steam was invented, this was the surest, though not the shortest, way. (3) The third direction will take us straight over the ocean towards Tokyo, but we must start out several points north of due west and keep traveling north of west, but less and less so until about half way, when we shall reach the vertex of our course, sail due west a short space and begin to go south of due west and then more and more so, continually shifting our course, yet sailing neither to the right nor to the left and in a perfectly straight line. This is the great circle course, which is so much more direct than the constant compass course that in an air trip from Panama to Yokohama it means a saving of one thousand miles in distance alone and a practically all-land route around the margin of the Pacific instead of an all-water route across its center—a matter of immense importance from a merchant's or an aerial pilot's point of view.

A fourth direction would be indicated by pointing a cane down into the ocean so that if extended in a Euclidian straight line, forming a cord to the great circle arc over the ocean, it would emerge from the earth's surface at Tokyo and would indicate the really shortest line of all.

Now three of the above four lines of direction lie in the spherical plane of the earth's surface, the fourth goes below in the same vertical plane as the third. If the direction of a pointed cane be taken literally in each of the first three instances, the direction would not curve around the sphere but shoot off in a tangent above and away from the earth's surface. Thus it turns out that "direction" from San Francisco due west or to Japan has three courses around the surface, and in the same planes three courses through the sphere (cords) and three courses up and off the sphere (tangents). So that we finally get nine senses of direction developed by a man on the seashore showing a friend the "direction" of Japan!

Even more baffling is this question of direction when it is not due north and south or due east and west, but mixed or oblique. Thus if an airship sailed from San Francisco a few compass points north of due west and kept on going in the same compass direction of west by north, it would go round and round the world many times in one gigantic spiral, finally landing at the north pole.

Seeing that this oblique course is a series of diagonals connecting the corners of diminishing rhomboids (any uniform spacings of latitude or longitude), this spiral is called a rhumb line, or, more scientifically, a loxodromic curve (Greek for oblique course). It is the correct course for a sailing ship keeping constantly to a given oblique compass direction. If we had some wonderful kind of rifle that would "shoot round the corner" like a boomerang, we can easily realize how hard it would be to hit a target with such a gun. How difficult, then, it must have been for a rough, unlettered mariner to lay a course that would reach a given destination when this curve was always changing on itself and was different from each point of compass and at every port of departure!

Now it is easy to see that if a chart could be devised in which these complicated accelerating curves could all be correctly made into straight lines, all that the mariner would have to do would be to rule a straight line on this chart, connecting his port of departure with his port of destination, and note the angle this line made with the meridians (also reduced to straight lines), and that would give him his correct compass direction, in which, if he continuously kept his course, he would be sure to reach his destination, after allowing for winds, currents and the variation of the compass.

Now it is extremely important to know and thoroughly realize that this was the sole end and purpose of Mercator's chart, to straighten the loxodromic curve. It was the supreme need of that day, when civilization had left the Mediterranean and North Sea and was reaching around the world. Mercator's chart, published in 1559 and perfected by Edward Wright of Cambridge University in 1610, was solely an instrument of navigation and as useful for that purpose as the mariner's compass.

As regards scale ,the shape of the continents or the short line between points Mercator's map had no concern whatever. Every map quality was ruthlessly sacrificed to the sole end of showing true compass direction, which it does with a mathematical certainty and a rectilinear simplicity that deserves the admiration and gratitude of all mankind.

Now we have seen how the constant route which is a spiral on a globe or conical map is not the short route, although on Mercator's chart, being developed into a straight line, it appears to be. On this chart the short route becomes a curve again, almost as complicated as the loxodromic one it sets out to straighten. But there is another projection whose sole and only usefulness is to show the shortest routes or directions all over the world, also in straight lines. This is called the gnomonic chart and it takes several of them to show the whole world. Like Mercator's, it achieves its sole end with mathematical perfection, but its scale and form distortions are worse than on Mercator's map or even Mollweide's, which again sacrifices all other map qualities to the one end of correct areal equivalence if not absolute areal exactitude.

In conclusion, we summarize the matter of "direction" on maps under the following heads:

(1) Direction is a relative quality identical with lines of latitude and longitude and having no connection with the marginal boundaries of the world map.

(2) Mathematical perfection in any one kind of direction is only obtainable at a sacrifice of all other qualities.

(3) North and south being fixed points, the meridians meeting them should be converging lines.

(4) The equator and all meridians being great circles should approximate straight lines and should cross each other at right angles.

(5) All parallels except the equator being arcs of small circles should also be arcs of circles on the map.

(6) Their curvative should be least at the equator and most at the poles.

(7) They should curve uniformly towards the north pole, north of the equator, and uniformly towards the south pole south of the equator.

(8) A straight orthodrome is of much more importance than a straight loxodrome, seeing that compass navigation is almost obsolete, whereas world travel by power other than wind is only in its infancy.

The Butterfly Map conforms to all these conditions, notably as to No. 8 (the "Japanama" problem, etc.), far better on the whole than any other world map published.

CATTLE FOR BELGIAN GOVERNMENT

A LARGE and regular movement of cattle from this country consigned to the Belgian government has been recently started and will continue throughout the greater part of the year. It is understood that these animals will be used to replace war losses. They are to go by way of Boston to Antwerp, by the Swiftsure Line of the France & Canada Steamship Corporation of New York. The consignor is P. Burns & Company of Calgary, Canada. Shipments will be made from Northwestern Canada, Kansas City and Chicago direct to the large stockyards of Mayer & Lage at Watertown, near Boston.

Between 3000 and 4000 head will be shipped each month, and a number of large ships, including some ex-German craft, have been allocated to the work by the United States Shipping Board. These will take in coal cargoes at Norfolk and Baltimore and proceed to Boston for their live freight. All of the cattle will be discharged at Antwerp, the coal being taken off both there and at Rotterdam.

In connection with the movement of the cattle it is interesting to note that the Mayer & Lage yards, which can accommodate 4000 animals under roof, were installed primarily to facilitate the shipment of horses by the tens of thousands to the French army during the war. The present instance affords a good example of the effective use of war equipment and facilities for reconstruction purposes.

The Professional Traffic Manager

By Lewis E. Stanton

FOREIGN TRADE of the United States, particularly that which moves through the port of San Francisco, confined to a very few concerns before this country entered the world war, has, since our entry, expanded largely, so that the number of firms engaged in the business is now numbered by the score. The cessation of hostilities saw fully twenty times as many importers and exporters as ever before, and that number has again increased in the past year.

Difficulties of finance, tariff, regulations of the Internal Revenue Department, regulations of the rail carriers, all have been foreseen and overcome, to very good effect on business generally, and with consequent favorable influence on the foreign trade.

Curiously enough, the Freight Forwarder and the professional Traffic Manager, both, have had their part in this general expansion. The Freight Forwarder has found that it is not enough for him to consolidate cars for movement in either direction; he must be willing and able to take care of the customs requirements for the smaller shipper, who cannot afford his own private export department, and, failing exact knowledge of his own toward the rules, regulations and rates of the ocean and rail carriers, call in the professional Traffic Manager for correct and proper information as to all the conditions to be observed, regulating the movement of the particular commodity at hand.

Increasing steadily is the number of concerns which cannot afford, or which are not big enough financially, or which have not sufficient business, to justify the expense of a traffic department all their own; and my opening remark about the increase in foreign trade can be taken as having large relation to the increase in the number of the smaller concerns, from the fact that, through the Freight Forwarder in some measure, but in much larger proportion through the professional Traffic Manager, such smaller broker or merchant has access to the same quality of information as his larger competitor. Indeed, it is not unusual for the Traffic Manager with a number of clients on his books to be able to handle a much wider range of business than can be taken care of by the traffic department of a large mercantile establishment, as the professional one must, from the very nature of his clients, anticipate demands for information covering a much wider range of subjects between much more widely distributed points, and under more varied conditions.

In this office we have tariffs covering hundreds of commodities and the rates thereon from practically all ports in the United States to nearly all ports in the world; and several hundred tariffs of the railroads in the United States, which latter cover all but a very small number of inquiries we daily receive, or can possibly anticipate. Our business is the natural outgrowth of the many years spent in the service of transportation companies, where we formed the opinion, now justified, that the smaller merchant, who could not afford a traffic department of his own, would gladly become a subscriber to our bureau at a smaller monthly fee than he pays his office messenger. We are glad, at all times, to receive calls from subscribers, as well as prospective clients, and let them "see the wheels go round."

Deep Waterway From the Great Lakes to the Sea

MEMBERS of the United States Great Lakes-St. Lawrence Tidewater Association and of the Canadian Deep Waterways and Power Association are actively co-operating with commercial organizations and business men in Ontario and in Western Canada in the work of continuing and arousing interest in the movement to deepen the necessary waterways between the head of the Lakes and the Atlantic Ocean, so that large steamers may proceed from Lake Superior ports, through Montreal, across the Atlantic without break of cargo.

On January 24, 1920, the Fort William and Port Arthur Grain Exchange, Fort William, Ontario, went on record as being strongly in favor of the plan. The secretary of the exchange, Mr. Charles Birkett, in a paper prepared for a convention at Winnipeg, names the following outstanding advantages that would accrue to the grain trade of Western Canada in general and of Fort William and Port Arthur in particular: (1) Reduction of freight rates; (2) elimination of transfers of grain; (3) elimination of shortage of grain in Eastern elevators; (4) retention of identity of grain shipped; (5) elimination of shrinkage and resultant reduction in quality; (6) elimination of delays to shipments; (7) nondisturbance of grain after final inspection at Fort William and Port Arthur.

Mr. Burkitt elaborates these advantages as follows:

Reduction of freight rates.—At present, owing to the fourteen-foot depth limit on the canals, the maximum cargo that be shipped by water from the head of the Lakes to Montreal is 110,000 bushels. Consequently, the great bulk of the grain shipped from Fort William and Port Arthur during the navigation season is carried east on large steamers as far as Georgian Bay only, where it is transferred either to small canal steamers or barges for trans-shipment to Montreal or to cars for transshipment to the seaboard. An important saving on freight rates could evidently be effected if large steamers could proceed direct to the sea.

Elimination of transfers of grain.—The present practice of transferring the grain at Georgian Bay ports and at Montreal necessitates five transfers. Four of these transfers would be eliminated could the vessel load at the head of the Lakes and proceed direct to Europe. Moreover, the grain would be delivered in better condition because so much transferring breaks the grain kernels. Transfer charges would be saved, also insurance charges at the Eastern elevators.

Elimination of shrinkage.—At present, from a majority of the steamers discharging cargoes at the Georgian Bay ports, shortages occur. The shortages happen, for the most part, at the eastern elevators, where the equipment and weighing facilities are far below the standard of the weighing facilities at the head of the lakes. The correctness of the weights at Fort William is generally acknowledged by the grain trade. If, therefore, these eastern shortages could be eliminated by direct shipment to Europe, the saving during the crop year would be enormous.

Retention of identity of grain shipped.—At present an English importer or a farmer in the Canadian Northwest cannot be sure of the identical grain that is bought or sold. The elevators in Eastern Canada or in Buffalo have a right to destroy the identity of a particular shipment by binning it with other grain of the same alleged grade.

Elimination of shrinkage.—Elevator superintendents state that of every thousand bushels of grain transferred from the boat to an elevator or from an elevator to a freight car, an average of thirty pounds is lost.

Elimination of delays to shipments.—Grain is often held in eastern elevators awaiting the arrival of ocean steamers. Congestion in eastern elevators soon makes itself felt in the grain business, not only at the head of the lakes but also at points in Western Canada.

Final inspection at head of the lakes.—The final inspection on the grain from Western Canada is made when the grain is shipped from Fort William and Port Arthur. Irrespective of the number of elevators in which a given parcel of grain may have been stored, irrespective of the number of steamers and cars the same parcel of grain may have been in, and irrespective of the probable mixing of said grain in transfer and in transit in Eastern Canada, the inspection certificate issued by the Dominion government at Fort William follows the grain to its final destination in the European market. Consequently, the inspection certificate quite often does not coincide with the sample of grain received, and the result is a disgruntled English importer, with a resultant injury to the grain trade of Western Canada. The Canadian certificate grading the grain would carry much more weight abroad could the identity of the grain be safeguarded by more direct shipment.

Grain can be grown much cheaper in many other countries, such as the Argentine Republic, India, Australia, Russia and Roumania, than on the North American continent, where land and production expenses are ever increasing. To compete with these other countries, North America must, therefore, eliminate every unnecessary tax on the handling of its grain. For this purpose the means now most apparent is the completion of the above-mentioned deep-waterway project.

AMERICAN MACHINE TOOLS IN THE DUTCH EAST INDIES

AMERICAN machine tools are rapidly gaining an enviable reputation in this market. One of the largest and most successful machine shops in Soerabaya is completely equipped with modern American machine tools and is securing an abundance of orders for shopwork which, it appears, it is able to fill more satisfactorily than any of its competitors. It is announced that this concern has recently been awarded the contract for the iron and steel work of a new government railway terminal at Tandjong Priok, the port of Batavia. This speaks well for the Soerabaya shop, with its American equipment, in view of the competition of Batavia firms located so much nearer the work—Commerce Reports.

Shipping Board Freighter loading overseas' freight at Chicago

Building Quality Markets Abroad

By Charles E. Jennings

President, C. E. Jennings & Company, and Ex-President, American Manufacturers' Export Association

> **"I have never expected to open a market after the manner of a tin of sardines — I know of no key that can can be used to expose the whole market all at once. I do not think that such keys exist. It is a matter of years and not of months, and I sometimes marvel at the rapid action which some firms expect to get—and never do get."**

THIRTY-SEVEN years of selling in most all of the countries of Europe, in Mexico, Cuba and Canada, have taught me these outstanding principles:

(1) That a permanent and satisfactory foreign market is not to be had on other than a quality basis, and that it is a waste of time and money for an American manufacturer to endeavor to sell **on price.** In such a case it is only a question of time before the home product is reduced below the American standard of quality and the market is lost. The first firms abroad that I sold to nearly forty years ago are still among my best customers.

(2) That any effort to "flood" a market, to exclude the native product, or to disparage the native goods by comparison, arouses an antagonism which eventually makes it difficult to sell at all.

(3) The very best advertising is a distinctive trademark on the article itself. If that article is always good, that trademark will be a standard of quality and will say more for itself than you can possibly say about it.

From all of this it will be gathered that I am wholly opposed to the notion of treating the foreign market as something which may be exploited or "captured," to use the term which was so common a little while ago. On the contrary, I regard the foreign precisely as I do the home market—that is, as a place in which goods, if they are of a sufficiently fine quality, can be sold on the merit. A considerable number of American products, especially those involving ingenuity of design and expertness of workmanship, are better than any similar products in the world. Other articles which do not involve any particular ingenuity cannot be made here better than they can be made abroad. And finally, there are products in which the foreign manufacturer leads. The first class of goods we will legitimately export. The second class we can expect to export in emergencies, but not regularly. The third class we may expect to export at some future time when we can make them as well as does the foreigner.

Following this general thought and not otherwise can we trade abroad without entering into unpleasant competition and without arousing ill feeling.

Take my experience. Although our tools are sold in almost every country, we do not carry a **full line** in any foreign market. We send out a full catalog, but we supply to and emphasize in each country only those tools which we have demonstrated we can make better than those which are on sale in that market. For instance, we wili not send plane irons to England because they make them there as well as they can be made anywhere in the world, and the English beech is the best wood on earth for a plane body. The English makers would resent our competition in plane irons. The position that I not only like, but which also I think in the end makes for the best business, is to stand back and say in effect: "There is only one reason in the world to buy these tools and that is because they are better than yours. Do not take my word. Try them and see for yourself."

A merchant in Liverpool one day protested very bitterly to me that it was unfair to send American tools into the English market and said that he preferred to buy British-made tools. I answered: "Why do you buy them? They are more expensive than British tools, there is no attempt to cut the price, they are not sold on a price basis. Why, then, do you buy them?"

"I suppose," he replied, somewhat ruefully, "it is because people come in and **ask** for them and I have to carry them."

It was adventure and a craftsmanly desire to demonstrate that my own tools would do what others would not that originally took me into the foreign market. I had always liked to travel about and observe people—in fact, as a boy I had wanted to be a student rather than a man of commerce. I liked to travel, finding out what people were doing, what they were using, and getting their ways and manner of thinking. Inevitably I had to notice what kind of tools the workmen used and this led me into the shops to buy samples, and compare and try them out with my own. I found that the finish we put on our tools was better than anything that could be found abroad, that our designs were more graceful, and that wherever ingenuity entered into a design our tool was more economical of labor than was the foreign tool.

The best foreign tools are made in England. They put in sound material and good workmanship, but they do not achieve our standard of finish and their designs are all very old. It is really extraordinary how an English manufacturer will cling to a design. It is the hardest thing in the world to cause him to improve even in the smallest degree.

The quality of German tools has always been very poor, with a few exceptions. I have often argued with German merchants that it was a disgrace to sell some of the tools that they did. I have never found myself afraid of the native manufacturer taking my ideas and designs and then making so good a tool as to drive me off the market—in fact, I have taken the other tack and counselled improvement when I could. I have praised the honesty of the English and the French tools, tried to point out in certain cases where they could be improved, and always insisted to my former German friends that they were short-sighted in sacrificing quality to price. No one making a quality product can be other than pleased to see market standards raised. For raising standards means that people will buy solely on quality, and price will cease to be important. If anyone is afraid to sell in a **quality** competition, then he should not sell at all.

When finally, after many tests and comparisons I decided to sell in the European market, I did not sneak in through an open back door, but went straight to Sheffield, which is the home of English tool making. I picked out the tool merchants there of the greatest reputation, obtained a proper letter of introduction, and after a purely social visit of a day or two, introduced them to some of my tools and explained certain special features in the manufacture. I asked the merchant if he would import these tools if in actual use they proved to be better than any tools he had ever sold. Of course, he consented to that at once. Then we gave the tools to an expert mechanic in his employ to use for a few days. I said:

"Be fair with these tools. Give them the hardest possible use that you know how. I shall be back in a month or so."

When I came back we called the man in and asked him for his opinion. He was the kind of workman to whom a tool is not just a piece of metal.

"It is far and away the best tool of its kind I ever had in my hand," he answered, "and I have used all of them."

The merchant was, I think, surprised—perhaps he had not taken me seriously. He thought I was talking in the proverbial manner of Americans, although I had given him no reason for such a notion. But he was still more surprised when I said to the workman:

"Try out these tools for a year. I shall be back next summer and have a talk with you."

I was in no hurry. I wanted a conclusive demonstration or none at all. When I came back in the following summer the workman and the tools were fast friends. The merchant did as he agreed to do and made up a large order for these tools to be executed through a London commission house.

I never personally take orders. Especially in the European market it is not good practice for the head of the firm personally to engage in selling. They do not understand over there anything of the dignity of salesmanship in the United States. It is better for a company officer to follow the practice of the country and preserve a certain aloofness to demonstrate that our company had something that the foreign merchant ought to buy and then let others take the orders. I have never made any attempt to touch the consumer—only to sell to the jobber — and they import directly from our factory in America, or have their orders executed through an American or London commission merchant.

Having opened in Sheffield it was an easy matter to introduce the tools into the finest tool houses in London, Manchester and Glasgow. The procedure was to ask the head of the firm, after proper introduction, where he bought his tools. If he answered "Sheffield," then the way was wide open to remark, "We sell from the United States to Sheffield. Why do you not buy directly?" That gave the opportunity to demonstrate by a test that our tools would do more work and better work than any other tools—than any tools made in Europe. It was never at any time necessary to discuss price. We wanted to and did have our prices so much higher than the market as absolutely to prevent the slightest possibility of a sale on price comparison. I hold it important not to mix price and quality, for then you lose the immense advantage which comes from establishing a standard.

It is very difficult for an agent taking orders to establish standards. He cannot get on a level plane with the prospective merchant purchaser. The head of the American house or an important officer of the company who seems to be traveling around and enjoying himself and only incidentally looking after business is in a position to treat on the necessary basis of social equality. In England and in an even larger degree on the continent, the important merchants like to keep the social atmosphere and they resent the pushing and bustle which are so often found in the American agent. Another point on which care can well be used is the spending of money. I could not personally think of making traveling an excuse for spending money solely to produce an impression. But the foreigners rather look for this sort of thing in the American abroad. One does not need lavish expenditure of money to sell a good product. I have usually traveled with some member of my family in the quietest possible sort of a way without extravagance, and I have always been very well received wherever I went. I tried to go with and not against the currents of society and never under any circumstances made any excessive claims for, or indeed brought up, the subject of our own tools as an affair of paramount importance.

For instance, in the largest tool house in Petrograd they had hanging up a great number of the peculiar type tools that the Russians like. Some were of German and others of English make. We talked about tools. I said that we sold tools in Sheffield—in the place where those English tools were made. The head of the house asked me something about prices. I gave him some prices and immediately he said:

"We can buy very much cheaper than that."

"Of course you can," I answered, "but we do not try to make cheap tools. Just have one of your men take the hardest piece of wood that you can find and try out ours against all of the others. That test will show you why we charge more."

The Russian buyer made a test to convince himself, but found the German and English tools of the same type failed when subjected to the test in hard wood and he made up a liberal order for our tools to be executed through our Hamburg agents. That began a large trade in Russia which we handled through the importing houses of Hamburg.

Down in Milan I noticed that they made beautiful furniture and used a great number of special tools for this purpose. I found that most of these tools were made in France, so I bought a dozen of them in assorted sizes, brought them home, had them tried out with our own tools, and in the next year entered into a little quality competition with the Italian and French manufacturers. Then we were in Italy. I did the same thing with ship augers and other tools in Norway, and designed special handles for chisels that were to be used by mechanics. Most of those merchants were buying their tools from England. We had the unusual argument that we sold in Sheffield and through Sheffield and London to the English colonies, to the Strait Settlements, and to the Orient. Why not buy their supplies directly from us?

There is an idea that quality goods are out of place in the Latin-American countries and that there the appeal should be to price. That is not my experience. Most of these countries work in hard woods and hard woods require first-class tools. Cuba requires the finest kind of tools for its woodworking. So does Mexico. We have large markets in both of these countries.

Some years ago I spent six weeks in the City of Mexico, where all of the trade in tools was in the hands of somewhat high and mighty German agents who had travelers out all over the country distributing. At that time there was a disposition to boycott American goods because some of our exporters who never export had been making rather loose speeches about going down and taking all the trade. They take these dinner declarations somewhat more seriously abroad than we do here. I talked to the head of the largest house. I asked him if it was his intention to handle only German goods. I had previously noticed that he carried in his stock both English and German tools. He answered: "I shall sell anything just so long as it is good."

An Argument That Always Carries Weight

I remarked incidentally that England and Continental Europe were our largest markets and that it seemed useless to go across the seas for what could be had so much nearer home, and then I suggested that one of his young men try out some of our tools.

He held the little competition I asked for, and before I left he wanted to give me a very large order and I told him that, although I did not care to take any orders in person, I would make a memorandum and see that the goods were properly transmitted through his New York commission house.

I have never found it advisable to set up agencies of our own and I think the circumstances would be most unusual where such procedure could be followed with profit. There are two reasons for this: The first is that an American agency managed by Americans will often tend to arouse hostility unless the article sold is something which is not made at all abroad, as, for instance, cash registers or bookkeeping machines. The second is that the extension of credit to local buyers in almost impossible for an American to grasp; he will have to rely upon a foreign employe and that employe is not going to exercise the same diligence as if he were himself responsible. I should rather thoroughly convince a reputable foreign house of the advantage of selling the goods, have them buy outright, if necessary send one of our factory experts to assist them, and let them take care of all consumers' credits.

For selling to Russia the Germans had a credit machinery extending to the small man which could hardly be equaled by any outsider. The native is the man to handle credits—if he is also responsible for losses.

Selling to our agencies the matter of credit causes no concern. We have never selected other than the highest class houses and to them we give whatever credit terms they desire. I never have had a credit loss among them in all the years of selling.

It might seem that this treatment of a market through the native firm is out of touch with modern methods and would result in home-made goods being pushed to the exclusion of American goods. I have not found that to be the case, largely because we have never sold upon the price competitive basis and have never pushed into a market with any article that was not better than anything on that market. The extent of the lines offered in the various countries differs widely always with the thought paramount that the good will of that market is an asset to be conserved. It never pays in foreign or any other kind of selling to take all that there is. Leaving something for the other man is both common sense and good business.

The personal touch which goes to making the native salesman quite as anxious to sell as would an American was, up until the war, obtained by the holding of annual conferences. In either London or Paris, I had a meeting for a day or two and a dinner with the English and French representatives, and another similar conference at Hamburg and at Berlin for the Continental houses other than the French. At these conferences I explained the tools in the catalog, went into new tools that had been brought out, and generally tried to discover what, if any, troubles were on the carpet.

The meetings I attended were about one-half business and one-half social and were designed as much to create a good feeling among the people as to stimulate their salesmanship. On several occasions we managed to have sections of the selling force over to the American factories in order that they might know every detail of the work and learn exactly who and what we were at first hand. This sounds like an expensive proceeding, but since most of our agents also handle other American lines of a non-conflicting nature, the expenses of conferences are not so large as might be imagined.

In their ways of selling we have left the foreign men to their own devices and have not attempted to introduce American ideas. We simply make sure that they know full well how to demonstrate what the various tools will do and therefore will make a sales point of quality and not of price. The only danger that we have had to guard against is the salesman who does not know the goods and tries to sell a high-priced article without knowing why the price is high.

All of this takes time. I have never expected to open a market after the manner of a tin or sardines—I know of no key that can be used to expose the whole market at once. I do not think that such keys exist. It is a matter of years and not of months, and I sometimes marvel at the rapid action which some firms expect to get—and never do get. It is a slow process to have people convinced that what you sell is the best; they will gain that conviction largely by word of mouth—one man who is pleased with a tool will tell another man and so the chain builds up. And even the making of contracts with agencies is no affair of a day or so; the agent wants to know all about you by having you, as a rule, live with him for a week or two, and then when he finally does get around to the contract he will usually insist upon some long, cumbersome document drawn up by a solicitor. They like to moke slowly, reflecting before each step—but once the decision is made it is for all time. An urge to haste only serves to make the average European suspicious—he thinks that you are trying to "put something over" and get away. Which is exactly the attitude above all that must be avoided if the best kind of trade is to be had.

Building on quality makes the trademark a vital thing. The mark selected should be one that cannot easily be imitated (we use an Indian arrow head) and which will be distinctively American. I have no patience with trying to deceive a foreign buying public into the belief that they are buying native-made goods; I want them to know that they are buying American goods, and I want the quality to be so high that they will be compelled to admit that the American goods are the best obtainable.

This is one of the reasons that I, in common with every other reputable manufacturer, so bitterly resent the sending of poor American stuff to foreign lands. One bad shipment by an irresponsible manufacturer hurts the sale of every American article on that market. Nothing is more important to our trade than the preservation of exact standards.

Does It Pay to "Raid" Foreign Markets?

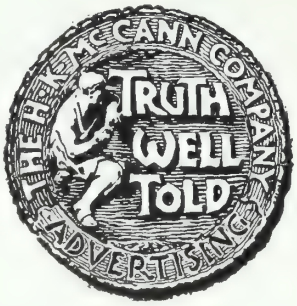
But after all, it is the big home market that we have here that counts—which permits us to gain a volume of production that admits of comparatively low labor cost in spite of high wages. The home market is paramount, but on the other hand I do not at all favor mere sporadic excursions into foreign markets to dispose of surplus stock at lower than the home prices.

That is really bad business; the people at home ought to have all of the price advantages possible. The big use of the foreign market is not in the way of taking off surplus stocks, but in preserving such a well-rounded field of sale that when the home market falls off during a depression the foreign market will pull enough to keep the factory on full time.

That happened in 1907; the home demand all but ceased, but our foreign orders were large enough to keep the plant going at nearly full time. Indeed, during the whole thirty-seven years that we have been selling abroad, we have been able to run our plant on a full twelve months' basis, year in and year out, and although we do not guarantee our men fifty-two weeks of work we could do so. We are absolutely out of the seasonal class. And this is one of the reasons we have never had what is known as labor trouble and that today we have men whose grandfathers used to work for us.

Printed here through courtesy of "System."

Trade Marks for "Brain Power" Secure Protection



It is now possible to secure government registration and protection for an emblem or business badge of a concern which sells brain power or "service" as distinct from a commodity having the physical attribute of merchandise.

Forwarders, shippers and others offering transportation facilities have in the past made many futile attempts to register their emblems as trademarks in the United States Patent Office. The Commissioner of Patents has been steadfast in supporting the Examiner of Trademarks, who held that only insignia applied to articles of trade and commerce might secure the benefit of Uncle Sam's registration. No matter how valuable a "service," or how much brain power was given, it was not deemed that such functioning was capable of being tagged or marked by a sign of origin. Thus, a wide field of endeavor, having for its product a "saleable" service or responsibility, has found itself without the same protection for its badge of integrity as accorded a canner of beans or a manufacturer of monkey wrenches.

The issuance, after a prolonged hearing, of a formal Federal credential authenticating the use of the emblem embodying the words "Truth Well Told" by the H. K. McCann Company, advertising agents of San Francisco, is of utmost significance to those who offer the product of the brain as distinguished from commodities having customary physical form.

After being repeatedly balked at the Patent Office, the McCann Company directed its efforts to the Copyright Office at the Library of Congress. The successful plea was based on the fact that the Constitution clearly states that authors and inventors are entitled to protection for their products, and, inasmuch as the protection was refused by the Patent Office, an obligation lay with the Copyright Office to protect a class of marks in many instances very valuable. The McCann Company has just secured as the reward of its efforts the official certification of the emblem shown in the accompanying picture. The primitive hewer of stone, chiseling the words "Truth Well Told," was the emblem granted recognition.

"It is conceivable," Printers' Ink remarks in discussing the decision, "that some emblems in use by personal service organizations and kindred corporations which do not rise above the distinctive decorative stature of the average monogram or grouping of initials, may be challenged at the Copyright Office on the score of 'artistic quality' which is a requisite of admission. However, this attribute seems to have been conceded to the 'Truth Well Told' mark."

Of chief interest to the readers of Pacific Marine Review is the fact that a way is now open for certifying the mark of a transportation service or system of carriage. Similarly shippers, forwarders, brokers, commission houses, and all manner of concerns not engaged in manufacturing lines, have the way pointed to a new haven.

Of equal importance is the fact that the copyright entry is a more familiar form of trademark registration with which to win certification in foreign countries. Mr. Harrison Atwood, resident vice-president of the McCann Company in San Francisco, says: "Many foreign governments require proof that an identification mark shall have been formally approved in the country of origin. We have found great difficulties in securing the acknowledgment of alien authorities for our mark. With this new certificate of approval which has been granted, the method of securing foreign protection will be easier and more certain."

The Army Transport As a Commercial Asset

By Brig.-Gen. Frank T. Hines, U. S. A.
Chief of Transportation Service

THE Army Transport Service, as at present maintained and operated, is a very distinct military asset for the national defense. Army transports, during twenty years of peace-time operation, have performed invaluable maritime service for the government, service which it is felt could not have been furnished with equal expediency and similar costs by private lines. Their personnel at the same time supplied an invaluable nucleus for expansion during the late war which materially contributed to the successful operation of the emergency transport fleet. In fact, the experience of the War Department in the operation of its transport service since very early in the Spanish-American war has been such as to warrant a permanent continuation of this service as it existed before the world war.

The War Department desires, however, without in any manner departing from past customs of the transport service, or affecting in any way the performance of these duties for which it alone exists, to make the army transport in addition a commercial asset, and an actual aid, so far as its essential limitations will permit, in the development of an extensive and self-sustaining American merchant marine.

For this purpose, the War Department has recently petitioned for authority to carry aboard vessels of the Army Transport Service, under certain conditions, civilian passengers and commercial cargo. This action has resulted in legislation which is now being considered by both the Senate and the House of Representatives, the provisions of which will authorize the Secretary of War to permit the carrying of commercial passengers and cargo for hire on army transports, provided, however, that such usage shall be always subordinated to the established duties of the transport service as prescribed by law; that rates charged shall be in no case less than those of commercial carriers for similar service; and that no expenditures will be authorized for alterations of transports to better fit them for such service.

There is a general impression in shipping circles, perhaps not entirely unwarranted, that the delegation of such authority to the Secretary of War will have the result of placing the War Department in the status of a competitor with the merchant marine in the transportation of freight and passengers. Any such proposition, however, is entirely foreign to the purpose of the government, and would be at once inimicable to the best interests of not only commercial shipping, but of the War Department as well. The War Department, it may be emphatically stated, has no desire to, under any circumstances, enter into competition with the developing American commercial marine. It is actuated, on the contrary, by every desire to promote the best interests of both American shipping and American shippers.

A consideration of the physical limitations of the marine facilities of the War Department, as well as the restrictions which will always be placed on their commercial usage, will at once establish the impossibility of the army's ever becoming a material factor in general shipping.

The total gross tonnage of the permanent transport fleet, fifteen vessels, will approximate but 120,000 gross tons; the total commercial tonnage now under the American flag is roughly 15,325,000 gross tons. By comparison it will be seen that the total tonnage of the transport fleet is less than seven-eighths of one per cent of that of commercial bottoms. The legislation under discussion, however, distinctly prohibits the carrying of either passenger or cargo aboard army transports when such transportation will in any way discommode the carrying of government personnel and cargo. Past records indicate that army transports may be depended upon to normally make use of approximately 80 per cent of their capacity. Assuming, therefore, a liberal surplus of 20 per cent of capacity, it will be seen that the extent of tonnage available for private carriage is reduced to the negligible per centum of one and one-half tenths of one per cent of that of commercial vessels, an amount which will probably never be actually exceeded in normal operations.

Assuming operation under authorization for such transportation of commercial cargoes, the War Department would never be able, nor would it be its policy, to establish for any appreciable period in advance the exact amounts of freight which it might be able to transport on particular voyages. The army transports in their activities are essentially variable and irregular. They are diverted frequently from run to run, according to immediate military necessity, a feature which is alone an impelling motive for the maintenance of an owned transport service by the government. This lack of dependability, so important for normal maritime traffic, together with the impossibility of establishing advance bookings, will always serve to restrain the War Department, even if it so desired, from making an actual bid for the extensive carrying of private cargoes.

So far as passengers are concerned, it will be further recognized that the vessels of the permanent

United States Army Transport Mount Vernon transport fleet are small, slow and equipped with but the barest essentials for comfortable travel. They thus cannot compete with luxurious passenger liners, either in speed or accommodations, although any such transportation furnished to civilians would be, under the provisions of the law in question, at exactly similar rates. The new type of transport will, as a matter of fact, have strictly first-class accommodations for but eighty passengers. The War Department would be unable to offer bookings or even guarantee to have surplus accommodations for civilians aboard any particular vessel until at the most a few days before sailing.

It will be noted that the bill under consideration further specifically prohibits the expenditure of any funds for alterations to transports to better fit them for carrying private cargoes or passengers, a fact which significantly indicates the impossibility of extensively utilizing transports for purposes foreign to their proper duties.

These various restrictions and limitations will have the result of so effectively preventing the War Department from actively competing with established shipping interests as to apparently make the granting of such authority of little real value. Yet these restrictions are necessary in that they enable the broadening of the usefulness of the army transports only to the extent of actual demand, at the same time preventing any infringement on the legitimate field of private operation.

So far as finances are concerned, the War Department views the proposition from an entirely disinterested standpoint. The Army Transport Service has over a number of years established itself as a profitable governmental venture and its indisputable records show that its services have been consistently performed at less expense than could have been accomplished through private enterprises. The transport service thus in no sense depends upon any revenue which might accrue from such transportation for hire to enable it to make an effective financial showing. It is felt, however, that any revenue which might be so derived, consistent with the best interests of the merchant marine, would actually be a distinct profit and as such a lessening of the burden of the American taxpayer.

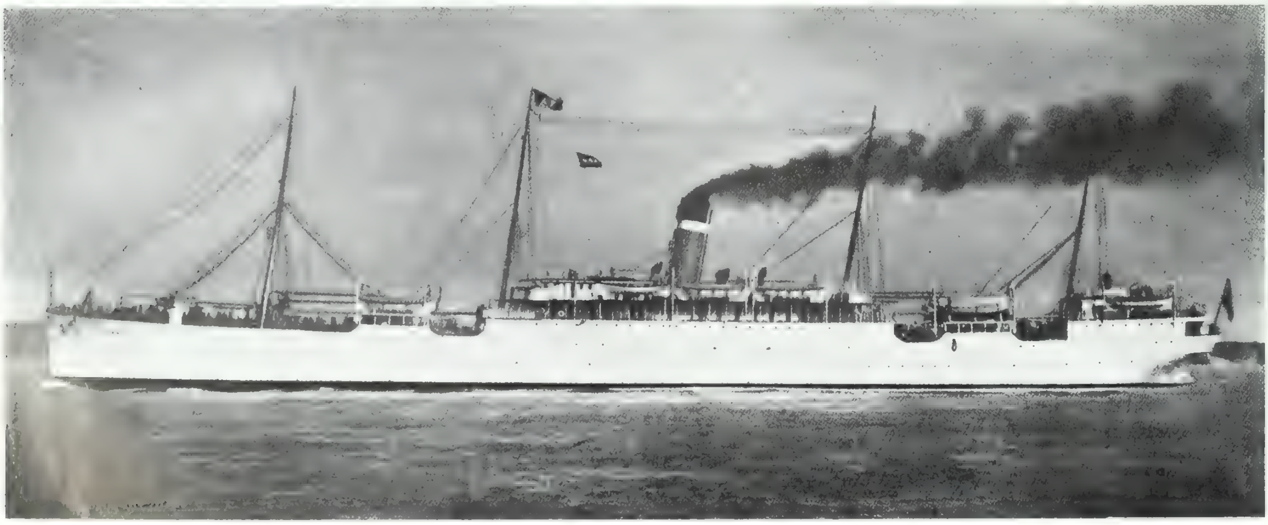
It will perhaps be interesting to note a few specific and typical examples of the many instances where the transport service, had it been authorized to carry private freight, could have performed valuable services without increased expense and at the same time without competing with private American ships.

Shortly before the late war the government was in urgent need of certain nitrate products which had to be imported from Chile. No American registry bottoms were immediately available for the purpose. The army transports Buford and Kilpatrick were therefore sent to South America for these cargoes. The transports sailed out in ballast, although at the time there were many tons of pig iron in New York which American exporters wished to deliver in Chile, and for which no ships were available. The revenues which might have been thus secured without additional expense would have paid for the operation of these two transports for upwards of a year, yet the operation itself was a distinctly profitable one to the government.

During the war, and immediately following the armistice, the Shipping Board allocated a number of ships for the transportation of military property and also of supplies for the American Relief Committee at various Mediterranean ports in the Levant. As army transports, these ships would normally, in the absence of government cargo, have been obliged to return empty to New York. For this reason many of them, while to all intent and purposes army transports, and provided for in the Mediterranean by the shore establishments of the Army Transport Service, were directly operated by private shipping agencies, and their commercial utilization for the westward voyage thus made possible.

Since there were no consular or private shipping representatives of American interests at Constantinople at the time, army officers by advertisements and similar methods were able to book for return to the United States on these vessels, which would otherwise have returned empty, more than twenty million dollars' worth of cargoes.

These ships were the first vessels flying the American flag and carrying American goods which had entered or left the Black Sea since the Civil War. The resulting prestige for the American merchant marine was certainly not inconsiderable, although had the present legal restrictions been modified to some extent, it would have been possible for the Army Transport Service to have cooperated with commercial shipping to a much greater degree without in any way interfering with its own operations.



United States Army Transport Sherman

During the recent and historic voyage of the Buford as the "soviet ark," this transport carried an army cargo to be discharged at Antwerp. While at Hango, on the Finnish Coast, a cargo of wood pulp was found to be awaiting shipment to the United States, a cargo which was urgently needed in this country and for which there was no vessel of any flag immediately available. The army transportation authorities were urgently requested to permit the Buford, which was returning to the very port for which this material was destined, to carry the cargo. On account of the existing restrictions, however, the transport was obliged to return to the United States in ballast, leaving the material in question to be brought over later under a foreign flag.

Such incidents may be considered as typical of the work which the War Department may be enabled to perform if this legislation is put into effect. The Buford in the latter case could have accomplished a distinct economic benefit without in any manner competing with the established merchant marine, at the same time lessening the expense of her voyage to the entire total of any revenue she may have derived from the transaction.

Considering the logical future effect of this broadening of the duties of the transport service, in the opinion of the War Department, one result will be that transports operating under commercially unprofitable but militaristically necessary schedules, will be enabled at times to carry passengers and freight under the American flag under circumstances where such services would otherwise be performed by foreign bottoms. The outcome of these operations cannot but mean a nurturing of American flag shipping until increased traffic warrants the expansion of private commercial service to care for such requirements. Once this point has been reached, the army transport must cease to be a competitive factor by reason of the superior facilities offered by private operators.

The trans-Pacific service has been and will probably continue to be characterized by greater regularity and stability than any other operations of the transport fleet. Transport activities on the Atlantic will shortly be reduced, for the first time since 1917, to less than those on the Pacific. With the completion of the return of American dead from Europe, the north Atlantic operations of the transports will amount to little more than the minimum routine work of supporting the small forces in Germany. The service between San Francisco and the Orient, however, will not only continue as before the war, but the older vessels in that service will shortly be replaced by the new standard type transport being built at Hog Island—8000-deadweight-ton ships with 2000-troop capacity. It will therefore be particularly interesting to shippers and shipping interests on the west coast to anticipate the logical result of the transportation of commercial freight aboard these transports.

Traffic between San Francisco and Manila has for years been considerable, yet at the present day practically none of it is being handled by American ships. It is therefore evident that such cargo as may be carried on transports between these ports could be at present in but very indirect competition with the American merchant marine. On the other hand, it is quite obviously desirable from every point of view to have a proper proportion of this traffic handled under our own flag. Insofar as the transports may be utilized for this purpose, they will actually be opening up the way for the establishment of a profitable private national shipping enterprise of sufficient size to handle the majority of the freight and passenger traffic between the west coast and the Philippines.

United States Army Transport Crook

That such a condition can and undoubtedly will be brought about under this policy may be better appreciated by recalling the situation in Porto Rico immediately following the Spanish-American war. At that time the traffic between the United States and Porto Rico was practically nil. The demand for American shipping had never been sufficient to interest enough capital for the establishment of a permanent service. Army transports were operated for a time on a regular schedule to the island, and were permitted, despite strong protests from private operators, to carry passengers and cargo for hire in cases of surplus accommodations. During the following two years commercial relations with Porto Rico were, as a direct result of these operations, so stimulated as to demand the establishment of a regular American-owned freight and passenger line. Such a line was established, and has since grown steadily until it is today one of the most profitable organizations of its size in our merchant marine.

It is significant, in the case of Porto Rico, to note that the scheduled operation of the transports was in no manner affected by the increased demands for ship space which they were so largely responsible in bringing about. The transport service had then, as it has now, a single "raison d' etre"—to meet the marine transportation needs of the army. That there was an increased commercial need for shipping in no manner affected the even tenor of the transport service; it had so much space surplus, and only so much, and any maritime business which it was able to develop above that point was necessarily not handled. The natural result was the creation of an actual economic demand for additional ships, a demand which was met, when it became sufficiently acute, by the organization of a private enterprise. Once this American line was established, the army transport ceased to be a competitive factor by reason of the very restrictions which prevented it from giving any definite premature assurance of sailings or available accommodations, and which at the same time prohibited it from furnishing such service at less cost than did the newly established commercial line.

It is along exactly similar policies that the War Department will administer any authority granted it for the commercial transportation of cargo in the Pacific. It therefore seems certain that any such operations of the War Department will in no sense handicap the merchant marine, but will on the contrary very directly aid in the early establishment of a self-sustaining private American flag service between the west coast and the Philippines, a service which will be without doubt most agreeable to all truly American interests, particularly those on the Pacific Coast.

The legislation under consideration has an effective duration of two years, on which basis it has the entire sanction of the United States Shipping Board. It is considered that the many features in favor of this proposition certainly warrant at least its temporary adoption. If, after having been given a fair trial for this period, it is found that through some now unforeseen situations this policy will not continue to be of actual benefit to shipping interests as a whole, the policy will, of course, be changed. In the meantime, however, since there is every reasonable indication of the desirability of increasing the scope of the transports along these lines, it does not seem that any reasonable or disinterested objection can be had to the passage of this bill as it now stands, and that the army transport will thus become, in effect, a not inconsiderable commercial as well as a military asset.

Russian Trade Conditions

By R. Martens

FIRST, whatever government is in power must have control of the railways or other transportation system; therefore the final sanction for the co-operatives to trade with the outside world must be given by the Soviet government. It is to my mind doubtful whether the Soviet government will permit direct trading without an actual acknowledgment of their government. The Soviet rulers are, strictly speaking, in a stronger position than the allied governments, for the reason that Russia as to food supply has always been absolutely independent of outside resources, and is at the same time the best market for the industries of the allies. Europe's first and foremost question today is how to feed her gradually starving population, and next, how to find a market for her mechanical products, so as to establish an "equal" trade balance. The United States, with all its well-developed industries, can never absorb any great proportion of European manufacturers. Russia's population is, primarily and principally, agricultural, the majority therefore self-supporting as to the prime necessities of life, whereas Europe's population is primarily industrial and urban, the majority therefore depending on a supply of the prime necessities of life from other countries. Europe is consequently at a disadvantage compared to Russia, especially at such a time as the present, when the food supply of Europe is over 50 per cent below normal, making Europe more than ever dependent on the granaries of Russia and more distant countries to sustain her life. In view of these facts, the Soviet government is likely to insist upon direct recognition as a condition precedent to trade.

Second, the co-operative societies of today are not a body separate and independent of the Soviet government, but part and parcel of the government; therefore by opening trade negotiations with the co-operative societies, the European governments in effect if not de facto, acknowledge the Soviet government.

But whether we should or should not trade with Russia, or whether we should or should not acknowledge the Soviet government, or whether Russia has or has not a surplus of food and raw material, are unimportant details compared with the main question: is it physically possible to trade with the Russian population? My reply is No, because the transportation system, never adequate, during five years of war became very much dilapidated, so that it was one of the primary causes of Russia's disastrous breakdown early in 1917. Since then, three years have elapsed, and naturally not in the direction of improvement. In fact, it is well known that such towns as Petrograd and Moscow, in spite of enormously reduced populations, are starving not because the Russian farmers have no food to spare, but because of the lack of transportation. If the country cannot supply the few dwellers of the town (representing today, roughly, 3 per cent of the total), how much less will the broken-down transportation systems be able to send goods to seaports for exportation? It is suggested, I presume by motor interests, that thousands of motor trucks could be sent to overcome the difficulty. But there never were good roads in Russia, and to build them would take longer and cost more than to re-equip the railway system.

Therefore, I repeat once more, Russia at large cannot today be a supplier of food and raw material, or a market for manufactured goods. In order to make her so in the course of two or three years, we ought today to concentrate our attention on the re-equipment of her railways as quickly as possible. But as the rehabilitation of the Russian railway system will require many years, owing to its enormity, work should also be commenced with the greatest possible energy on the improvement of Russia's water routes, and the simultaneous connection of her wealth of navigable rivers by canals, routes for which are already laid out. In this way only is it possible to open up the country for the importation of machinery and other manufactured articles, and to release thereby the surplus of grain and raw material, without which Europe at large cannot go on sustaining the life of the majority of her people and the manufacturing industries of her communities. If from failure to perceive and act to relieve the transportation crisis, Europe should suffer a financial and industrial collapse, the United States will lose not only the enormous sums already loaned to Europe, but also one of the most important of export markets, for Europe outside of Russia last year bought American products to the amount of $5,185,980,350 out of a total of $7,922,150,592, or 65.5 per cent. (Against a total import from Europe of $750,569,784, or a balance in favor of America about four and a half billion dollars.)

To prove that the transportation system is the crux of the whole matter, I need only refer to the conditions of other countries. Here in America, where there were, strictly speaking, only two years of war conditions, the railway systems have suffered severely, and delays and congestion of terminals have caused huge losses. What, then, of the countries that have been five years at war, and have had, over a longer period, scarcity of raw material, labor and money to equip or repair their transportation systems? England, for instance, is a country which was not affected by direct warfare, yet compare the Board of Trade figures for 1919 with those for 1913, the last normal year. These disclose the following position: Imports are down in quantity 30 per cent, but exports for 1919 were only 46,104,000 tons, against 91,172,000 tons for 1913. As compared with 1913, the last pre-war year, British exports last year (1919) weighed only 50.6 per cent of the 1913 figures. The principal decreases were in coal, i. e., 76,687,000 tons in 1913, against 38,465,000 tons in 1919. But manufactured goods also showed a falling off from 10,791,000 tons in 1913 to 6,019,000 tons in 1919, and this is not entirely due, as it is generally stated, to slackening of labor effort, but principally to the bad condition of the transportation systems, as is proven by the enormous delays of shipping at British ports.

If this is the position of England, least affected by direct warfare, what must be the case of the other countries which were devastated by armies? We are blinded today when we are given figures showing the wonderful export and import of the various countries, and how quickly they are coming back to normal conditions, and, in fact, figures and values given out are claimed to show that their trade is greater today than it was before the war. These figures and values are misleading, and are of consequence only when used in connection first with the current rates of exchange, and second when taken in conjunction with the actual weights. To my mind, the increase of values with such a decrease in quantities shows a very unhealthful state of affairs. As an illustration, Italy, while importing less coal in quantity, suffers in consequence a decrease in industrial production and in transportation, and at that her coal imports show an increase in total cost. That means that Italy, while paying an enormously increased price, is actually operating her factories and railways at a stringent reduction in results. The increased cost of Italy's fuel runs into figures such as would stagger American railroad owners or industrial magnates, and cause them to consider whether it would be worth while to continue operation. While Italian factories run from day to day only, never sure of their coal supply for tomorrow, the cost of their fuel has gone up from a pre-war price of about 30 lira to 700 lira, i. e., 23 times. At the same time, the population at large have to pay, indirectly, proportionately more for their daily articles of subsistence, for the cost of imported foods has gone up almost in the same proportion as the cost of coal, and all food and supplies must carry an increased transportation cost. The same applies to Italian manufactured articles.

How can wages or earning capacity ever reach a level to overtake the constantly increasing cost of purchase, production and transportation? Does it not mean an ever increasing unrest among the laboring classes, continual demands for higher wages, and in turn, still higher cost of production and transportation? It is indeed a vicious circle that the war has brought us into. Some say, let the European nations stop importing. But the people of most Eastern countries long ago ceased to be self-supporting as far as articles of prime necessity were concerned; and five years of withdrawal of their manhood from the cultivation of the soil for military training and war and their lower vitality from the prolonged under-nournishment, have caused severe decreases in soil fertility and in industrial production, so that today the European peoples are 50 per cent below their normal home supply. Consequently instead of having importation decreased, they must have it increased.

Yet where are the foodstuffs and goods to come from, and who shall furnish the credits? A balance of trade by equality of import and export between America and Europe is out of the question. America, being self-supporting in almost every way, expects to export to Europe food, raw material and manufactured articles, but can and will import only a few articles, principally luxuries. The only solution for the European nations is to import their raw material and foodstuffs from such other countries as will take in turn their manufactured articles. Such a country is Russia, formerly Europe's primary source of supply of food and raw material, and in return one of the largest customers for Europe's manufactured articles.

Thus only can there be established a real equilibrium as to the rate of exchange. Further borrowing or lending cannot rectify it, but can only make it worse. Already the annual interest charges are far beyond the possibilities of payment under existing circumstances, and the position of Europe today is such, owing to the shortage of foods, lower and still decreasing vitality, ever increasing cost of living, and consequent increasing discontent and decreasing productivity, that the following years will be worse instead of better.

The possibility of further loans by America to Europe, and of further sales of foodstuffs, is exceedingly small, owing to the tendency of farmers to produce less, and to the shortage of credit so that railways, public utilities and manufacturers today cannot obtain cash for urgent home requirements. Last year, large loans were requested by Europe and were more or less promised by public spirited men in America, yet nothing came of the proposals. Already, much larger sums than any contemplated loans have been advanced by bankers to manufacturers and traders whereby to give credit to the purchases in Europe. Study the trade balance against Europe, and note how much more has been bought than sold. This trade balance has not been adjusted—that is, these countries have not purchased the required dollars to pay for the goods. The funds which purchased the goods exported to Europe are now tied up in trade bills, or lie as cash in sterling, francs, lira, etc. The trade bills are being continually renewed, and the cash balances are waiting for remittances at a better rate of exchange, if possible. The realization of these funds today would firstly produce an utter collapse of the rate of exchange, and furthermore would involve such losses to manufacturers, bankers and merchants as to more than absorb their capital. In fact, some of these funds have been invested in European enterprises. This is one of the principal reasons why the bank balances of European bankers are so large and prosperous and yet there is such a stringency of money, which means that American enterprises are short of liquid cash. Who has furnished the money for the goods which Europe has purchased from America and so created the past wonderfully prosperous year—whose money was it, since the public apparently has not subscribed to the proposed loans? The answer to the question is that the public after all has unconsciously subscribed, because the credits advanced on the goods exported came from the funds deposited in banks; and these deposits are made up, partly by the savings of the people, partly by the cash balances of traders and manufacturers, and partly by moneys loaned by bankers to merchants and manufacturers and in turn deposited in their checking accounts.

It is being stated often that Europe henceforth is going to import less and export more, that therefore her trade balance will improve; but apart from the fact that America can only import certain articles, principally luxuries, how can Europe export more, if she is going to import less? Europe generally, and especially England and Germany, must import large quantities of food and raw materials primarily to sustain the European population, and only the possible surplus of manufactured articles can be exported. If European countries are going to decrease further their imports as compared with last year's statistics, how can they possibly increase their export of manufactured articles? Any temporary increased export without an increased import, decreases their home stocks and only accentuates the future scarcity. Yet their exports must be increased if they are to pay the larger demands for food for sustaining the European population, to pay interest on capital borrowed during the war and since, and to restore their productive industries to pre-war conditions. All of this necessitates a considerably increased importation of food and raw material. As it is, last year the import in quantity was 30 per cent and export 50 per cent below pre-war conditions, and as yet little has been actually done to make up for the ravages and destruction of the war.

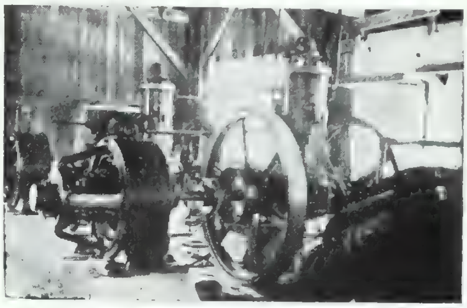
All the current discussion in regard to loans and credits to Europe is beside the point. The all-important question is how to reconstruct the inland transportation systems of the world. Already the nations have more shipping tonnage than in 1913, and millions of tons are building, while at this very time ports are congested with freight awaiting inland transportation, and cargoes offered are 50 per cent below the tonnage of 1913, because of railway and terminal insufficiency. Ships lie idle in port for weeks, while wages and port charges cause enormous loss to owners. There is already a surplus of shipping, while there is a serious deficiency of inland transportation.

Reverting to the Russian position, I recommend the utmost caution as to crediting the conflicting news coming through from Europe. It is necessary to be very cautious at this juncture in making any permanent connections, or in transacting definite trade unless the order be accompanied by a substantial deposit, with the balance payable cash on delivery of goods at an American port. In view of the uncertainty of the real situation in Russia, I strongly advocate the formation of a special business commission divided into three sections, one each for Siberia, South Russia and the Baltic region. Each section should be located in a neutral country as near as possible to its particular field of action, so as to be able to watch events and report accurately upon the changes that take place. It is evident from the news that we are on the eve of important changes, probably for the better, and that the Russian population generally are becoming more inclined to settle down to work. If it is a fact as reported that the Soviet government is forming labor battalions for the purpose of starting effective and constructive work, this is to my mind a good sign, for heretofore the people have been encouraged to idle rather than to work.

The Russian position needs careful watching, for the Russian market is the most important in the world. It should be studied from close up, instead of at long range, to eliminate all sorts of conflicting rumors, and the observers should be reliable and competent business men selected by American interests. The cost of such commissions as I have proposed would not be great, and the results of their observation and work would lead to hundreds of millions annually of permanent trade.

An Economical Modern Freight Carrier

Getting the Other Fellow's Viewpoint in Foreign Trade



Electric Power Station at Talcoban, Philippine Islands

ONE of the most valuable assets which a foreign trader can have is the ability to put himself in the other fellow's place — get at the other fellow's viewpoint on life.

By a foreign trader we mean —not the fly-by-night, one-trip salesman, who is trying to put over a raw deal on some unsuspecting native — but the man who is trying to build a solid foundation for future business.

It should be remembered in all foreign trade business that a number of small accounts are very much better than one big account, because of the assurance of wider distribution of products and the fact that distribution is the fundamental factor in merchandising.

It is especially desirable at this time, when America is looking to a tremendous expansion of her overseas' trade and particularly her Oriental trade, that the young men sent out as representatives of American firms shall be broad enough in their sympathies and viewpoint to recognize potential markets in what are seemingly the most impossible conditions.

We should never forget that in many lands which we are prone to consider uncivilized, the people inhabiting those lands have back of them wonderful records of early civilization and that the Chinese, for instance, who to a great many Americans are simply a lot of vegetable peddlers and laundrymen, produced three or four thousand years ago engineering works which to this day are marvels of the world; that in Peru people whom we are accustomed to look upon as "Greasers" had over three thousand years ago woven fabrics, the quality and texture of which have never been equalled by any wonderful modern machines; and that the half-naked, head-hunting Igorrotes of the Philippine Islands have natural engineering brains and produce without the aid of any modern scientific instruments contour terraces on hillsides for irrigating farming purposes which are the delight and despair of all engineers who behold them.

Getting down to concrete instances, every store or home in the Oriental world, no matter how humble, is a potential market for modern household conveniences, and even for the application of public utilities. To quote from an article on the subject, "Don't Get Warped," written by Benjamin Sody of the Western Electric International Company, "every hamlet without electric light is a customer for generators and wiring, fittings and fixtures; and every place where they now have electric current is a customer for more current. Suppose the suburbs of your city or town looked like Figure 1, or the main street and store resembled Figure 2, or the homes were like Figure 3, you would think very seriously of getting into some other line of business than selling electric appliances. And yet, Talcoban, on the island of Leyte, in the Philippine Islands, has a power plant consisting of three 22½ kilowatt generators, and the homes and stores are wired. It is a town of 12,000 people, who, under the skin, are the same as we are, and if we can but get their viewpoint we will find they have desires for comforts just the same as humanity everywhere. We rather like to associate electric appliances with luxury instead of utility and we forget a great market that exists among the toilers and especially those of foreign birth, because we do not understand them."

That young American genius, Wrigley, of Spearmint fame, traveling through China did not overlook the possibilities in four hundred million pairs of human jaws and opened a market for his famous chewing gum, which bids fair to eclipse that of the homeland. And likewise every foreign trade representative should be able to see potential markets in the teeming villages, towns and cities of Oriental countries and by getting the viewpoint of the native people introduce his particular product in a manner that will make it stick.

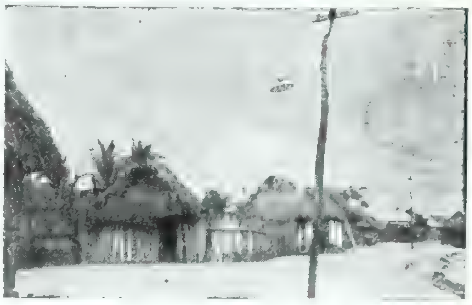


Figure 1

Views in the Town of Talcoban on the Island of Leyte, Philippine Islands, showing the demand for Modern Conveniences in Places Where it would be Least Expected.

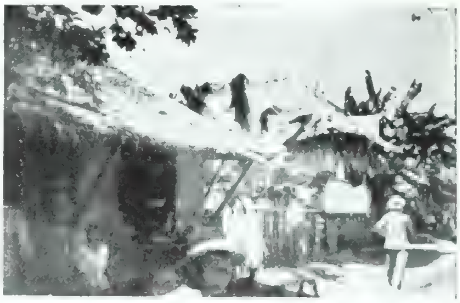


Figure 3

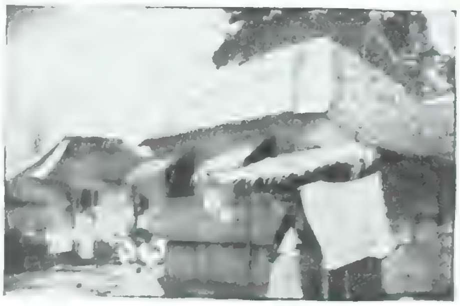


Figure 2

Why Gold Is the Basis of Money

By John Clausen*

Vice-President Union National Bank, Seattle

A CURRENCY exists in order that the operations of trade may be facilitated. Ages ago one bought with goods and not with money; all operations were in kind. In the final analysis, one still buys with goods, or the service equivalent of goods—but it was early seen that in complex exchanges, goods of smaller bulk and equal value might be substituted at a gain in commerce. It was convenience which caused something known as money to be created. however, where it is more convenient to use goods than money, trade in goods still obtains. For instance, the farmer, in some localities, finds it more expeditious to trade in the product of his land at the store and receive, in return, commodities which he does not himself produce. Instead of the storekeeper buying the farmer's produce for cash and then having the farmer take that cash and buy something else from the storekeeper, the two agree to drop the use of the medium and trade in kind—although they usually translate each product into dollars and cents values and then settle on the difference.

If that which is known as money is not convenient of carriage, is not unimpeachable as to value, then it is not a practical or convenient medium. Today in Russia and also in Mexico, to some extent, the money is represented by pieces of paper which are promises on the part of some government or other to pay. They have not a redeemable value in specie, but are mere promissory notes, in which the ability of the promiser to pay is open to question. Therefore, we find that they are not regarded as an acceptable medium of exchange.

They do not express values and people in those regions are going back to barter simply because their currency does not express values. It has been argued that the value of gold is artificial—the result of legislation and the like—but history teaches us that gold has always been prized next to the actual necessities of life. Before anyone thought of having legislation—in fact, before anyone knew what legislation was—gold was the popular medium of exchange and no matter what other metal may be selected as a standard, it derives its value from its relation to gold. If, in a moment of [illegible]—and financial lunacy is not uncommon—we decide to substitute cobblestones as a currency standard, the buying power of those cobblestones would be fixed not by legisation, but by their value in world terms of gold. Legislatures may determine the nomenclature of money, but they cannot determine its buying power.

ENDORSEMENT OF GOLD EXCISE AND PREMIUM PROPOSAL

It would seem very important, not only on account of our internal economic position, but also because of our position in international trade, to protect the monetary gold reserve of the United States from excessive withdrawals for other than monetary uses. Statistics of this year indicate that the consumption of gold in the arts and trades will exceed the production of new gold in this country.

I have carefully analyzed the legislative proposal suggested by the American Mining Congress for the consideration of Congress to create a fund by imposing an excise upon the manufacture and sale of gold used for other than monetary purposes, this fund to be utilized as a premium to producers of new gold in order to stimulate production. This plan would seem a practical solution of the complex problem with which the gold-mining industry is now confronted, since it eliminates monetary entanglements and reduces the subject to the sale of gold as a commodity in its manufactured state. It would seem that such stimulation of the gold-mining industry would insure a sufficient supply of gold to the trades and at the same time protect the gold reserve. The soundness of this proposal should commend itself to the favorable consideration of Congress, and on account of the immediate need for constructive relief, it is to be hoped that the passage of this legislation will be expedited.

JOHN CLAUSEN.

The Gold Standard

It was the thought that buying power might be fixed by state fiat that gave force to the remarkable Bryan campaign for free silver. Bryan's idea was that the "gold standard"—that is, the conscious instead of the unconscious recognition of the foundation of money in gold, was entirely of artificial creation and due wholly to the machinations of bankers, which was in a way a compliment to the bankers, because it ascribed to them a power approaching the supernatural. He thought to destroy the gold standard and substitute the silver standard. Instead of taking the world relation between the two metals, which always determines the price of silver, he was going to give an arbitrary price to silver. He thought thereby to destroy the gold standard, but he would merely have had the Government post an artificially high price for silver. If our government could have stood ready to buy all the silver in the world at that fixed price, we could have maintained that price, although at an enormous and probably ruinous outlay. But we would not have destroyed the gold standard. We would merely have failed to recognize it.

The point that puzzles so many and which makes us fail to realize the importance of a money standard is that so little of the world's trading is today actually accomplished with money. The world first found that trading in kind was too awkward and cumbersome; therefore it used money. But now we find that metal is too awkward and cumbersome, and, still being animated solely by the thought of convenience, we passed from the actual metal to various credit representations valued in terms of metal.

Currency.

A gold dollar, if such were minted for general use—because of its diminutive size—would be very apt to get lost. Therefore the government issues an engraved piece of paper and by saying that it will redeem it at face value in gold, and further by its public financial statements shows that it can so redeem it, then that piece of paper becomes equivalent to the actual specie and because of its convenience is used in its stead. In business we use other forms of credit, such as bank checks or drafts. These are simply expressions of a promise to pay or a direction to a third party—as a bank—to pay. They connote an ability to pay the face value in gold.

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*[illegible] International Mining Convention, [illegible]

In foreign countries, under normal conditions, a great deal of gold is actually in circulation. They use fewer bank checks and more specie in their commercial transactions, and on our own Pacific Coast the use of gold as currency is, or rather was, very common. In the United States generally, however, one sees very little gold. People do not like to carry it about with them and prefer to do business with bank checks and bank notes. But, however seldom the actual gold may pass from hand to hand, it is the standard of measurement, and whenever, in the past, this standard has been in any way altered or any inability to pay in gold exhibited, the instruments of credit, which seem so intrinsically valuable and so divorced from gold so long as it might eventually be had for them, drop in value the very moment that specie payments are discontinued.

Legal Tender Act

An interesting example of this sort of thing occurred during the Civil War. At the beginning of 1862 a bill was introduced which had for its purpose the making of government notes legal tender, and although that measure was considered unconstitutional, it became law in February of the same year. The issue of "greenbacks" payable to bearer, after several amendments to the bill, was authorized up to a maximum of four hundred million dollars. When the greenbacks were put out it was expected that they would circulate at par with the gold dollar, containing 23.2 grains of pure metal, but a year after the first Legal Tender Act had been passed, paper money had an exchange value equal to only 14.5 grains of gold. Its value rose in August, 1863, to 18.4 grains, but fell in July, 1864, to 9 grains, which appears to have been its lowest point. The premium on gold was then such that a dollar in paper money was not worth more than 36 cents in gold coin!

The most striking example of profiteering during that period was the Black Friday Conspiracy of September 24, 1869, when a group of speculators bought up large quantities of gold—creating an artificial scarcity—and as a result that commodity could only be obtained from this clique at ruinous terms. This brought about many failures, and to check gambling in gold, and reduce the premium on it, the Anti-Gold Law was passed, but as it did not materially bring the premium on gold to a lower level, it was very soon repealed.

In June, 1862, Congress authorized the use of "Postage and other stamps of the United States" as money, because of the demand for small currency, notwithstanding the circulation of the so-called "shinplasters" which were issued in denominations of 5, 10, 15, 20, 25 and 50 cents.

In some of the Western States, attempts were made to maintain specie payments—after they had in main been given up in the Eastern States—but California alone had the distinction of remaining on a sound metallic basis during the Civil War. In New York some of the banks felt confident of their ability to continue paying cash, but none did, if the records are complete, with the exception of the Chemical National Bank. It was not until 1876 that gold again sold at par throughout the United States.

Credit On a Gold Basis

Credit is founded, at the last, upon gold. It is not necessary, for instance, for a government to have an amount of gold on hand equal to all its outstanding currency note obligations, because it is one of the peculiarities of human nature that all persons do not ask for the same thing at once, and therefore a complete ability to pay in gold is evidenced by the possession of a stock which may be as little as one-fifth of the total outstanding gold redeemable obligations. Such a reserve is known as a "gold cover" and any nation which has it is on a perfectly solid gold basis. But when notes are issued by any government in excess of the gold cover, inevitably the buying power of that paper decreases and we have an inflated currency—that is, a currency behind which is only legislative fiat.

If the Russian rouble had a gold cover, it would be valuable. It has no gold cover and, therefore, it is practically worthless. In a degree, the same is true of the Austrian krons and the German mark. People rarely ask for the redemption of their paper in gold, but it is the ability so to redeem that determines its value.

Just as the value of a nation's money issue depends upon its gold cover, so also is determined the ability to trade on a money parity with other nations. Finance has become an international rather than a national affair and the monetary condition of any country tends to become more and more merged with that of the whole civilized world. It is of the highest importance that any country engaged in international trade should have a gold store of a sufficient size to support the credit for that trade.

For several years prior to the declaration of war in Europe, the countries of France, Russia, and Germany especially, had been engaged in an eager, competitive scramble for gold, which resulted in the holdings of their great state institutions increasing rapidly. On this account, at the outbreak of hostilities, we found them with, what was up to that time, the peak of their gold reserves.

Currency Inflation

It is not surprising that, at the outbreak of the war, practically every country placed an embargo upon the export of gold—practically every country sought to gather into its financial vaults all available specie, for the purpose of supporting the immense credit structures which financiers knew would have to be erected to meet the costs of war. However, the war credits have, in every one of the belligerent countries, other than the United States, far exceeded the safe gold cover, with the result that we have world-wide inflation. This inflation is so great—that is, the increases of paper over gold security is so great—that there has even been not a little wild talk of adopting a standard other than gold for the financial operations of the world. This has given rise to some very curious situations.

Some countries have too much gold, some countries have too little, and there is ample opportunity for anyone with a new idea of currency in mind to present and to have a hearing on his theory. A financial Moses has always been in demand, but international credit is firmly established on a gold basis and no country has any interest in upsetting the present standard, although it is contended that, notwithstanding a great production of new gold, it may not necessarily assure universal gold standardism, as it would be a mere drop in the bucket of our future needs. If the world's credit, therefore, is to be carried on with gold, every ounce that can possibly be produced will be required as a basic foundation upon which international and national finance has been reared.

The production of gold is a vitally essential industry which must be promoted to the fullest extent. It is very apparent, however, that with a fixed value for the yellow metal, together with the rapidly increasing cost of material, labor and transportation, this particular industry, as now developed, is seriously affected and it would seem inevitable that unless some form of government relief is given to the producing mines, many of them will be compelled to discontinue operations.

Gold Production Necessary

In a letter addressed to the Honorable Charles A. Sulser, relating to the conditions concerning the production of gold in Alaska the Secretary of the Treasury clearly voiced the attitude of our government when he stated, "I fully appreciate that, with the rising cost of raw material and labor, and with a fixed value for their output, the gold miners are facing difficult conditions. I should be sorry, however, if for this reason there were any relaxations in the effort to produce gold. At no time has the country so much required the largest possible production of gold as at present. . . . In order to place the enormous amount of government bonds required to finance our war expenditures, a large credit structure will inevitably be erected in our gold reserves, and it is necessary that these reserves, which are the foundation of the structure, shall be maintained on the broadest possible basis."

There are people who argue that, if the government would agree upon a plan to increase the value of gold from $20.67,18 to say $30 or $40 a fine ounce, it would make a settlement of obligations possible with only half the metallic requirement otherwise necessary to redeem outstanding paper credits. This course, radical to say the least, would have a disastrous effect upon all credits and especially reflect upon the cost of living, which, in all probability, would climb to limits beyond the reach of the average citizen. Increasing the value of gold or giving it a premium does not necessarily give it a higher purchasing power, but, on the other hand, in the final adjustment, seriously disrupts the basis of international credit. To increase this uncertainty by tampering with the standard of international payment would be an extraordinarily futile means of handling the situation and only make the confusion worse confounded.

The principal nations of the world have adopted gold as the basis of their currency system. The market price for it is everywhere the same and equally certain at the standard price of $20.67,18 a fine ounce. It may be an anomaly that economic civilization should depend for means of payment on the supply of a particular metal, but it will take much ingenuity to find a practical substitute for gold and secure for it the popularity and confidence that this precious metal commands. The mere fact that it has been chosen by the most enlightened commercial nations is strong proof that it is the best single commodity for practical use as a standard.

Gold Distribution

The disproportionate distribution of gold among world nations attracts attention to the study of the part that this metal plays and is to play in future in the world's economic affairs. It is apparent to the careful observer that the pace at which the production of gold increases is not as fast as the rise in value of the world's wealth.

The vast obligations piled up by the nations; the huge issues of paper currency; the refunding of debts, and resumption of specie payments, are among the most urgent and difficult problems with which the world is now confronted. This makes it only too apparent that gold is a necessity for the credit and financial unity of nations and it is essential that an adequate foundation of gold be created to uphold the system.

One of the first acts of the British government, after England was plunged into war, was to insure that the gold turned out of her mines should be safeguarded, and steps were taken for the deposit of new holdings in Canada, South Africa and Australia to the credit of the Bank of England. This arrangement had many advantages and tended greatly to facilitate the concentration of the metal where it was most needed for the settlement of liabilities, and Great Britain was, in this way, enabled to use her gold unsparingly in meeting immediate obligations.

The enormous increase in credits and paper money circulating in every country of the globe, as a result of the great war, reacts very materially on the present and prospective supply of gold and reflects in prices in general, which in normal times zig-zag to meet the demand for, and the supply of, credit and gold. If, for instance, prices and wages are increased, so far as they are paid in gold, it requires a proportionate amount of money to meet the higher costs. It follows as a matter of course that a large circulation of money is required to meet the demand. While the quantity of gold available as money is seen to exert an influence in the direction of raising or lowering prices, it would seem equally certain that as international commerce progresses and the system of credit expands, an increased world's supply of gold is a matter of vital importance.

It is true that, in practice, many transactions of buying and selling are set off one against another, but there can never be a system of finance carried on in any country, operating under a gold standard, without a basis of money somewhere.

The tendency to a further rise in prices is likely to continue for several years; the increase in the cost of living and the importance of adjusting wages to prices; the increasing obligations of nations extending over long periods; the problem of a universal standard of values; the development of commerce and banking; the growth of population and wealth—are questions which are becoming of increasing importance as time runs on. With the falling off in the production of gold and a material rise in gold prices, a very serious state of affairs is presented which is likely to affect the international economic position of all peoples.

Marine Notes from Japan

EDITORIAL NOTE.—Every foreign trader and shipper is interested in what his competitor in the game is doing; especially is this true in regard to the competition between American and Japanese commercial interests on the Pacific Ocean. We have, therefore, made arrangements with a keen American journalist in Japan to supply our readers with authentic information and forecasts as to Japanese marine policy and operation.

THE dramatic dissolution of the Diet by the Emperor, on the request of Premier Hara, on February 26, has thrown many of the plans of the shipping interests into confusion and uncertainty will reign until it is known what the results of the coming necessary elections will be. The Diet was dissolved without action upon the new budget, which carried the appropriations for the proposed new subsidies for the steamship lines, thus affecting some of the planned services vitally, while there were pending several measures affecting shipping, including the naval expansion appropriation items, the passage of which had been anticipated by the shipbuilders and dockyard men.

It had been expected that by April 1 the amount of yen 1,038,000 would have been available for the subsidizing of the Osaka Shosen Kaisha's South American service, whereby it could have increased the number of its ships on the west coast run from three to seven, for a regular monthly service, and under which it would have inaugurated a service to the east coast, resuming the service it had abandoned some months ago as unprofitable. With this subsidy in view, the O. S. K. was to have taken over all the South American service, withdrawing from the Puget Sound run in favor of the Nippon Yusen Kaisha. These arrangements are now disrupted. Other lines affected by the failure of the Hara government to carry on until the appropriation bill was passed are those between Java, Singapore and Bankok, and between Shanghai, Hongkong and Canton, the former being planned by the Osaka Shosen Kaisha and the latter by the Nisshin Kisen Kaisha, each figuring on a new subsidy of yen 150,000.

However, these plans for subsidy are only postponed, not abandoned, as it is the settled policy of the government to give the Japanese merchant marine every possible assistance. This was made plain early last month, when the Minister of Communications, in response to a series of questions put to him by representatives of the shipping interests in the Diet, made a formal explanation of the new subsidizing policy and threw some sidelights on the general policy of the government toward the merchant marine. He explained how the government is pressing the claims of the Japanese shipowners against Germany for compensation for the shipping sunk during the war and the expectation of the government that the greater portion of these claims will be met, and went into details regarding the plans for the establishment of marine schools for the training of seamen and officers to meet the shortage which has become pressing.

One of the questions asked at this time was whether the government favored the suggestion that Japanese merchantmen might be allowed to use the coal stored in foreign ports for Japanese warships in cases where foreign regulations made the bunkering of merchantmen difficult, inasmuch as warships could always secure coal at foreign ports. When this point was raised, the galleries were cleared and the Diet went into an executive session of ten minutes in order that the members may be told confidentially just what the foreign bunkering situation is and just what the Japanese government proposes to do about it.

The determination expressed by the government to help the merchant marine in every way comes at a time when the shipping men themselves are very much divided in their predictions as to the future. Kakichi Uchida, former Minister of Communications, who has just returned from the United States and England in connection with a proposed new Pacific cable company, reports that it will be a long while before England, France and Germany are able to restore their merchant fleets to normal conditions, while the United States will probably see the wisdom of coming to some equitable arrangements with Japan whereby there will be no cut-throat competition on the Pacific between the ships of the American Shipping Board and those of Japanese owners, "which would be disadvantageous to both." Summing up the results of his observations and his extensive interviews with shipping men on both sides of the Atlantic, Mr. Uchida declares that "there is no cause whatever for fear or pessimism on Japan's part in regard to the future shipping situation."

Narinobu Terashima, one of the executives of the Nippon Yusen Kaisha, who has also been touring America and Europe, in company with Baron Kondo, president of the N. Y. K., is also optimistic as a result of his observations, but believes that Japan should double her merchant marine to be in a position where she could really compete with America and Great Britain. Japan should aim at an early total of 5,000,000 tons, he says, and should put the bulk of her tonnage into international trade. "To increase our national strength," he says, "we must first develop the country's foreign trade and shipping. In trade and shipping we should regard the whole world as our sphere of activity. The old policy, with Japan and its neighborhood as our center of operations, will not do. We must try to develop our trade between all parts of the earth. In order that the country may occupy a place among the five powers of the world, not only in name but in reality, it is clear that both the authorities and the people should direct their energies wholeheartedly toward further developing our international trade."

To back up what its executive officer says, it is now announced that the Nippon Yusen Kaisha is planning for a fleet of 1,000,000, doubling its present tonnage, as well as building a number of new ships to take the place of those it is proposed to scrap in the near future. Six of its best ships are to be put on the Puget Sound run, where they will monopolize the subsidy for that service.

But while the spokesmen of optimism paint the future in rosy tints, the shipping interests are facing two rather black realities—the shortage of steel and the mounting cost of labor. The shipyards are watching the price of ships going down and the price of labor and steel going up, each movement cutting into possible profits, while there is the further possibility of a steel famine. Japan looks to America and England for her steel and conditions in both countries are unfavorable for exportation

Already delays have been announced and deliveries that were expected last month and this month will not be made in many cases until August or September. On top of this, the workmen at the Yawata Steelworks, the big government plant, are today in their second strike in three weeks, with the prospect that this plant will not be back to normal until May 1. This steel shortage is expected to cut down this year's launchings from the anticipated 800,000 tons to about 600,000.

Nearly every day finds Japan losing some part of the one big advantage her shipyards have had over American and British yards, that of a cheap labor supply. Although many of the yards which opened during the war boom have closed down and other of the larger yards are laying off men, the demand for higher pay from those still at work continues and strikes are frequent. Even when the men do not walk out, they slacken down and carry through a "go easy" form of strike that is particularly effective in Japan, leaving the men safe from police interference. The cumulative effect of strikes, "go easy" campaigns and more open forms of sabotage, with increased costs of materials, is estimated to have raised the cost of ship production from yen 120 a ton in 1915 to yen 250 a ton today, the figures being those of Nobuya Uchida, president of the Uchida Shipyard and formerly of the shipping department of the Mitsui Bussan Kaisha. Mr. Uchida presents his statistics in advocacy of the renewal of the Shipbuilding Encouragement Act, which has been suspended.

The ocean charter market has been steadily dropping during the month, although the coastal market continues good, with prospects of even further betterment. In the open market, however, conditions at the end of February were about as bad as they could be, with practically no demand for bottoms and with a number of the ships under European charters about to be released. Just a year ago the shipping industry was in the depths of the slump that followed the armistice and it is now back practically in the same place, after a steady rise from April to September and a steady fall since. In February of 1919 the ruling charter rates were: world service, yen 9, to London for single voyages yen 10.50, to North America yen 8. Now they stand: world service yen 9.50, for London yen 9.50, and for North America yen 8.50. As the minimum working expenses of a 10,000-ton ship is placed at yen 8 per ton per month, the rates prevailing leave a small margin and are regarded as low as they can possibly go before the owners will prefer to lay their ships up.

At present, March 31, there are thirty-four ships, totaling 234,560 tons, idle in Japanese ports, with small prospects of charters. During April and May there will be thirty-one more released from European charters, bringing the aggregate tonnage that will probably be idle by May 15 to 479,610 tons. There have been a few charters recently for North American service, principally to carry freights from America to Japan, but there is no improvement in the Japan to America trade, with the newly-launched ships of the United States Emergency Fleet Corporation continuing to cut under the Japanese carriers. Last month thirteen of these ships sailed for America, totaling 103,800 tons.

Japanese Ships Unpopular

In the European charter market the Japanese ships are being last considered, which situation has caused an investigation to be made by the Japanese shipping representatives in London. These representatives have reported, stating that the following faults are being found with Japanese ships:

Japanese officers and sailors lack knowledge and experience in European and American trade, while they have not a sufficient knowledge of English as to maintain harmonious relations with foreign members of the crew, the ships thus being prevented from showing their maximum efficiency;

Japanese engineers, both chiefs and subordinates, are unfamiliar with European and American voyage conditions, while they ask for more boiler water than is strictly necessary;

All Japanese sailors use too much fresh water, while Japanese seamen ask for space for unusually large quantities of provisions for themselves, thus cutting into available freight space. This is particularly the case in long voyages;

Japanese owners generally exaggerate the speed and deadweight tonnage of their ships, while minimizing the quantity of fuel actually needed in negotiations with charterers;

Japanese seamen dislike voyages of a year or longer, thus rendering it difficult to conclude long contracts.

These pointed criticisms, with the fact that charters are not being renewed on any terms, are being taken to heart in Japanese shipping circles, although there are some who still profess to see bright spots on the near horizon. These point out that it is inconceivable that America will remain indifferent to the great necessity of sending large supplies to Europe and that it is more than probable that there will be a demand for many ships for this export trade soon. It is further estimated that the Argentine will be able to export about 12,000,000 tons of agricultural products this year, which is well above the normal, and that this exportation will soon be requiring bottoms, while the coal imports from Durban to Marseilles are likely to greatly increase during the summer. The lifting of the embargo on rice exports from Saigon and Rangoon is looked for, and this will require bottoms, while Europe is now buying largely of sugar, cocoanut oil and other goods in the South Seas. The fact that the last Shipping Board ship will soon be delivered by Japan is also giving hope to Japanese owners, as the disappearance of these ships from the one-way run will cut down the disparity in the amount of tonnage to Japan and that offering for America.

The coasting, or "near sea," charter market, on the other hand, is strong and very active, with freights going up. The rate on coal, which is regarded as the index in the near sea rates, has advanced 15 cents during the past week, being 12½ yen from Kyushu to Singapore, 8½ yen from Kyushu to Hongkong, and 7 yen from Dairen to Yokohama.

There is an increased demand likewise for bottoms for the coastal lumber trade, freight rates for lumber being now quoted at yen 350 per 100 koku from Hokkaido points, an increase of yen 50 in a week. This rate is expected to increase still more and already figures of yen 400 to yen 500 are being talked of. This is due not so much to the lack of bottoms as to the growing lumber scarcity in Japan, which has led to great lumbering activities in the Hokkaido and the piling up of freights. A situation is developing, as a matter of fact, where ocean-going bottoms will soon be entering the coasting trade as the more profitable.

Even with the dearth of demand, some owners are showing a great reluctance to chartering at existing prices. It is reported that foreign charterers have been trying to secure a number of Japanese ships for coal between America and Italy, but are meeting with small welcome at the prices they are offering. There are five steamers of the Kokusai Kisen Kaisha now running out of New York for Italy with coal, but the number will probably not be increased until better charter conditions are offered.

Recently two steamers were chartered for the Australian run, the Suki Maru, 5100 tons, for the round trip at yen 8.65, and the Fukukai Maru, 6400 tons, by the N. Y. K. for the Indian and Australian trade at yen 8.50. Outside of coastal steamers these were the only charters reported.

Shipbuilding

The building plans of the Osaka Shosen Kaisha have not yet been definitely settled upon, although the company has just ordered two 10,000-ton freighters in England and a 6000-ton freighter from the Mitsubishi Shipyard. In addition, the company is preparing to order 200,000 tons of shipping and has secured estimates from American, British and Japanese yards. According to report, the American bids are the highest, the quoted figure being yen 300, or yen 320 a ton, while the Japanese and British prices are close to yen 300. The Japanese yards are busy this year with unfinished contracts and it is stated that they are urging the O. S. K. to postpone their orders until next year, when they will be able to offer terms more advantageous than the British. However, some of the O. S. K. officials are reported to be anxious not to wait, not knowing what the labor conditions may be a year from now and being afraid of the growing steel scarcity.

This company has now well under way two big liners under construction in the Mitsubishi Shipyards, Nagasaki, the Arizona Maru and the Alabama Maru, which vessels are being planned largely for steerage passengers. The Chicago Maru and the Mexico Maru, already under operation by the O. S. K., are particularly fine in their steerage accommodations, but the two new liners are going to be better still, the steerage to be fitted with staterooms, dining saloon and bathrooms, with accommodations for 300. For the first-class trade, each of these liners will have accommodations for only forty. The Arizona Maru is scheduled to make her maiden voyage to Seattle on July 9 and the Alabama Maru on September 1. When these liners enter the Seattle service, the Chicago Maru and the Mexico Maru will be withdrawn for other service.

New launchings during February included the China, a freighter of 5860 tons, from the Kawasaki Dockyards.

The Hague Maru, 12,000 tons, of the Osaka Shosen Kaisha line, sailed on her maiden voyage for Singapore on February 15, to enter the company's Singapore-New York service. She will be followed by the new Amur Maru early in April and by the Havana Maru, another new steamer, by the end of April. The three are sister ships.

The Russian warship Yakuts, which reached Tsuruga from Vladivostok after the Reds seized that city, bringing anti-Bolshevik refugees to Japan, is to be converted into a freighter, the contract for the necessary alterations having been signed with the Sawazaki Shipyard of Tsuruga. Payment for the work will be made from the proceeds of the sale of a lot of extra cables the Oriel, another erst while warship, had aboard. The master of the Yakuts, who seems to have taken over the ship as some sort of a derelict, says he will put her in the freight service east of Singapore.

The S. S. Tokai Maru, 6257 tons, and the S. S. Nansho Yoko, each twenty-one years old, have been sold in London through Suzuki & Company, to foreign buyers, said to be Greeks. These are the first Japanese ships to be sold to foreigners since November last.

Among last month's launchings was the cruiser Tama, built for the Japanese government at the Mitsubishi Shipyard, Nagasaki. She is of 5500 tons, 500 feet long, 46.9 feet beam and a planned speed of 33 knots.

In the same shipyard the keel of the battleship Tosa was laid on February 16, immediately after the launching of the Tama. The Tosa will be one of Japan's greatest battleships, with a displacement of 40,600 tons.

New Steamship Lines

A representative of the Chilean government, Dr. Enrique Kaempffer, is now in Japan urging the speedy realization of the planned direct steamship service to Chile. Such a line, he says, if supplemented by one or more Japanese banks in Chile, will give to Japan the Chilean trade which Germany had secured prior to the war.

The N. Y. K. is arranging to open a big service to Germany, the Tatsuno Maru, 6900 tons, having entered Hamburg on February 1, the first Japanese ship to make Hamburg since the armistice. She was followed during February by the Delagore Maru and the Durban Maru, while the Toyama Maru sailed on the Hamburg run on February 6 from Nagasaki, being due in the German port on April 16, via London, Antwerp and Rotterdam. The Akita Maru cleared for Germany on February

Launch in a Japanese Shipyard

16. The seventh N. Y. K. steamer to be put in this service will be a new ship, now being fitted out at the Mitsubishi Shipyard, to be completed about the middle of this month, while three more new steamers under construction, one at the Mitsubishi Shipyard and two at the Yokohama Dockyard, are expected to join the Hamburg fleet.

A new service between Kobe and Tientsin is being inaugurated by Masuda & Company, who are putting the Hakozaki Maru, Minamoto Maru and Satsuki Maru on the run, the pioneer in this service, the Hakozaki Maru, clearing from Kobe on February 23. It is reported that 100,000 tons of cargo have accumulated at Tientsin, to be shipped as soon as the ice goes out, and the Masuda boats will compete for this with the N. Y. K. The latter company will resume their Tientsin service early this month, despatching the Haryo Maru as their first liner for the season. She will be followed early this month by the Heijun Maru and the Washin Maru.

The Yamashita Kisen Kaisha is arranging a new South Seas-Australian service, with chartered steamers, in what is reported to be an effort to fill the gap in the Australian trade caused by the tying up of Australian bottoms by striking seamen and dockmen. The Yamashita flag will be carried by the Yoshida Maru, 8750 tons; Komagata Maru, 4329 tons; Asahi Maru, 41 tons; Canton Maru, 3700 tons; and the Akehono Maru, 3280 tons.

Marine Insurance

There has been a marked increase of late in marine casualties in Japanese waters, due in part to the greatly increased number of ships, but not due to this alone, claim the insurance men, who state that hasty war construction is partly responsible. The marine underwriters report heavy losses and poor business, but this has not prevented another new company appearing in the field. This is the venture of the Kawasaki Dockyards, launched principally to carry the insurance of its own ships and those of the allied Kokusai Kisen Kaisha.

The Kobe Marine Insurance Company announces a plan to double its capitalization to yen 15,000,000 through a new stock issue at par. For the business term just ended, the company reports a net profit of yen 1,356,292, from which a 20 per cent dividend will be paid, and yen 1,000,000 set aside as a special reserve.

The S. S. Nissin Maru, with passengers and crew numbering forty, was abandoned in a sinking condition off Formosa on February 9. One boat with twenty members of the crew was lost.

The S. S. Toyo Maru, of the Toyo Bussan Kaisha, drove ashore in a storm on February 1, piling up on the Shantung Peninsula. She was abandoned by her crew and broke into pieces.

Harbor Improvements

A thirteen-mile breakwater and docks and equipment to handle 25,000,000 tons of cargo are included in the plans for the projected Tokyo harbor, to be completed within ten years and making Tokyo one of the great ports of the world. A great railroad station and yards are a part of the scheme, to carry out which will cost, it is estimated, yen 350,000,000.

These ambitious plans are now well matured and the Tokyo municipal authorities are now engaged in maturing plans for the issuance of municipal debentures for the carrying through of the project.

The harbor scheme embraces an area of 120,000,000 square feet, half to be under water. The western point of the harbor will be about two miles from the mouth of the Rokugo River, from whence the breakwater is planned to extend to a point off the mouth of the Nakagawa River.

Sea Labor

In order to relieve the situation caused by the scarcity in the number of qualified seamen and marine officers in Japan, the Nippon Yusen Kaisha has just donated yen 500,000 to the Department of Communications for the Mercantile Marine School in Tokyo, while the company has recently arranged to establish another marine school of its own, setting aside yen 3,000,000 for this purpose.

At a recent session of the Diet the question of control of the Kawasaki marine school was brought up. This school was recently turned over to the government by Baron Kawasaki, with funds for its upkeep. Heretofore this institution has been the only school in Japan for the training of officers and qualified engineers, and it has been definitely decided that the gift will be accepted by the government and it and all other marine schools to be established in the future will be conducted by the government.

Japanese shipping men, and the owners of coasting vessels in particular, are looking forward to the coming International Marine Conference at Geneva with misgivings, owing to the practical certainty that this conference will adopt the decision of the International Labor Conference at Washington in favor of the forty-eight-hour week and will make it apply to the shipping trade. Japan is not bound by this Washington decision on land, being rated as a "special country," but it cannot plead for special consideration on the water while Japanese ships are all over the world competing with the ships of all other lands.

It will be most difficult to apply any regulations that provide for eight hours' continuous sleep for seamen to the coasting trade, the owners declare, without largely increasing the number of men in the crews, the Japanese ports being so close together and the number of calls so frequent. The hope of the coasting men is that the rule, if adopted at Geneva, will be made to apply only to ocean-going craft.

Meanwhile the coming conference has started trouble among the seamen at Yokohama over the selection of a delegate. The Yuaikai, the leading seamen's union, has selected Mr. Yamawaki of the N. Y. K. to represent Japan's seamen, voting this in recognition of the way he distinguished himself when his vessel was torpedoed in the Mediterranean during the war. The outside seamen object, saying that Mr. Yamawaki is practically a director of the N. Y. K. and therefore not qualified to speak for the sailors as against the owners. The independents will probably select a man of their own and send him also to Geneva, there to fight for his own recognition at the conference.

Observations on American Foreign Trade and the Industrial Situation

By C. A. Stone

The article herewith is composed of excerpts from the Annual Report of President C. A. Stone of the American International Corporation to the stockholders, and they are here printed because of their application to the foreign trade situation which is now facing the United States.

The American International Corporation has, probably, as large and varied a foreign trade interest as any concern in America, and the optimistic nature of this report should be of great encouragement to all who are looking for expansion in American foreign trade relations.

THE year 1919 was one of great industrial and commercial activity in the United States. As far as your corporation is concerned, the results have been satisfactory. We have done an increased business and have increased our profits, and we ended the year in a strong financial position.

It was, however, a year which disappointed many of the hopes and also many of the fears that were commonly entertained at its inception. Twelve months ago it was generally hoped that the war-stricken countries of Europe would swiftly turn their energies to the activities of peace. The principal fear was that the process of transition would bring with it a large and sudden reduction of prices and a temporary disturbance of industry with unemployment of labor. But it was hoped that this would quickly give place to a resumption of production on a large scale as the world set about earning its living in the old-fashioned way.

Without going into the reasons why these things did not turn out in this way, it is sufficient to note that in 1919 the continent of Europe did not resume production on a self-supporting scale, but continued to draw largely on the American continent and the Far East for supplies of food, raw material and machinery. Moreover, most of the principal European nations continued to create debt both by loans and by further emission of paper money. The United States last year sent to Europe almost four and one-half billion dollars' worth of goods over and above the amount imported from Europe. A small proportion of these four and one-half billions has been settled by the sale of our own securities held abroad, but the largest part has been met by borrowing in various forms. Probably one-third of the amount is represented by current credits. In these facts we have, in large measure, the explanation of the stringent money market in the United States, and the collapse of the rates for exchange on European countries, together with the continuance of high prices for commodities both here and abroad.

Conditions of this sort bring in the end their own cure. The larger European countries—especially Great Britain, which took nearly 45 per cent of the 1919 exports above referred to—realize that the time has come to stop the creation of new debt and the further dilution of paper currencies, and to make national budgets that will balance. While the central and eastern nations will for some time to come require food and material to an extent much in excess of their capacity to produce, it seems clear that from now on the larger nations will tend to rely less upon the outside world and more upon their own resources for all commodities other than those food supplies and raw materials which they must have and cannot at present produce for themselves. It is also clear that the volume of their manufactured exports will tend to increase largely. In this respect, Great Britain has already shown a remarkable capacity of recuperation and one which is increasing rapidly, as indicated by her monthly trade returns. This is a very satisfactory sign, not merely as regards Great Britain herself but also as regards Europe as a whole, for, despite her own difficulties with exchange, she is aiding largely, by means of credits to the smaller nations in Eastern Europe, the general process of recovery.

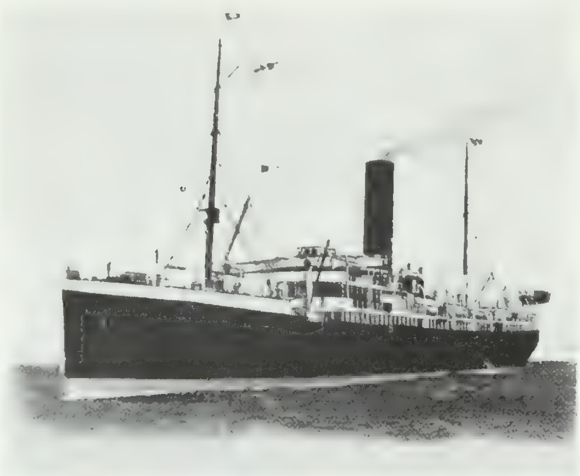
Once the European continent is fairly started in economic convalescence by means of balanced budgets and sound currency policies, the United States may look with confidence to the future as full of opportunity for American capital and American initiative in foreign fields. It is true that trade currents may be changed in some respects for a while. Europe will probably buy from us in smaller amounts and sell to us in larger amounts than in former times, for only in this way can she pay the interest due to us on what she owes. But new markets are opening. Silver is the monetary standard for a group of nations in the Far East whose aggregate population is probably one-half the total population of the globe. The rise in silver has enormously increased the purchasing power of these peoples, so far as the rest of the world is concerned. The South American nations have been materially enriched by the war, which gave them a wide and profitable market for their natural products and enabled them to put their exchange rates with the outside world on a satisfactory basis, to the great benefit of their purchasing power. All this spells opportunity for the United States, which, alone among the great nations in the world, possesses not merely enormous natural resources but also, under normal conditions, a large available capital. Foreign trade in the long run largely follows foreign investment of capital, and we are abundantly equipped for both.

The principal foreign trading interests of your corporation are included in the group of owned and controlled companies and are of a very diversified character. Through the Allied Machinery Company of America we export all kinds of machine tools and construction machinery; the Rosin & Turpentine Export Company ships naval stores abroad; steel products of all kinds are exported by the International Steel Corporation; Carter, Macy & Company, Inc., deals in tea, and G. Amsinck & Company, Inc., transacts a general merchandise import and export business, especially with South America. During a considerable part of the year ocean transportation was a difficult problem. Notwithstanding this and notwithstanding also the very unsettled state of the foreign exchanges, the volume of business done by these companies was well in excess of that done in 1918.

"Through Nelson Strait"

Ralph E. Cropley

TO most of us the sea is an adventure to which we gladly go and from which we return with relief. Yet to some of us it is romance, vaguely enticing, dimly alluring, always maintaining its distances. Until the past troubled years, for most Americans the sea has had only a shadowy existence. Now it has been brought home to us that the sea is all one—the Navy and merchant ships all one. It has been proven that ships are America's treasure; that to have ships of commerce, not only is a vital necessity to prevent us from continuing to be the commercial slave of foreign maritime nations, but that if for no other reason, merchant ships are justified by naval and military necessity.


Royal Mail Steamer Ortega

And through she went, where no ship sailed
Since first the world began,
With all her precious passengers
The boat to safety ran.
The German next time won't be half
So cocksure of his plan—
Not when a vessel's skippered by
A merchant sailor man!

The complete history of what merchant sailors of all nations did during the war will never be written. It can't be, for ships are solitary wayfarers, and you cannot record the adventures of all. Fortunately a single deed or act of heroism is nowhere elevated above the rest, as courage and resource and determination have been everywhere on the sea, and the unit is merged in the magnificent total.

It was the merchant sailors who saved the day for England prior to our entrance into the war. It was the merchant sailor who saved the day for us during the hectic period of April to October, 1917, when faulty Naval policy in Washington nearly caused an allied defeat because of starvation. Had they faltered in the face of the terrorism—the barbaric acts, such as that of the "Belgian Prince," which Germany did to merchant sailors—had their old qualities of grit not sprung forth to meet the new and deadly peril, Germany would have won before Washington had given the American Navy a chance to fight. Certainly Admiral Sims' testimony proves this, backed up as it is by Herbert Hoover's statement of the desperate plight the Allies were in from April to October, 1917, a period during which Admiral Sims begged Washington to see light and give our handcuffed Navy a chance.

The average landsman is inclined to regard the immaculately uniformed officer of a passenger liner as a typical example of a merchant ship sailor. Yet, compared with the rugged, blusterous boy of the tramp ship, a passenger liner's officer can almost be classified as a fresh water navigator who does not know what trouble is and probably never has been thrown up against tough luck at sea during his career. Yet, among a liner's crew, especially the "black gang," will be found many a man who has done his gruelling in a tramp ship. It is he who can tell exciting stories of stress and storm. For life on a tramp is one continued round of adventure and hardship, with very few short interludes of pleasure, and a man living such a life becomes inspired with a striking spirit of dare-deviltry and self-reliance—ready to face any emergency and laugh at death itself. It was this type of man, who in spite of the lack of proper naval protection, Germany couldn't terrorize or keep off the sea as long as there was a ship to carry him.

Still I should not be so hard on the immaculately uniformed liner officers. They rose to the occasion wonderfully, during the war, especially as, unlike the tramp ship officer, they had rarely been called upon to do the unexpected. An example of this is what Kinnier did with the big Ortega. If he had been a tramp ship man the trick would have been expected of him, for tramp ships go to all sorts of little traversed quarters of the world, whereas liners ply on regular routes, almost laid out as plainly as the track of a railroad.

With the German cruiser "Dresden" shelling him even though he was well within the three-mile limit off the Chilian coast, Capt. Kinnier to prevent his passengers from being shot to pieces or face death in open boats, was forced to enter Nelson Straits, an uncharted waterway in the vicinity of Cape Horn. No vessels drawing 26 feet as the Ortega was, had given its possibilities a thought. Yet Kinnier had no other alternative than to attempt it, for he knew the German wouldn't dare to follow. And right he was. Not only that but the German was so sure that the Ortega would not survive that he sent out a wireless to the effect that she had gone down with all hands.

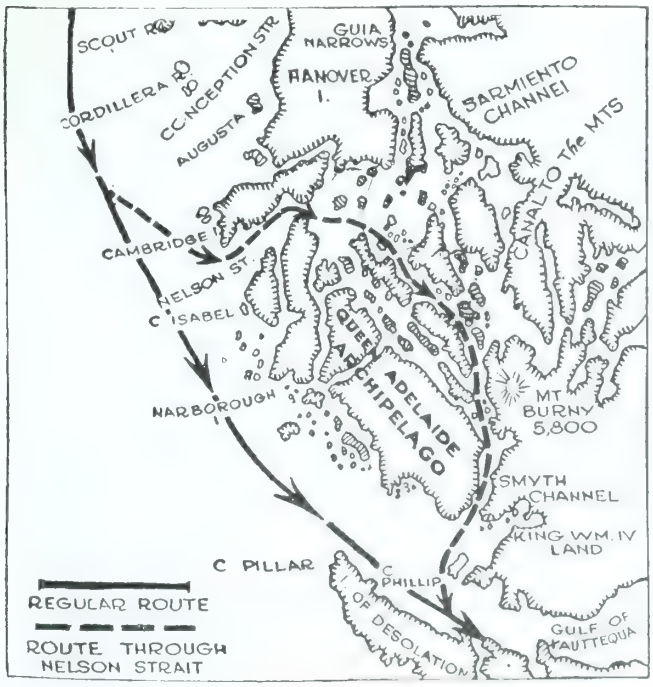
Possibly if the captain of the Dresden had been a merchant sailor he would have appreciated the resourcefulness in men of that breed when facing death. For that is what all on the Ortega faced, as Nelson Strait is a hundred miles in length, bounded by the wildest of the South Chilian islands with thickly snow-clad peaks and mountains either side.

And through this tortuous waterway crept the Ortega at a snail's pace, a rowboat preceding her taking soundings. As one passenger has written about the trip:

> "The passage through those wild fjords will nevër be forgotten by any of us. The risk was terrible—the scenery superb. It was truly a magnificent sight to see the sun rise majestically behind the high mountains of snow with the black water of the strait at their base, for sheer mountains rose precipitately on either side of us, mountains of rock and snow. It was fairyland! Frozen waterfalls, here and there a little rock peeping up, the danger Capt. Kinnier must avoid. Not a vestige of human life was to be seen. It was the awfulest form of desolate grandeur. So it continued as the crew worked willingly, doggedly, patiently, hour by hour."

It took two days for the Ortega to get through Nelson Strait. Eventually she reached Isthmus Bay, a waterway which is charted, yet for the navigation of a ship the size of the Ortega is almost as dangerous a feat as going through Nelson Strait. So rare is it for a vessel to visit Isthmus Bay that each ship records the fact by nailing her visiting card on the trees ashore. And before picking her way towards Terra del Fuego the Ortega's visiting card and the reason for her visit were duly posted.

What Capt. Kinnier did was certainly a most notable feat of pluck and skilled seamanship. Yet it can be in no manner elevated above thousands of other acts which the lack of proper naval protection forced merchant sailors to perform. No one gives more credit to the merchant sailor than the regular navy man, for he not only knows their stamina and worth but knows that the civilian heads of all navies gave the merchant sailor a raw deal—a worse deal than that given the navy man himself.



Sketch Map Showing Route of Ortega Through Nelson Strait

A WONDERFUL DOCKING RECORD

MORE than 225,000,000 tons of shipping, steam and sail, harbor, coastwise and deep water, have been drydocked in the big repair yards owned by the Todd Shipyards Corporation in New York harbor and on the Pacific Coast.

This stupendous total is more than four times the merchant tonnage of the world at the end of 1919. These 225,000,000 tons, representing vessels of every size and type, have been handled by the nineteen floating docks and the two graving docks that are distributed between the various Todd yards. Excluded from this remarkable drydocking record are the thousands of vessels—from chunky but essential tugs to the speediest ocean grayhound—on which work has been performed at piers and elsewhere in the harbor by the skilled mechanics of the Todd Shipyards Corporation.

There is no other ship repair organization in the world operating as many drydocks as this American company. The Todd drydocks placed end to end would measure nearly a mile and a half, and if the vessels that have been on those docks were set stern to bow they would span the continent from Erie Basin to Puget Sound.

It seems appropriate at this time—the renaissance of American shipping—to cite the following figures in the belief that they will convey some idea of the ship repair facilities of the world's largest ship repair organization. A ship is a ship only when in service, and if a nation would possess a merchant marine it must have adequate facilities for the proper upkeep of the ships that fly its flag.

The Todd organization is a federation of expert men and great plants for united application of the vast modern industrial practice to every kind of ship work from construction to interior decoration. It is equipped to build any vessel, from ocean liner to river barge. It possesses unsurpassed facilities for remodeling, lengthening and refitting of ships of any character and for any service. It has made world records in the handling of the biggest repair jobs that ever have been sent to American yards. Its resources include nine construction ways, two graving docks, nineteen floating drydocks, twenty-five piers, a fleet of tugs, floating derricks and service craft, and the latest improvements in shop equipment.

Co-operation binds all the organizations, yards and plants of the corporation into one powerful whole, which is at any moment capable of concentrated effort. In all other respects, however, each organization is an independent unit for itself, with its individual prestige to maintain. This makes for exceedingly sharp competition between them all for achievement, efficiency, speed and economy, but there is free interchange of knowledge and experience, mutual enjoyment of inventions and improvements, and, when necessary, exchange of resources.

Each plant is not only a unit in itself, but the unit principle is so applied that every vessel obtains unit treatment precisely as if it were the only vessel in a yard devoted entirely to it. This concentrated individual attention is made possible by ample berthing spaces and dockage capacities, an abundance of experienced workers, and every modern facility for applying power in all its forms directly to every ship.

Wilmington Plant of the Pusey & Jones Company

Panorama of the Pusey & Jones Plant at Wilmington, Delaware

IN the year 1848 Joshua L. Pusey and John Jones formed a partnership and established a manufacturing plant at Wilmington, Delaware, on the Christiania River. The establishment was originally devoted to the manufacture of a miscellaneous line of machinery, including steam engines, boilers, pumps, paper machinery and general marine engineering and small boat building work.

In the year 1879 the firm was incorporated under the present name of The Pusey & Jones Company and gradually in the evolution of modern manufacturing processes several of their lines were eliminated and efforts were concentrated on two main classes of work, namely—shipbuilding and papermaking machinery.

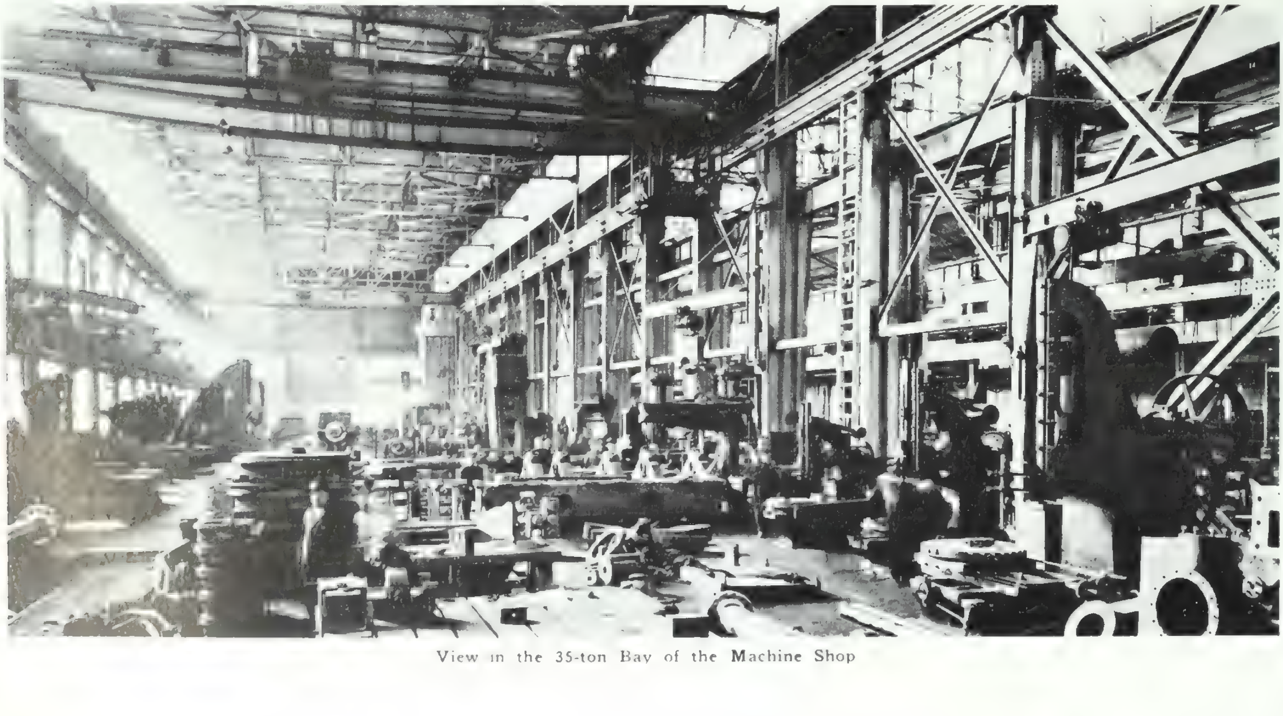
At the present time the plant occupies about fifteen acres of ground lying between the Christiania River and the main line of the Pennsylvania Railroad Company. The site is about two miles from the Delaware River and has a frontage along the Christiania of about 1400 feet with a depth from the river to the railroad of about 500 feet.

There are some twenty-five main buildings, the greater portion of which have been built within the last three years.

The four ship ways are capable of taking boats up to 350 feet over all and up to about five thousand tons capacity.

There are three main departments in the plant, namely—ship construction, foundry and machine shop, and the planning of the yard has been such as to group these departments so that all unnecessary handling of material is eliminated.

The main structures of the marine group are the mold loft, the fabricating shop and the outfitting shop in connection with the four shipbuilding ways mentioned above. The buildings in this group are all of brick and steel construction with wood block floors and the maximum possible amount of steel window sash. A two story building 70 by 360 feet houses the mold loft, marine offices and cafeteria on the second floor and the punch shop on the first floor. The punch shop is fully equipped with machine tools to handle plates up to 1½ inches thick, 6 feet wide and 25 feet long and these tools are served by fourteen three-ton electrically operated overhead traveling cranes. In the end of this building there is a gas-fired furnace for plates and angles with a bed 7 feet wide by 36 feet long. The building is so located that material enters one end from the storage yard and passes through the various fabricating processes emerging at the other end of the shop directly to the ship ways. The



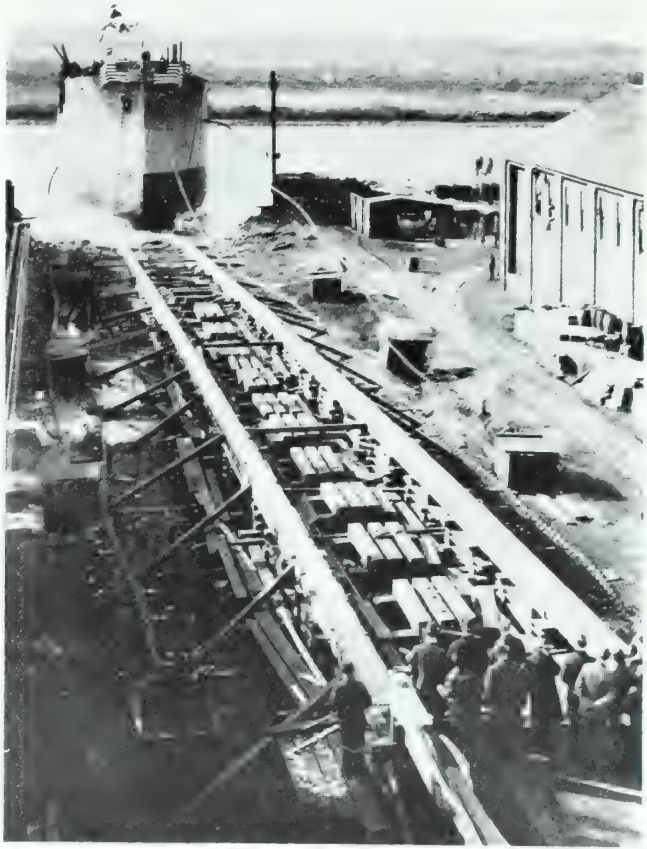
View in the 35-ton Bay of the Machine Shop

Steamship Fire Island on Trial Trip

shop has a capacity for turning out fifty tons of fabricated material per eight-hour day and it is said that no one piece of material travels over one thousand feet in traversing the distance from its storage space to the farthest point of the ship ways. The outfitting shop, 60 by 100 feet, two stories high, houses the necessary equipment for outfitting ships. The smaller buildings in the marine group are sheet metal shop, pipe shop, forge shop, sawmill and joiner shop. This marine group as a unit is fully equipped and adequately organized to finish and fit out the hulls of all types of ships from the ordinary cargo carrier of five thousand tons capacity to the finest yachts afloat.

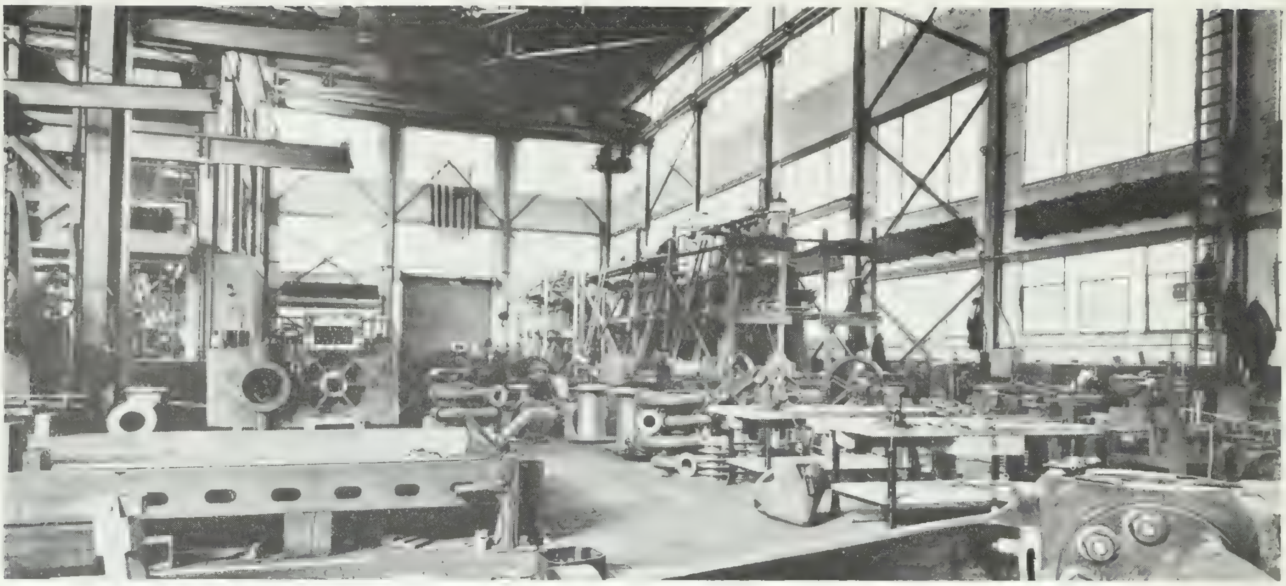
The shipbuilding ways are served by two traveling tower-type hammer-head cranes, one between each pair of ways, and at the outfitting dock a 50-ton stationary hammer-head revolving crane and a 50-ton capacity 90-foot shear-legs handle the installation of machinery.

The foundry group of the Wilmington yard consists of a main foundry building, a pattern storage building and a pattern shop. This group of buildings was completed early in 1919 and are all of brick and steel construction with concrete roofs and steel sash. The main foundry building is 335 feet long by 86 feet wide with a height giving a clear lift under the crane hook in the main bay of fifty feet. The crane way of this main bay extends 175 feet into the yard over the storage space for flasks and is served by two electric traveling cranes of 35 tons capacity each. There are also three-ton wall type traveling cranes, electrically operated, which serve the pouring ladles in this building. There are six steel core ovens gas-fired with forced ventilation, the largest being 20 feet wide, 18 feet high and 22 feet deep. The two cupolas have each a capacity of 15 tons per hour and the capacity of



A Launch at the Pusey & Jones Yards, showing method used to check hull in narrow waterway

The Beautiful Steam Yacht Nokomis built by Pusey & Jones



The 50-ton Bay of the Machine Shop, showing the Erecting Floor with several Engines on the Stand

the entire foundry approximates 80,000 pounds of gray iron or semi-steel per day.

The machine shop group consists of four buildings all adjacent to each other and having transfer crane service. Three of these buildings are classed by the capacity of their cranes, as the 15-ton shop, the 35-ton shop, and the 50-ton shop, and the fourth building is a centralized main tool room three floors high which serves all three of the shops. These buildings were designed and the machine tools selected especially for the purpose of building paper-making machinery up to 265-inch face and the largest of reciprocating engines. There are, therefore, some very large machine tools, among which may be mentioned a special grinding machine for dryer rolls which will swing 72 inches over the saddle and 325 inches between centers. This machine is equipped with four motors, one of which (a 40-horsepower) is directly connected to the grinding wheel, which is 24 inches diameter and 8 inches face. This is said to be the largest grinding machine in the world.

The lathes for turning and boring dryer shells are also worthy of mention. These machines are direct motor driven and will swing 72 inches over the saddle and 320 inches between centers. Work weighing twenty tons has been swung between the centers and machined with very little difficulty. These lathes are equipped with boring bars 280 inches long with a head carrying four tools capable of taking a quarter-inch cut with a half-inch feed per revolution per minute on a sixty-inch diameter hole. Each boring bar with its head weighs about seven tons.

The power house is centrally located and houses three water tube boilers, which are stoker fired. Electric current is received from the city at 2300 volts and is distributed throughout the plant at 110 and 220 volts, both alternating and direct current.

Seven air compressors of 7000 cubic feet capacity are motor driven and one of 1500 feet capacity is driven by steam. This latter is only operated during the winter months and the exhaust is used for heating purposes.

All buildings are protected from fire by an automatic sprinkler system which is supplied with water from a 75,000-gallon tank on the top of the storage building. The greater portion of the roadways throughout the plant are of concrete and the industrial trackage is all of 120-pound rail.

Panoramic View of the Prince Rupert Drydock and Engineering Company's Shipyard at Prince Rupert, B. C.

The Prince Rupert Dry Dock & Engineering Company

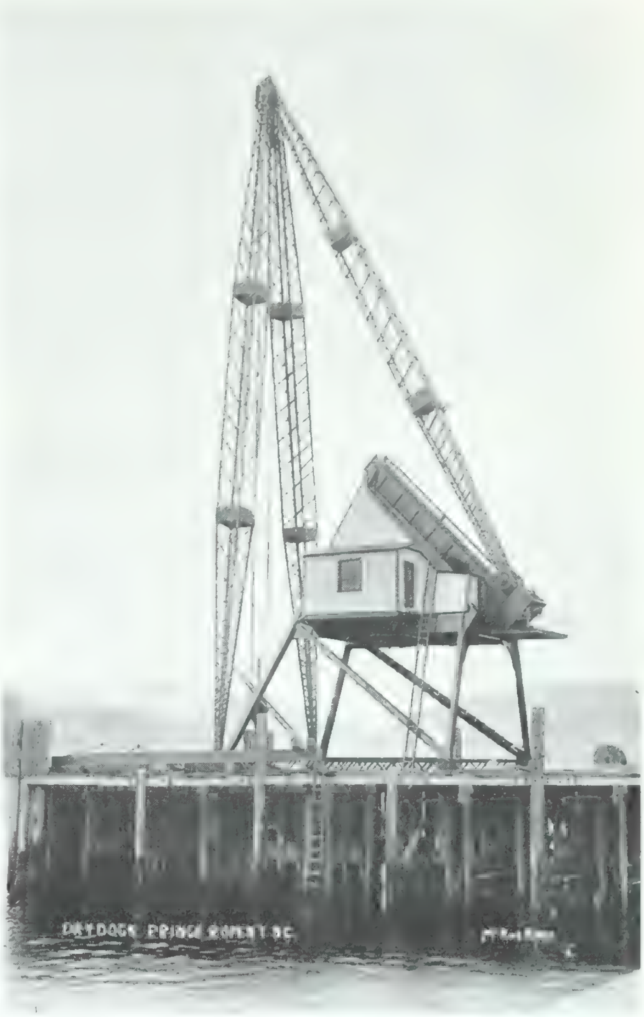
WHEN the Grand Trunk Pacific Railway of Canada established its Pacific terminal at Prince Rupert the directors of the road, recognizing the necessity for ocean terminal facilities and for marine connections, arranged for the construction of a great dry dock and repair plant at this northern Canadian port. Subsequently the war emergency shipbuilding program led to the establishment there of shipbuilding ways and adequately equipped shops for the construction of modern cargo carrying vessels, both of wooden and steel hulls. This plant is now being operated by the Prince Rupert Dry Dock & Engineering Company, Ltd., who have under construction two 8100-ton deadweight standardized vessels for the Canadian government.

Located between the main tracks of the Grand Trunk Pacific Railroad and the channel, a simple spur track arrangement serves the plate and angle storage yard from which the material is handled to the building slips and the various shops by means of locomotive cranes.

The two steel shipbuilding ways are arranged for endwise launching and the plate shop, shrieve board, bending slabs and furnaces are located in one large frame building alongside of and parallel to these slips. The plate shop is equipped with overhead traveling cranes handled from the floor and with a large number of modern punching, shearing and bending machines, all operated by individual electric drive.

The machine shop is of steel and frame construction with a large open central bay and a smaller lean-to bay on each side. This shop is splendidly equipped with modern machine tools and can handle all the machine work necessary for the building of marine engines, boilers and all fittings used in the construction of a modern vessel. Many of the machines are of American make, as, for instance, the Niles, Bement, Pond radial planer.

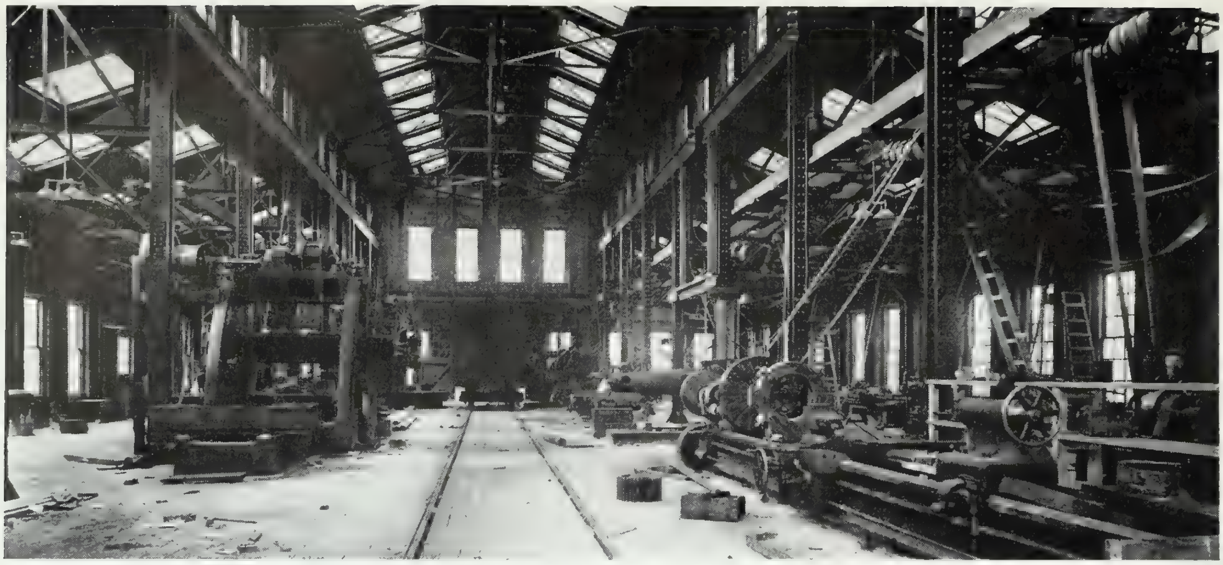
The boiler shop is of the same type of construction as the machine shop and is equipped properly to take care of the manufacture of Scotch marine boilers.



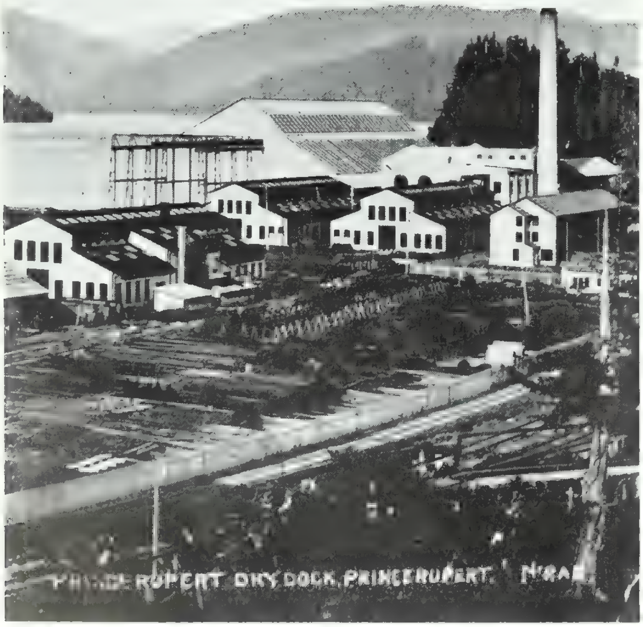
Electrically operated 50-ton Shear-legs

A Corner of the Plate Shop, Prince Rupert Yards

A Corner of the Machine Shop, showing Stern Frame for 8100-ton Freighter



View in Main Bay of Machine Shop, showing Large Machine Tools. Note Standard Gauge Industrial Tracks and Box Car spotted



View of Corner of the Yard, showing Power House, Machine Shop, Foundry, Blacksmith Shop, their Plate Storage Yard and Covered Ways

The foundry is likewise of the same type as the machine and blacksmith shop and has a capacity for single castings up to fourteen tons in the gray iron department and castings up to six tons in the brass department.

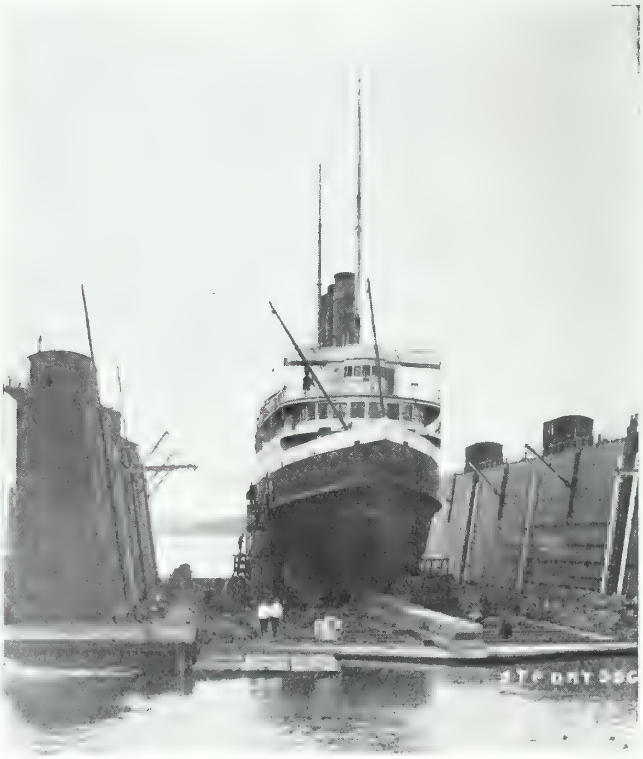
The pattern and joiner shop occupies a three-story building adequately equipped for woodworking of all kinds and with arrangements for the proper storing of patterns and templates.

The power house is of reinforced concrete with a very tall and beautifully proportioned stack, which is a landmark in the vicinity of Prince Rupert.

The floating dock operated by this company is said to be the largest of its type on the Pacific Coast, being capable of lifting twenty thousand tons. It is of steel construction arranged in three sections and can easily take care of the largest commercial liners now operating in trans-Pacific trade.

A rather unique and interesting feature of the yard is the covered slip especially adapted for the building of wooden ships, which will accommodate a wooden vessel of five thousand tons deadweight capacity.

The outfitting wharf is equipped with a steel shearlegs, electrically operated, of fifty tons lifting capacity, and this in connection with the splendid boiler and engine building equipment and machine shop repair facilities would entitle Prince Rupert to rank as the largest and best equipped ship repair and shipbuilding establishment on the Pacific Coast of North America north of Vancouver, British Columbia.



Part of the Great Floating Drydock at Prince Rupert

Fuel for Rivet Making and for Cutting

By Letson Balliet, M. E.

In the installment of Mr. Balliet's paper published in the March issue of Pacific Marine Review, he explained very fully the advantages of using gas as a fuel for rivet heating forges and demonstrated its superior economy to either crude oil or coke.

In the present installment he discusses the use of gas fuel for heating the rods from which rivets are forged by machine and also the use of natural gas as a substitute for acetylene in the cutting of metals. It would appear from the results of the experiments of the writer that for both these purposes gas is much the more economical agent, and that this is a fact is shown by the action of many of our shipyards and large industrial plants in adopting gas in preference to any other fuel for these purposes.

PRACTICALLY all the rivets that are made for structural steel and ship construction are made without proper metallurgical direction. Most of the rod furnaces are powerful oxidizing furnaces. The speed with which the rods are heated and withdrawn reduces the oxidizing period so that some rivets appear better than others, but oxidizing has started on them all. After the rivets are made they are accumulated in large buckets or piles and allowed to stand for hours to cool, during all of which time more or less oxidizing is taking place. Great quantities of scale accumulate in the furnace, and around the rivet-making machine, which is all lost weight. The loss from this source varies, in different furnaces and under different operators, but careful weighing of scale has shown a loss in weight from 2¼ to 3½ per cent of the weight of the rods used. Just to carry these figures to a concrete basis, we find that a small rivet-making plant that produces sixteen to eighteen tons of rivets a day loses 1000 pounds of metal in scale which should have been in the rivets, at 7 cents a pound, to add \$70 to the value of the day's production. Seventy dollars a day loss for thirty days means \$2100 a month, which would pay the salary of a fairly competent metallurgist and still leave a profit. But this is not all the loss. Scale gets between the dies and keeps them from properly coming together, with the result that oversized rivets occasionally occur, heads and necks are often imperfect, and the breakage and wear upon dies is tremendous. Under proper working conditions the rivet dies should produce several times the tonnage they do.

The gas furnace, with its flexibility and ease of control, offers the best opportunity for producing a reducing or non-oxidizing fire. The theory of the non-oxidizing furnace is that the pressure inside the combustion chamber must be just a little above the atmospheric pressure. There must be no inrush of cold air, either where the rods are fed into the furnace or taken from it. The burned gases that are the products of combustion should tend to make a partial exit through these openings. If the gas and air mixture is on the ratio of 1 to 5, and no other air is allowed to come in contact with the rod, the rivet will not be scaled nor oxidized.

Touching again for a moment upon the rivets with imperfect necks, where the dies have not closed due to scale, or where for other cause the rivet is oversized, or imperfect, not only is the rivet lost, but the labor of its transportation to the work, its heating, passing, trying to use it and throwing it away, is all lost, together with the time lost in waiting for another. Rod-end furnaces and rivet forges, being lined with fire clay (which fluxes with iron) find that the furnace bottom becomes a slag, which at times becomes serious, and requires a complete shut-down for furnace repair. In designing rod-end furnaces, the writer lays down a number of points that must always be considered:

The combustion chamber must have no drafts of excess air.

The combustion chamber should be no larger than necessary.

The interior of the combustion chamber should be easily and quickly accessible.

Repairs of minor nature should be possible in a few minutes' time, even without waiting to cool.

A complete replacement of combustion chamber should be possible in a few hours' time.

Temperature control should be positive and accurate, so that every rod comes out with exactly the same heat, and the right heat.

The feeding of the cold rods and exit of the hot rods must be easy and fully up to the speed of the machine.

The rod exit opening should be as close to the header as possible.

The burners should be adjustable, so that the fuel quantity will be right for various sized rods. Manifestly the required b. t. u. will be greater when making eighty 1½-inch by 6-inch rivets a minute than when making the same number of ¼-inch by 2-inch rivets.

With these conditions carefully observed in furnace construction, the furnace repair will be less. the scale loss will be practically nil, the dies will more than double their length of usefulness, machine repair will be less, and better rivets will be obtained.

Cutting With City Gas

One of the greatest savings to be effected by the use of city gas is in connection with the cutting torches in the plate shops, the boiler shop and the angle shops. From the experiments so far made, the results show that in making a given cut, the consumption of city gas is from 20 per cent to 80 per cent more in volume than that for acetylene gas. The difference in price between city gas at 70 cents per 1000 cubic feet and acetylene makes the city gas much the cheaper. The speed of cutting, during short tests of five or six feet in length, showed no difference. Sometimes the gas and sometimes the acetylene would be a few seconds ahead, but this difference might be in the way the operator held his torch (all hand cutting). The strangest of all the results is that the amount of oxygen used appears to be no greater with city gas than with acetylene.

If this condition holds out in further tests, the cutting with city gas and oxygen will cost about 50 per cent as much as with acetylene and oxygen. The speed of cutting is about the same, and the cut edge, when city gas is used, is softer than with the acetylene cut. This is important when reamers or machine tools are to be used on the cut edge. With the city gas cut the machine tools stand up as well as with the hydrogen cut. It is almost unbelievable that the cost appears to be about \$2 per hour less with city gas and oxygen than with acetylene and oxygen. With thicker plates the difference is even greater, as the thickness increases

With 1¼-inch plate the city gas shows a saving of over $5 per hour upon comparative tests.

Up to the present time I have been concerned mostly in getting good cuts and rapid cuts, and have not undertaken to make accurate measurements of gases and pressure, which would naturally follow after my results had been obtained.

Recently some figures (made by two different firms who are selling city gas torches for cutting, welding and brazing) have reached my desk, and their figures seem to bear out the preliminary conclusions I have drawn above.

In burning ¾-inch and ⅞-inch holes in ½-inch and ¾-inch steel plate, the city gas torch burns them in from fourteen to twenty-three seconds, leaving a well-finished hole.

Vacuum in Surface Condensers for Reciprocating Engines

By Luther D. Lovekin

THERE has always been more or less of a doubt among engineers as to just what vacuum should be carried in connection with reciprocating engines of the regular type in use at the present time. Some engineers have the idea that the higher the vacuum carried the more economical the performance of the engine; in other words less fuel will be required for the same power. This would be true were it not for the fact that when dealing with the higher vacuums we are also dealing with volumes of steam which increase tremendously between absolute pressures of from one to four pounds; for instance, the volume of steam at four pounds absolute pressure is practically 90 cubic feet to the pound, while at one pound absolute pressure it is practically 334 cubic feet to the pound, or very nearly four times as great.

From the very nature of the design of the ordinary reciprocating engine all engineers know that it is impossible to design the ports and passages in the cylinders of sufficient size to take care of these large volumes of steam, consequently we suffer a serious loss due to drop in pressure owing to the necessarily high velocity of the steam at these large volumes.

It is well known that steam will flow through an orifice or steam passage from a higher to a lower pressure at a certain velocity, depending on the form of said orifice or steam passage and the difference in pressures. If the resistance to flow due to the larger volume flowing into the higher vacuum is greater than the resistance due to the smaller volume flowing into the lower vacuum then we have everything to gain by accepting the latter course in our design for the reason that apart from the resistance alone we have the opportunity of conserving a large amount of heat in the case of the lower vacuum on account of the increase in the temperature of the condensate, saving just so many heat units for the boiler feed.

From the experience gained by the writer in connection with actual trials on numerous engines, there appears to be no advantage in using more than 25-inch vacuum in the condenser, while a vacuum of 22 inches is about all that the average reciprocating engine can properly care for in the exhaust passages. In order to obtain an idea as to the effect of the varying vacuum on the S. S. Defender a trial was made by Mr. Oscar Winter on Wednesday, October 29, 1919, with the following results:

R. P. M. main engine	84	85
Boiler pressure	215	217
Main steam pressure	210	210
H. P. rec. pressure	206	206
1st M. P. pressure	92	93
2nd M. P. pressure	44	43
L. P.	6	5½
Vacuum at condenser	25.3″	27″
Hot well	140°	118°
Boiler feed	236°	226°
Sea	60°	60°
Discharge	128°	106°
R. P. M. circulator	149	176
Barometer		30.36

It is interesting to note that with the steam pressure the same there was no perceptible difference in the revolutions of the main engine, while the vacuum in one case was 25.3 inches and 27 inches in the other case, both readings being taken by the same mercurial gauge, by the same person and within one hour's time. The temperature of the hot well in each case is slightly higher than the temperature corresponding to the vacuum in the condenser, but this is due to the drains being led into the hot well. It is interesting to note the various temperatures recorded and also the reduction in speed of the circulating pump where the lower vacuum was carried, together with the fact that the revolutions of the main engine were identical under the same steam pressure, for it serves to prove conclusively the uselessness of carrying a vacuum of 27 inches in the condenser when used in conjunction with the ordinary reciprocating engine. This engine was fitted with an air pump attached to the main engines and consequently was not so elastic as an installation where the air pump and the circulating pump are both independent.

While there is probably nothing new in the statements contained herein to many of our engineers they certainly serve to prove to those who are unfamiliar with these conditions the great value of an actual trial to determine the most economical vacuum for each particular case.

Conditions on board ship at sea are entirely different from conditions in our power plants on land as in the latter case the engineer has at his disposal many facilities and more correct methods than the engineer on board ship. This is particularly true where the marine engineer has to contend with an air pump which is driven from the main engine and consequently may or may not be operating at the proper speed and yet with no possibility of changing the speed of the air pump without changing the speed of the main engine, consequently any change in the vacuum is dependent entirely upon the amount of water being passed through the tubes in the condenser.

I think that every chief engineer should endeavor to find from the actual running of his machinery just what vacuum should be carried at the main condenser in order to obtain the best results.

European Marine Developments

Exclusive Correspondence of Pacific Marine Review

WHEN endeavoring to get anything like a concentrated view of the British shipping and shipbuilding positions, one generally finds quite conflicting opinions expressed in this country. Emphatically there are the optimists and the pessimists and each alike can produce facts and figures to support any positions taken up. On the shipping side, however, there is a decided consensus of opinion that the effort that Great Britain may make as a nation to regain the position she held before the war must to a very large extent depend upon the rate of recovery in her carrying trade. At present she is certainly in the unfortunate position of suffering from a pronounced lack of tonnage, with the result that the export trade is hampered seriously by the impossibility of providing adequate transport. It follows, therefore, that Great Britain is unable to add to a sufficient extent to those "invisible exports" which still have to be depended upon to right her apparent adverse trade balance. Of course, this shrinkage in tonnage is more or less universal.

British Shipping Outlook

Colonel Leslie Wilson, Parliamentary Secretary to the Ministry of Shipping, said recently that the world's tonnage was now larger than it had ever been. It was greater by 5,000,000 tons, he said, than before the war, but he added that the utility of the ships was reduced by at least 35 per cent, owing to persistent and incorrigible congestion at the ports. This is a case of a statement made, apparently, quite in defiance of public figures. The statistics issued by Lloyd's Register showed that the total tonnage owned by the principal maritime countries of the world had increased by the end of June, 1919, as compared with June, 1914, by nearly 2,500,000 tons. The increases were due largely to America and Japan, the former increasing her seagoing tonnage by 7,746,000 tons and the latter by 617,000 tons. The British mercantile marine at that date, however, was reduced actually by 2,547,000 tons. It may further be added that, taking into account the progress which would have been made normally if there had been no war, the estimated British loss was 5,202,000 tons.

Lloyd's Register statistical summary estimated that the world's tonnage would have increased by close upon 10,000,000 tons if there had been no war interruption. This gives a world deficiency of practically 5,000,000 tons, supposing, of course, that the need for shipping has increased during the war period and since at a rate capable of absorbing the above-mentioned normal output of ships. The deviation from normal would have been still greater had it not been for the American improvement, but it is pointed out here that a substantial proportion of the United States tonnage has been built of wood, a shipping material held to be admittedly not nearly as efficient as steel.

Port Congestion and Longer Voyages

On the top of this there is certainly the above-mentioned question of port congestion, while, furthermore, there is the fact of the employment of shipping to bring certain products from countries more distant than those from which Great Britain had been accustomed to derive supplies before the war. Notable examples have been the necessity of looking elsewhere for grain than to Russia, and to countries across the oceans for sugar, whereas before the war this country had, to a large extent, been dependent for its sugar on Germany and Austria. Whether or not the United Kingdom will again be able to take grain from Russia and sugar from Germany and Austria will largely affect the tonnage question in the future.

From a survey of these latter facts, therefore, the freight position becomes more understandable. But, again, there are people, like W. J. Noble of Newcastle-on-Tyne, the new president of the United Kingdom Chamber of Shipping, who declare that there is no lack of shipping space and that the trouble lies in the fact that nothing like full use is being made of our reduced tonnage. He says that land transport must bear a large part of the blame and the utter incompetence displayed by the British Coal Controller must also take its share.

On the day when Noble made that statement there were 700 steamers in the Bristol Channel waiting and wasting time. They could not get cargo or bunkers and were accordingly idle. The blame was put down to the continuance of government control of imports, the coal industry, and shipping. Ocean-going British ships have to pay £6 to £7 (say at an exchange rate of $3.50 per pound sterling, $21 to $24.50) a ton at English ports for coal against a pit-head cost of about £1 ($3.50).

Another shipowner mentioned upon this occasion that one of the steamers of his firm had been lying at London four weeks with a cargo including 40,000 chests of tea. She was finally ordered to Glasgow, Scotland, to discharge the lot. All the tea had then to be railed back to London, a matter of four hundred miles, and the ship then had to return to London herself to unload the remainder of her cargo. This is only one of an enormous number of cases that seem to point to an almost criminal incompetence, if, in fact, incompetence be the right word.

Entry of the Big Capitalists

With all these troubles, however, it may be mentioned as a curious point in passing that big capitalists are interesting themselves more and more in shipping. So much so is this the case on the Clyde, Scotland, in fact, that anxiety is being caused there by the wholesale disposal of local shipowners to large shipping combinations in England and Wales of Clyde-owned steamers. The types of vessels mainly concerned in these deals are cargo tramps and steamers on the coasting service. So far none of the large ocean-going lines has been affected. In most instances the changes simply involve a transfer of capital, as the ships will continue to use the Clyde as before, and the former owners will continue to act as managers and agents for the purchasing combines.

The statistics for tramp vessels are startling. In July, 1914, the aggregate tonnage registered as Clyde-owned and Clyde-managed was 1,576,091, but in December, 1919, this aggregate had dropped to 704,677 tons, a decrease of 871,414 tons, or slightly more than half of the pre-war figure.

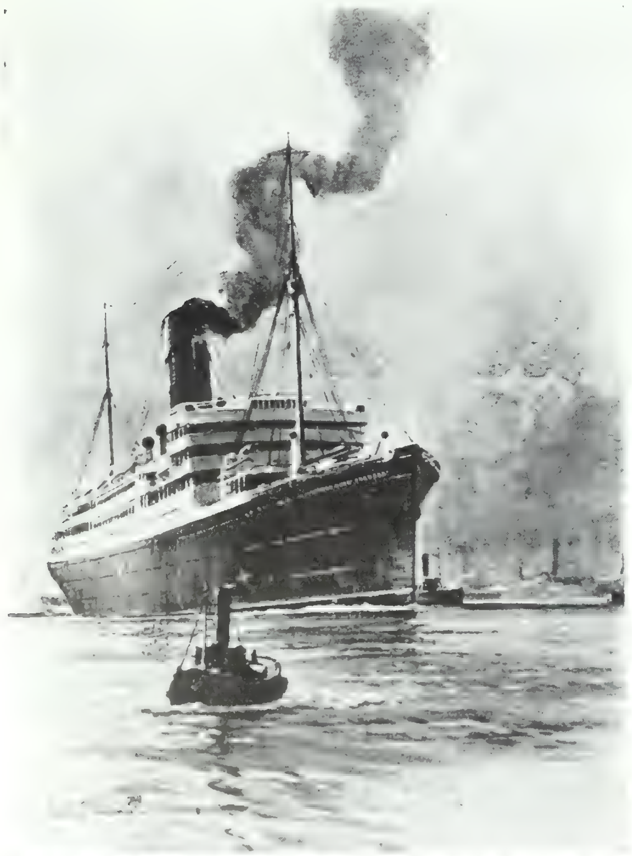
It is not anticipated that these changes will affect the Clyde shipbuilding industry, nor will they have any immediate effect upon the shipping on the river, but in the past the development of the port was largely due to the efforts of local shipowners, whose interests were bound up in those of the river, and it is feared that with the transference of the owning interests elsewhere, the future development of the Clyde may be jeopardized.

Then we have the sale of the controlling interests in the Ulster Steamship Company of Belfast, Ireland, to a London syndicate for $15,000,000. This company is the owner of the Head and Lord lines and possesses thirteen steamers trading between the United States, Canada and Continental and Baltic ports, and Belfast and Dublin.

There are some people, of course, who argue that if experienced shipowners elect to sell their ships at a time like this they are doing so because they think they are getting the best of the bargain. They may think so, but it does not follow that they are. The big financial interests never buy foolishly, and the fact that this buying is going on in the above-mentioned and many other cases can be taken to be proof that these big British financial interests are convinced that shipping profits are going to be bigger in the future than they have been in the past. Perhaps not too much attention should be paid to the fact that a good deal is spoken and published to the effect that sooner or later the earnings of British shipping will be far less satisfactory to owners than they have been for some time past, but circulation of bear news of this kind, coupled with the fact that present shipowners can command high prices for their ships upon their sale, may be all part and parcel of a campaign.

The Newest Cunarder

The new Cunarder Scythia, which is to be launched by Vickers of Barrow on March 23, will be not only the largest liner to be designed and built for the burning of oil fuel, but is the first vessel of the liner type to have double reduction geared turbines. The adoption of this solves an important problem for engineers, the operation of both turbines and propellers at their respective natural and economical speeds. A further departure from previous practice is that all deck machinery, such as winches, windlasses, capstans, etc., instead of being driven by steam are driven by electro-hydraulic power.



New Cunard Steamship Scythia recently launched at Vickers

The Scythia is 600 feet long, with a beam of 73½ feet and a depth of 45 feet. Her gross tonnage will be 21,000. She will have a speed of 16 knots and accommodation for 2600 passengers. Her turbines are capable of developing a collective shaft horsepower of about 12,500. The passenger accommodation includes two garden lounges for saloon passengers, also a veranda cafe for the sole use of second-class passengers. Another feature will be the numerous small subsidiary rooms or alcoves, which, forming extensions to the public rooms from which they are partially separated, afford parties of friends comparative seclusion, but allow them at the same time to keep in touch with the proceedings in the main apartment. Open berths have been entirely dispensed with, and throughout the ship third-class passengers are berthed in commodious rooms, each accommodating two to four persons.

Stem Design

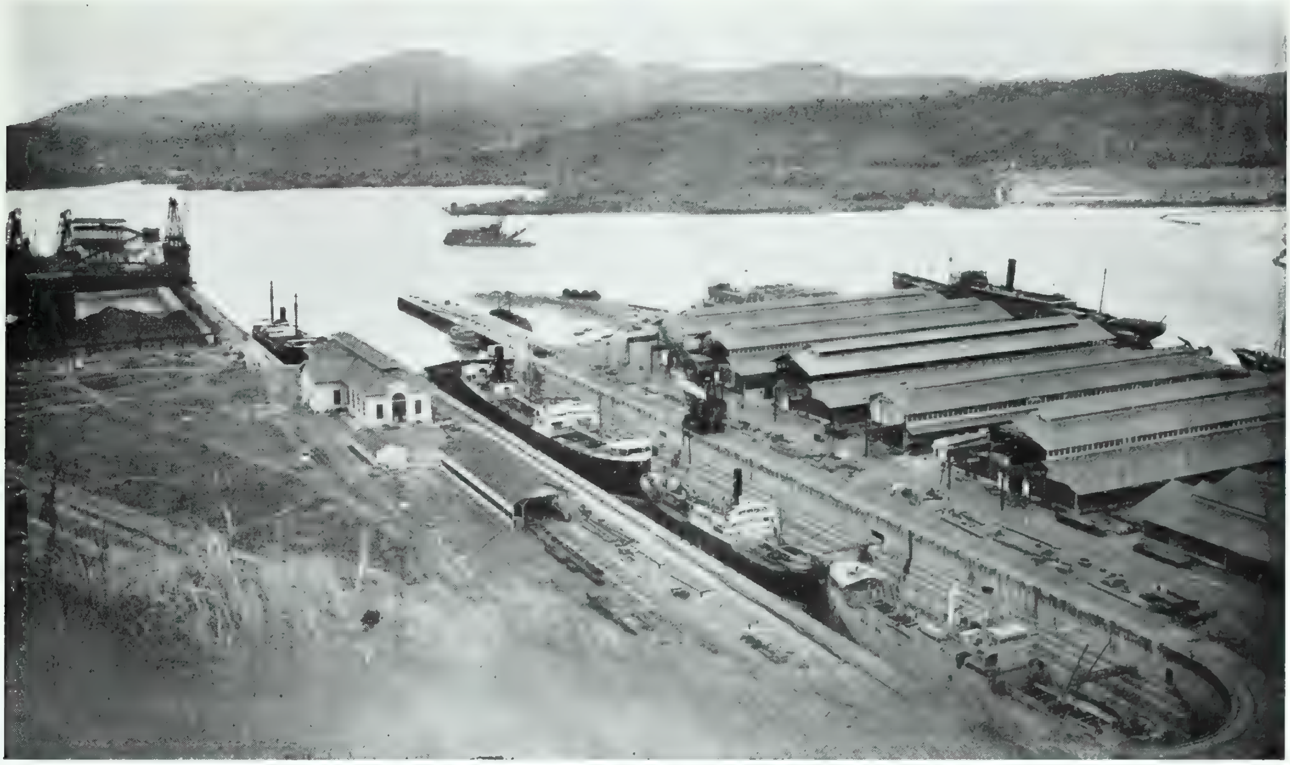
Shipping men have been talking and shipping scribes writing considerably of late about what Captain A. H. F. Young, of the British Board of Trade, said on the occasion of the annual dinner at Liverpool of British shipmasters. In that speech he strongly condemned the straight stem, which is the prevailing feature of the present-day ship, as compared with the clipper bow, which was a more familiar object twenty or thirty years ago than it is today. The origin of the straight stem, he continued, was the desire to reduce the cost of construction without the least regard for humanity, and he put forward the opinion that the straight stem has been the cause of greater loss of life than even Germany's submarine campaign. He advocated an angle of 15 degrees for the stem.

A most important shipping paper in this country goes dead against Captain Young. It denies that the change he suggests would materially minimize the risk of exceptional damage to the objective ship. In the case of a vessel struck anywhere about amidships it declares any material overhang in the blow of the striking steamer would be well above the side of the other ship, so that the interval of space between water line contact would be measured in inches, and not many at that.

Supporting Captain Young we have Alfred Holt & Company of Liverpool, who possess a fleet of steamers of considerable proportions. They give in a letter the benefit of their experience in respect of stem design. In the course of the letter Messrs. Holt write thus: "Our experience of stem design, most carefully observed and considered, has convinced us that even our own rake of 6½ degrees is lacking in security, and we have lately decided to increase the rake to 14 degrees. We are quite aware of all the disadvantages arising from a sloping stem, the chief one being the necessity of providing (generally at our own cost) greater length of quay space for our ships, but we are satisfied that the security of our own vessels and of others, when they have the misfortune to come into collision, is substantially increased thereby. None of the disadvantages seem to us to outweigh that advantage. The recent collision of the Clan Malcolm with our Lycaon in the Mersey probably would have had most serious consequences but for the slope of the Lycaon's stem."

According to latest advices, the matter is to come up in the House of Commons, when questions will be asked the government spokesman tending to prove or disprove Captain Young's statement.

The Dry Dock at Balboa



The Drydock and Shops at Balboa, Panama Canal Zone.

THE accompanying photograph shows three ships dry docked together at Balboa, the Pacific terminus of the Panama Canal. The total length of the three ships is 968 feet. The dry dock is 1000 feet long by 110 feet wide at bottom, with a depth of 45 feet over the keel blocks at high tide, and can accordingly accommodate the largest ships in the world.

The ship nearest the reader is the Lake Fitch, 262 feet long and of 2939 gross tons. She had her hull cleaned, repaired and painted, and repairs made to her boilers and main engines, propellers, stern tube, tail shaft, steering gear and rudder, auxiliary machinery, sea valves, and forepeak tank.

The Lake Garza, 261 feet, 2482 tons, is in the center. Work on her included hull repairs, cleaning and painting, repairs to feed and bilge pumps, sea valves, windlass, fire-room ventilator, and telegraph.

The ship next the entrance is the San Joaquin, 445 feet, 7059 tons. Boiler repairs, cleaning and painting, and winch repairs were the principal items for her.

On the far side of the dry dock is seen the 50-ton steam crane which travels around the coping of the dock and out on the repair wharf, beyond the shop buildings, in the right middle distance. The large ship at the repair wharf is the 9000-ton Cristobal, being overhauled and virtually rebuilt in her interior. The photograph shows about a third of the shops, which employ over 2000 men. On the extreme left is the coaling plant of the Pacific terminus of the Canal.

AIR REQUIRED TO OPERATE THERMIT WELDING PREHEATERS

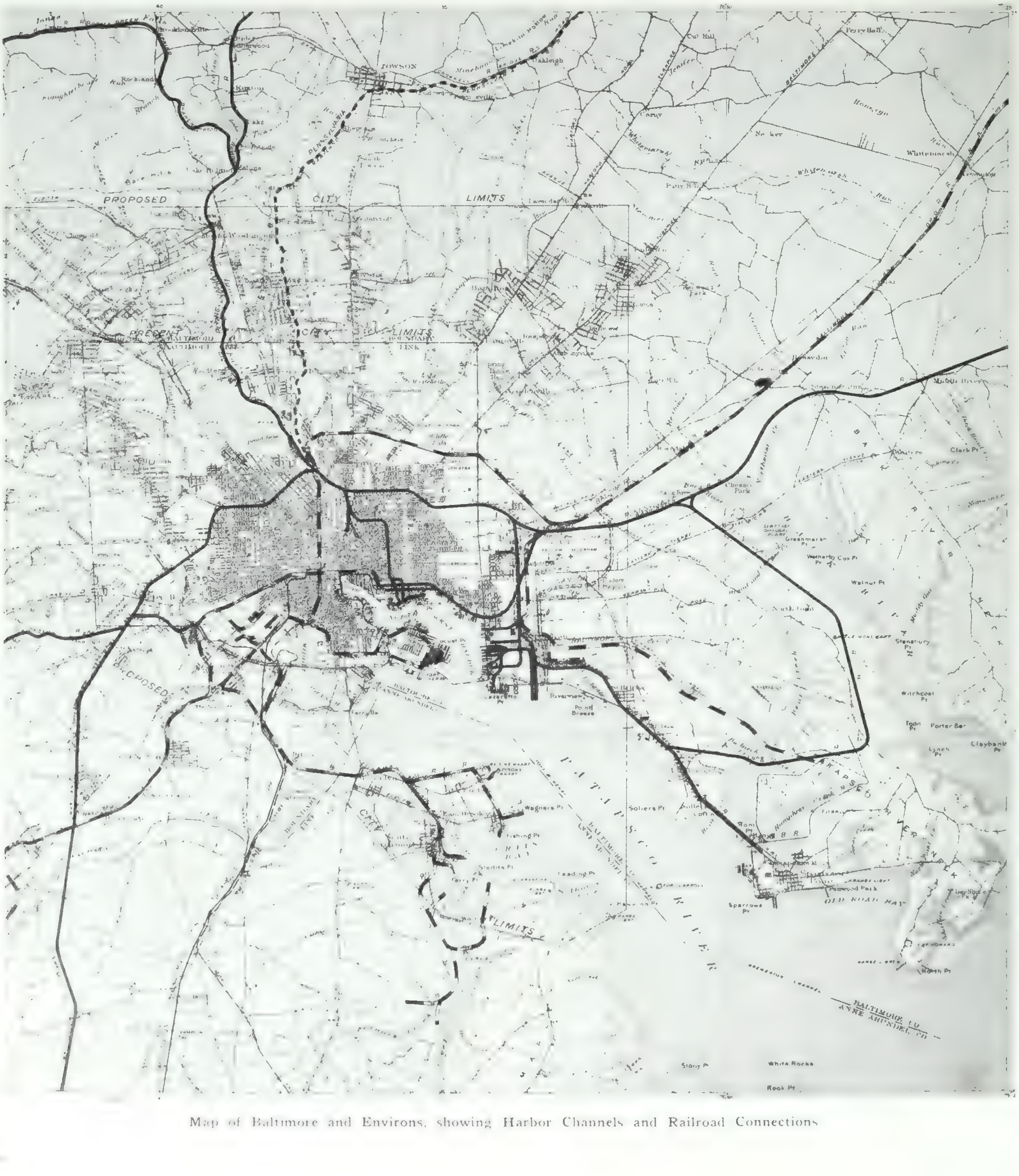
THE following data is the result of some recent tests made by the Metal & Thermit Corporation, New York, N. Y., to determine the proper amount of air required for special thermit welding gasoline and compressed air preheaters:

Twenty-five pounds per square inch seems to be a practical minimum for operating preheaters. At this pressure, a single burner preheater will require approximately 25 cubic feet of free air per minute and a double burner preheater approximately 50 cubic feet of free air per minute. For very large welds, where the walls of the molds are thick and the preheater gates longer than usual, a pressure of 40 pounds per square inch would be advisable, which would require approximately 35 cubic feet of free air per minute for a single burner preheater and 70 cubic feet of free air per minute for a double burner preheater.

In the case of a large plant with a central air compressor plant, upon which demands are being made by many departments, the pressure quoted above should be maintained at the outlet to which the preheaters are attached.

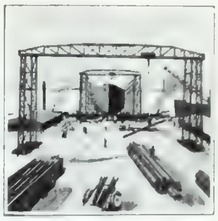
The Port of Baltimore

View of the Water Fronts, Baltimore Inner Harbor

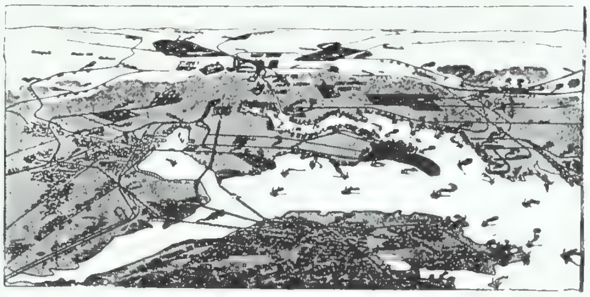


Map of Baltimore and Environs, showing Harbor Channels and Railroad Connections

Material Handling



The Port of Baltimore



Birdseye view of Baltimore harbor

THE city of Baltimore, Maryland, on the Patapsco River at the head of Chesapeake Bay, is fast achieving an enviable position as the most important harbor and industrial center south of New York on the Atlantic seaboard of the United States.

The harbor proper, as will be seen on the map reproduced herewith, is fourteen miles from the mouth of the river and is one hundred and fifty nautical miles from the capes at the entrance to Chesapeake Bay. The mean average tide at this point is only twelve inches and at the piers provided for ocean steamers a uniform depth of forty-five feet is maintained. There are thirty-eight miles of dockage and waterfront within the present corporate limits of Baltimore and a total of one hundred and twenty miles of available waterfront facing a minimum depth of ten feet of water and immediately adjacent to Baltimore harbor.

The city of Baltimore up to the year 1918 had through its harbor board expended nearly $3,000,000 for deepening the harbor and over $9,000,000 for public wharves and docks and for marginal or waterfront streets. In addition to this, the Federal government expended more than $9,000,000 in improving the channel approaches to the port.

Baltimore, during the past ten years, has enjoyed a wonderful industrial expansion, which really began immediately after the great fire of 1904, when the city administration seized the opportunity of rebuilding Baltimore with a broad constructive development planned along modern lines.

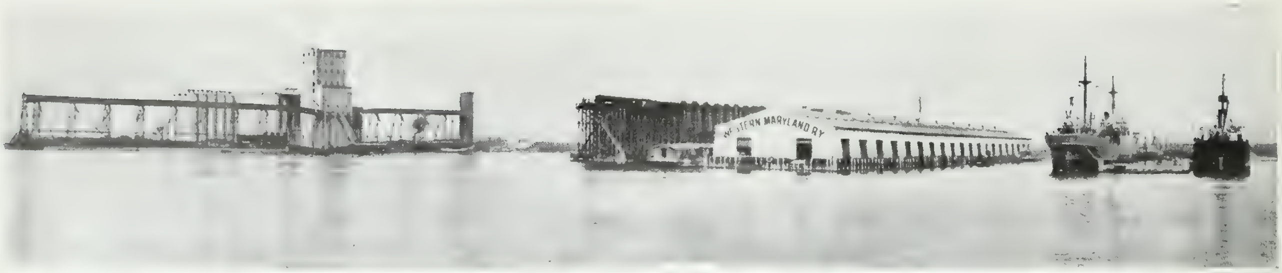
Foremost among the plans projected at that time were those for the development of the upper harbor, where the city built eight splendid piers and broadened the streets adjoining them so that they could meet the demands of the traffic of these and other wharfage properties. Since that time many additional improvements have been carried forward, including dredging for deeper water and the building of Baltimore's wonderful "Key Highway," which includes a broad, well-paved street skirting the entire upper harbor, and a municipal belt line railroad connecting and serving the three trunk railroad lines which enter Baltimore. By this municipal railroad the city was able to largely absorb expensive switching charges.

Baltimore has a rather unique position in regard to industrial and foreign trade development in that geographically it is closer to and enjoys lower freight rates from the great industrial middle west section than any other port on the Atlantic Coast.

From a foreign trade standpoint, Baltimore is the nearest important Atlantic Coast port to Southern Europe and Africa, and to both the eastern and western coasts of South America. It is a little difficult for Westerners to realize that Baltimore is 1369 miles closer to the Panama Canal than is San Francisco. This fact brings Baltimore closer to the ports of the western coast of South America than is any port on the west coast of the United States.

The city is also very close to the great coal fields of West Virginia and Western Maryland, and this fact, combined with the hydroelectric power generated in great quantity and at low cost

One of the huge ore unloaders at Baltimore



View of part of the waterfront of Baltimore showing grain elevators and coaling piers

from the Susquehanna River, completely solves the question of power supply for industries located in Baltimore. Great industries and large capital are being attracted to this region, as is evidenced by the recent purchase of the old Maryland Steel Company by the Bethlehem interests, which are extending and co-ordinating these great works at Sparrows Point at an expenditure of nearly $50,000,000. Part of their plans call for making the shipbuilding department of the Bethlehem Steel Company the greatest commercial shipyard in this country and it may be confidently stated that eventually this shipyard will be the largest of its kind in the world.

Baltimore harbor is very well supplied with shipbuilding and ship repair plants, as the Baltimore Drydock & Shipbuilding Company, which operates three plants in this vicinity, is in good condition to undertake almost any type of new construction or the repair and conditioning of the largest ocean steamers. In fact, Baltimore has high hope of regaining the fame that was hers in the days when the fastest ships which sailed the seas were known as Baltimore clippers in every port on the globe.

The harbor administration consists of a harbor board of five members, including the harbor engineer, who is ex-officio president of the board. All the members of this board are appointed by the mayor of Baltimore and its jurisdiction includes the improvement of the harbor, construction and maintenance of all municipal piers, bulkheads, wharves, dredging and mantenance of all channels within the city limits, supervision of private pier or bulkhead construction, and of all wharves and bridges, maintenance of the city's tug and ice boats, supervision of anchorage, and of all sanitary and salvage work in the harbor. Space on the municipal piers may be leased by responsible parties at the rate of 36 cents per square foot per year.

On the waterfront and elsewhere in the city are located spacious fire-proof warehouses equipped with the most modern machinery for handling bulk, special and general cargoes.

In addition to the nearly six miles of municipal wharfage front, there is, within the corporate limits of the city alone, and still open to further development, over thirty-two miles of private wharfage, of which ten miles are occupied by the railroad piers and docks, 1-4/10 miles by steamship companies, two miles by wharf and dock companies and nineteen miles by industrial concerns.

The port has mammoth, modern grain elevators with a total capacity of six and one-half million bushels. These elevators can easily place 2,500,000 bushels of grain aboard vessels during a working day.

There is a differential of three-tenths of a cent a bushel in favor of Baltimore as compared with New York and Boston on grain for export from the Great Lakes region. On grain arriving all-rail from the West the differential is nine-tenths.

Modern coal piers equipped with rapid loading devices, together with the city's proximity to the mines, make Baltimore the greatest exporter of coal on the continent. The Curtis Bay coal pier of the Baltimore & Ohio Railroad is one of the largest and best equipped coal terminals in the world. The pier is 800 feet long and can accommodate vessels up to thirty-foot draught. On November 23, 1912, the United States collier Neptune was loaded here in three hours and forty-five minutes with 7500 tons of coal.

Two new coal piers—one of the Baltimore & Ohio Railroad at Curtis Bay, 117 by 700 feet; the other of the Pennsylvania Railroad at Clinton street and the foot of Ninth avenue, 66 by 942 feet. Both of these piers are equipped with every modern device for the expeditious handling and transshipment of coal. The Baltimore & Ohio pier will be lengthened to 1175 feet as soon as the pierhead line is extended. Both piers will accommodate ships up to thirty-five feet draught.

A part of the Sparrows Point plant of the Bethlehem Steel Corporation

Waterfront Development in Winter at Northern Ports

H. McL. Harding
Consulting Engineer, Harbor Commission, City of Milwaukee, Wisconsin.

FROM experience lately gained in the construction of the new port works of the City of Milwaukee, Wisconsin, it has been ascertained not only that the work can be continued during the winter months, but that it can be carried on more rapidly, and at even a less cost than during the summer.

In the driving of piles, the placing of timber and the installing of various terminal facilities, that which has always been considered difficult if not almost impossible during severe cold weather, has now been found easy. In fact, it has been more advantageously done in winter than at other times.

The usual custom has been to shut down until spring.

At Milwaukee, along the inner shore of Jones Island, there is being built about 1600 feet of quay construction consisting of the driving of rows of vertical and batter piles and attaching longitudinal and other timbers to these piles.

The depth of the water near the shore, especially where the inner rows of vertical and batter piles are being driven, varied from one to three feet. This section is later to be filled with earth. In the summer, it would have been necessary to have dredged sufficiently deep to bring the scow supporting the pile driving machinery close to the shore or else to have erected false work along or near the bank. Either of these methods would have been expensive and have consumed much time in preparation.

During this winter for an average distance of some seventy feet from the shore, the ice was frozen some two feet in thickness and when the water was less than two feet in depth the earth under the ice was also frozen. It was suggested that some 12″ x 12″ timbers be laid upon the ice and upon these rollers, and on these rollers be placed the framework of pile drivers and the house containing the winches, the boilers with other accessories.

With a bar a small hole a few inches deep was started in the ice and by means of a steam jet from the boiler in about five or six minutes a hole in the ice was made and enlarged and the frozen earth beneath was sufficiently softened so that the vertical and batter piles could be freely and easily driven. After this driving the alignment not only of the vertical, but also of the thirty-degree batter piles was so perfect that it was impossible to detect any variation from a straight line.

After the several rows of piles were driven the longitudinal and other timbers were placed in position, the cuttings for these in the ice were also carried on from the surface of the ice.

The steam jet apparatus consisted of a flexible armored hose with a pipe one inch in diameter bent at right angles.

It was estimated from the progress already made that the number of piles driven in a day through the ice was about double that which would have been possible in summer from the floating scow.

The winches for operating grab buckets were sheltered in the movable houses and similarly were moved to and fro upon timbers on the ice where desired.

The men, even those occupied outside the houses, could keep warm by going for a few minutes into the boiler houses, when there were intervals during the driving of the 60-foot piles. The men were more comfortable than when working in the cold water during the spring and fall. The lost days due to inclement weather were not more than during the other seasons.

It is a source of much gratification that the water front development of northern ports need not be suspended during the winter, but that the work can be continued, the men kept employed and the progress be even more rapid than it is under summer conditions.

This possibility of winter construction is of great value on the upper Mississippi and other northern rivers, and ports on the Great Lakes where construction has generally ceased upon the advent of cold weather.

The port of Southhampton, England, showing four huge trans-Atlantic liners at docks

Unusual Warehousing Task

THE warehouseman's planned field of activity is in the regular channel of commerce and he is equipped accordingly, but recently the Haslett Warehouse Company, which operates the Mission Rock dock and warehouse, together with a dozen others on the San Francisco waterfront, was confronted with a task for which the usual warehouse machinery was entirely inadequate.

The steamship Howick Hall, loaded with 10,900 tons, consisting largely of steel rails, pipe and plates, some of which were close to seven tons in weight, in addition to nearly 9000 bales of cotton, damaged her stern post in leaving port and was compelled to return to discharge her cargo in order to be drydocked.

The Mission Rock warehouse was found to be the only place on the San Francisco waterfront which could satisfactorily serve the need of rapid unloading of the cargo, placing it under cover and returning it to the ship at a moderate cost. This warehouse is situated on a small island some 200 yards off shore, with deep water docks, giving berth room for three large vessels. Its one-story building roofs an area of over three acres.

While the Haslett Warehouse Company is not unaccustomed to the handling of full cargoes, these have previously consisted mainly of sack and case goods, and the problem of handling such a heavy and variegated shipment was a somewhat novel one.

The Ford engine was called upon and added one more to its lengthy list of uses.

The Haslett Warehouse Company owns a fleet of tractors built by the Reliance Trailer & Tractor Company of San Francisco, which it has used for some years for hauling beans and coffee from the dock to its numerous warehouses, in some of which it operates large cleaning and grading plants. These Ford-driven tractors with the "flats" shown in the accompanying illustrations, were taken to Mission Rock and used with the greatest success. Although they had previously shown themselves capable of hauling six tons of beans over San Francisco's cobble streets, it was nevertheless surprising to see them hook to a pair of tongs fastened to a thirty-foot strip of steel weighing from a ton and a half to seven tons, and snake it over the floor to the pile within the warehouse.

The cargo other than the plates was handled on the flat cars, the ship's slings dropping the goods to them direct.

One tractor worked from each of the ship's four hatches with a set of three flat cars, one being loaded, one being in transit, and one being unloaded at the pile. In this way each tractor moved over two hundred tons per day of eight hours, or over twenty-five tons an hour.

Had the same work been done by ordinary hand-trucking methods, the services of seventy-five additional men would have been required and the work would have taken at least twice as long.

Loading the vessel was accomplished even more expeditiously than the unloading, the speed being only limited by the ability of the stevedores to stow the cargo.

This one experience has shown that a vessel in distress in the neighborhood of San Francisco may safely put into port for necessary repairs and have its cargo handled as promptly and as economically as anywhere else in the world.

Truck and trailer handling baled cotton

Truck and trailer handling steel bars

Pacific Coast Shipbuilding Company

Panoramic view of the yards of the Pacific Coast Shipbuilding Company at Bay Point, California

A REPRESENTATIVE of Pacific Marine Review recently had the privilege of inspecting the plant of Pacific Coast Shipbuilding Company at Bay Point, where many improvements are being installed by that company. Riding across from the station at Bay Point to the plant, we noticed a new trestle under which the roadway passed at one point. On inquiry this proved to be a spur from the Oakland, Antioch & Eastern Railway which was being built jointly by the Clayton Bay Point Company and the Pacific Coast Shipbuilding Company, and that as soon as this trestle was completed the trains of the Oakland, Antioch & Eastern would run right to the entrance of the shipyard.

On arriving at the shipyard we found that there was only one entrance which could be used during working hours. At this entrance we were received by the genial gentleman who has charge of the employment department of the shipyard, and we found that this one-entrance plan had been devised by him so that every man applying for employment and every man discharged or quitting for any reason had to pass through this office either going in or coming out, so that the employment department was thus put in personal intimate contact with every individual employed. This method of keeping in touch with employes is said to have been of considerable value and to have resulted in the elimination of many of the grievances which are bound to occur in any organization.

From this employment office we were taken to

Mold loft floor showing unusually large templet

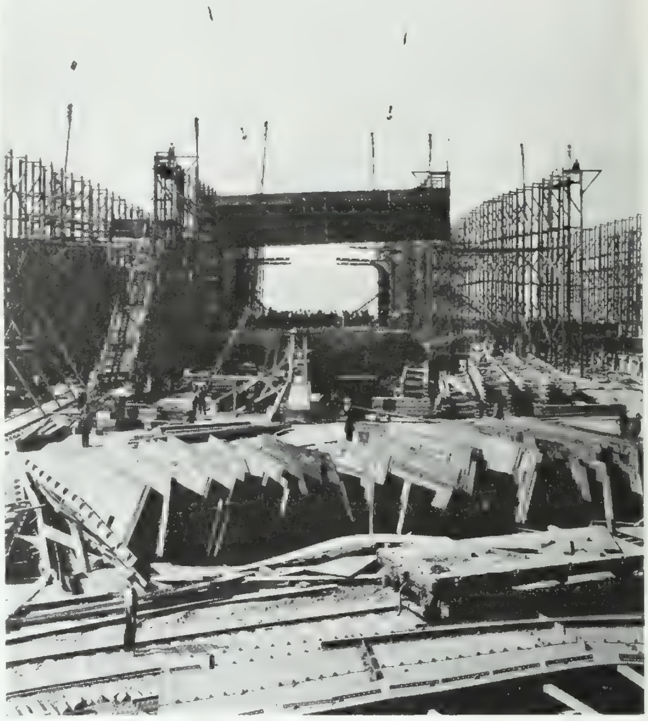
Plate storage yard, laying-out park and huge gantry crane at the Pacific Coast Shipbuilding Company the yard restaurant, where a very bountiful lunch was served, from which we proceeded on a tour of inspection.

The Pacific Coast Shipbuilding Company broke ground on its site on January 12, 1918. The site is on a geographical formation known as Seal Bluff where there is a good thirty feet of water facing the shore, and where the foundation is of good hard clay at a depth of about four feet below the surface. This clay has a bearing capacity of about two tons per square foot, so that practically no piling was necessary for the foundations of machinery in the shops or the shipbuilding ways.

The company has a contract for the building of ten 9400-deadweight-ton steamers for the Emergency Fleet Corporation of the United States Shipping Board. Three of these steamers have been delivered; one is finished and now at the outfitting dock having a few changes made in her heating plant; three are in the water at the outfitting dock; and three are on the ways.

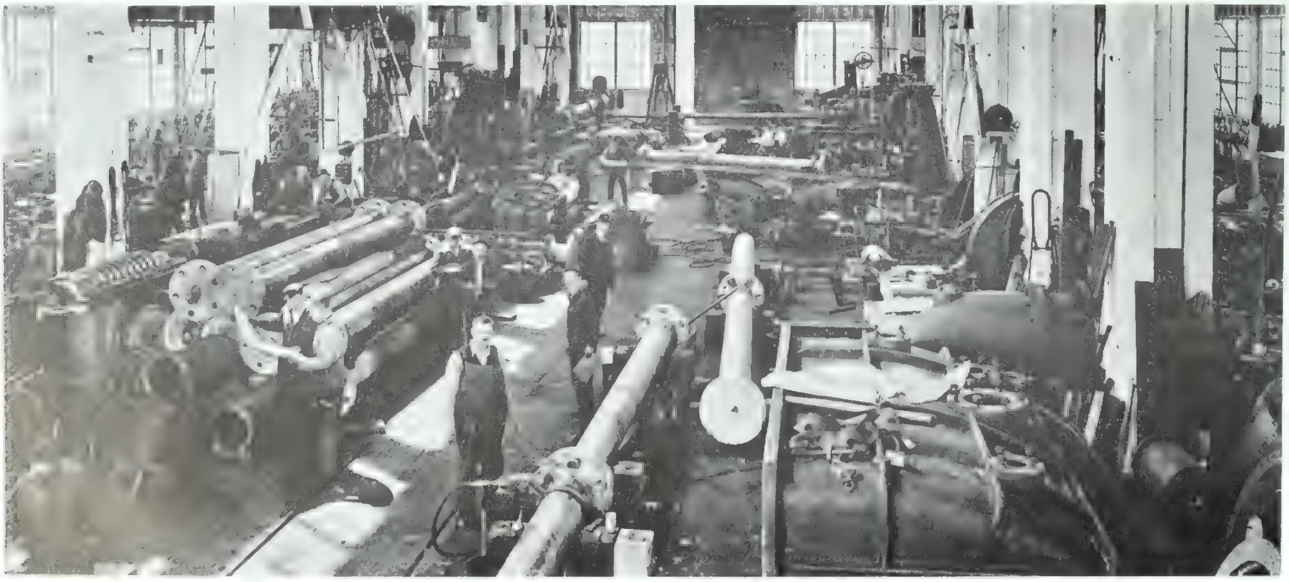
They have also recently undertaken a contract for the completing of two self-propelling oil barges for the Associated Oil Company. One of these is partly in frame and the keel of the other has just been laid. At the present time the plant is working approximately 1300 men.

There are four shipbuilding ways, the keel blocks being all of concrete. The ways are surrounded by the usual scaffolding and the material handled by overhead trollies on cables, using practically the same system that had been found so successful in the Skinner & Eddy yards on Puget Sound. The fabricating park at the head of the ship ways is also served by cable trollies and lies between the shipbuilding ways and the plate shop, on the other side of which is the plate and angle storage yard served by locomotive cranes and a huge electric traveling gantry. By this arrangement material passes in a straight line from the storage yard through the plate shop to the fabricating park and thence to the ship ways. The plate shop is of heavy frame construction of two stories, the upper being enclosed and housing the mold loft. The plate shop is adequately supplied with punching and shearing machinery and plate planers, and with portable electric drilling and countersinking machines and a set of liner rolls. Many of these machines were designed and built at the plant and the more important of them have already been described in detail in the columns of Pacific Marine Review.



Swinging a midship bulkhead into place with the aerial trolleys

Power is brought in from the Great Western Company's power line at 22,000 volts. The total full load is approximately 3000 horsepower, and the current is distributed to the various motors around the yard at 440 volts. In the main powerhouse there are two Bury air compressors of 1500 cubic feet capacity each, driven by direct connected Electric Machinery Company motors; and two Nagle air compressors of 3000 cubic feet capacity, direct connected to General Electric motors. These four air compressors carry the plant load very nice-



Main bay of the machine shop

Steamship Diablo built at the Pacific Coast Shipbuilding Company

ly, which at its peak sometimes reaches 10,000 cubic feet. In addition to these, there is one 500 cubic feet Ingersoll-Rand air compressor belted to a General Electric motor, which is used for emergency purposes and to carry light loads on holidays.

The air pressure is 103 pounds at the powerhouse, and the line drop amounts to about three pounds, giving 100 pounds' pressure at the mains on the slip ways. In all riveting work, oil fuel is used for the forges on shore and special devices are installed in the compressed air leads to the burners in the rivet forges to prevent wastage of the air at that point.

The machine shop is all heavy frame construction with a maximum amount of wooden sash and with a white-washed interior, giving a very fine lighting effect. All of the larger tools are individual motor driven and the smaller tools are grouped at one end of one bay and are driven by a group shafting system whereby one motor takes care of eight or ten tools in a group. There are three of these groups and it has been found that this system works out very economically in practice. The machine shop is taking care of the machining, of line shafting, of rudder stocks, rudder arms and tillers, of propeller hubs and practically all the heavy flanges and fittings which go into the ships they are building.

Many devices and tools have been designed and built in this shop and the tool room connected with it, so as to make possible the getting out of large work on comparatively small tools, and Pacific Marine Review hopes in the near future to have some special stories on some of these jigs and fittings.

The outfitting dock is served by an electric traveling wooden frame derrick of fifty tons' capacity.

Industrial Insurance at Moore Yard

THROUGH the medium of the Works Council the industrial governing body recently inaugurated in the shipyard of the Moore Shipbuilding Company of Oakland, the company on Saturday, April 17, signed a group life and permanent total disability policy for $2,500,000 to insure every one of its 6,000 employes in Oakland and San Francisco. This new expression of industrial relationship between the company and its employes places in the hand of each person working in the plant, without cost to the workmen, a life and total disability policy of $500, which automatically increases $100 a year until the face value of the policy reaches $1000.

This new free group insurance was signed by George A. Armes, president and general manager of the company, in the presence of representatives of the Aetna Life Insurance Company of Hartford, Connecticut, at the close of a meeting of the Works Council, where the plan had received the unanimous endorsement of the industrial governing body of the shipyard.

The insurance is in no way a substitute nor will affect the present industrial and compensation insurance provided for by the laws of California, and already in force in the Moore Shipyard, but is an additional insurance ranging from $500 to $1000, which covers the employes of the Moore Shipbuilding Company, irrespective of whether they meet death or permanent total disability in pursuit of their employment in the shipyard, on a week-end excursion, sickness, operations, or any other remote cause.

While each individual life of the 6000 employes of the company became insured for $500 when the contract was signed by President Armes, those employed in the future will not enjoy the benefit of the free insurance until they have worked for the company one month. The insurance automatically terminates when the individual leaves the employ of the company.

The $2,500,000 free group insurance was announced to the workmen on boards as they were leaving the shipyard. The notices explained that the insurance plan provided for policies ranging from $500 to $1000, dependent on the length of service of the employe. They were further notified that the policy remained in force absolutely free of cost to the employes, as all the premiums would be paid for by the Moore Shipbuilding Company and that the face value of each policy will be paid to any beneficiary by the Aetna Life Insurance Company upon the death or permanent total disability of an employe.

This free group insurance is only one of several measures the company has under consideration and to eventually be presented through the Works Council to promote a better relationship between the employer and employe. The free group insurance was the first of the measures to be adopted, as it was deemed by the Works Council one of the most effective means in which the company could do something for their employes and their families.

The Moore Shipyard is the first one on the Pacific Coast to adopt free group insurance for its employes. The insurance is made easy to obtain, as it requires no medical examination. To enjoy the full measure of the insurance the employes must be actively at work, although absence because of sickness or any other legitimate cause, not to exceed two weeks, does not nullify the policy.

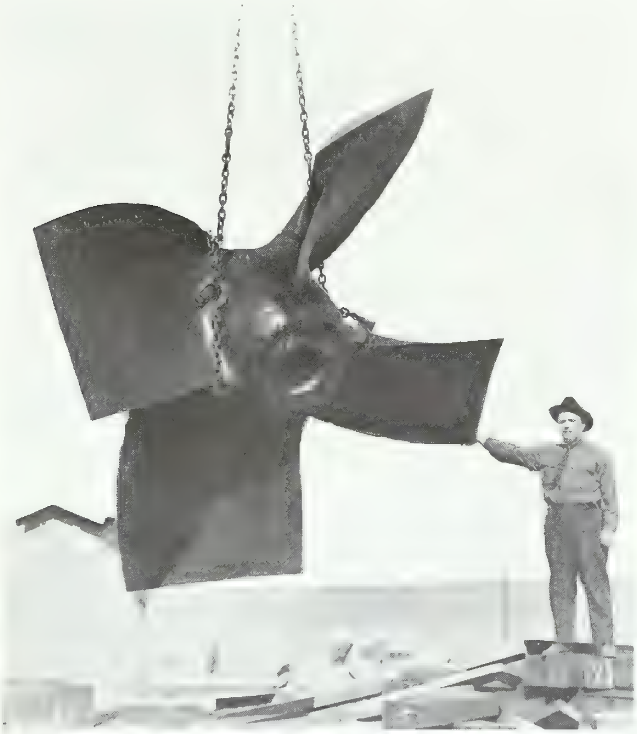
A Remarkable Welding Job

THE Southwestern Shipbuilding Company have very recently completed successfully a rather unusual repair by welding the tips of the blades of a large cast iron propeller for the steamship Tascalusa which had been broken and the foreman of the welding department of the Southwestern Shipbuilding Company proposed that the wheel be repaired by oxy-acetylene welding. After considerable discussion and with the consent of the inspectors for the Standard Oil Company who were operating this vessel, it was decided to try this method.

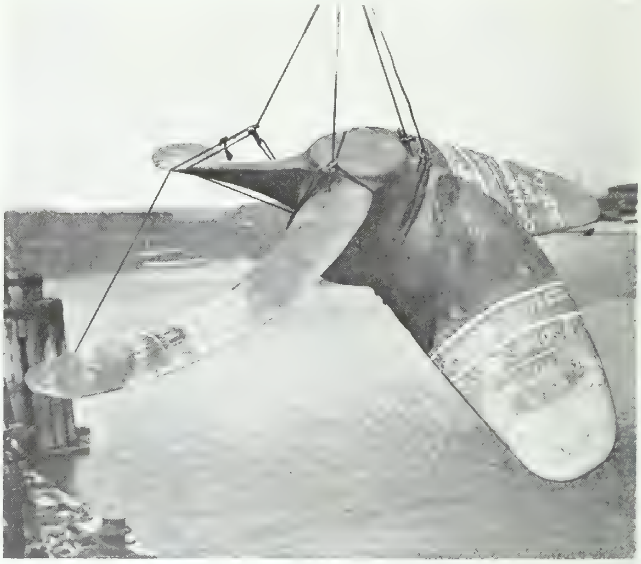
The blades of the old wheel were sawed off and an analysis of the material made and furnished to the foundrymen, who used this information in matching as closely as possible material of the new tips to the material in the old wheel. The tips were cast, then each blade of the wheel was carefully bricked up with firebrick backed by sand and asbestos and preheated to within twelve inches of the root of the blade. The new tip was screwed on to strong backs and bolted to the old body of the blade; the strong back being so constructed that it allowed one and one-quarter inches for shrinkage in the welding operation. The weld was made entirely with the acetylene torch and approximately 260 cubic inches of new metal was used in each weld, or a total of about seventy pounds.

After the weld was completed the entire blade was covered with asbestos pads and left to cool. The time allowed for cooling each blade was approximately fifteen hours. The surfaces to be welded were prepared with a torch by burning the metal to a flowing heat and the entire mass of new metal was kept in this state until the weld was completed. The new tips weighed approximately 800 pounds each.

Just before the wheel was loaded on the vessel, the sling in which it was being carried by the crane accidentally broke and the wheel was dropped about four and one-half feet. The fact that no damage was caused by this drop is accepted as showing that there were no internal stresses in any part of the metal and the company's experts are firmly convinced that the wheel is as good as a new one.



The cast iron propeller wheel of the steamship Tascalusa with defective tips cut off ready for welding operation



View of the propeller showing finished welds

Plate yards and fabricating park at the Southwestern Shipbuilding Company

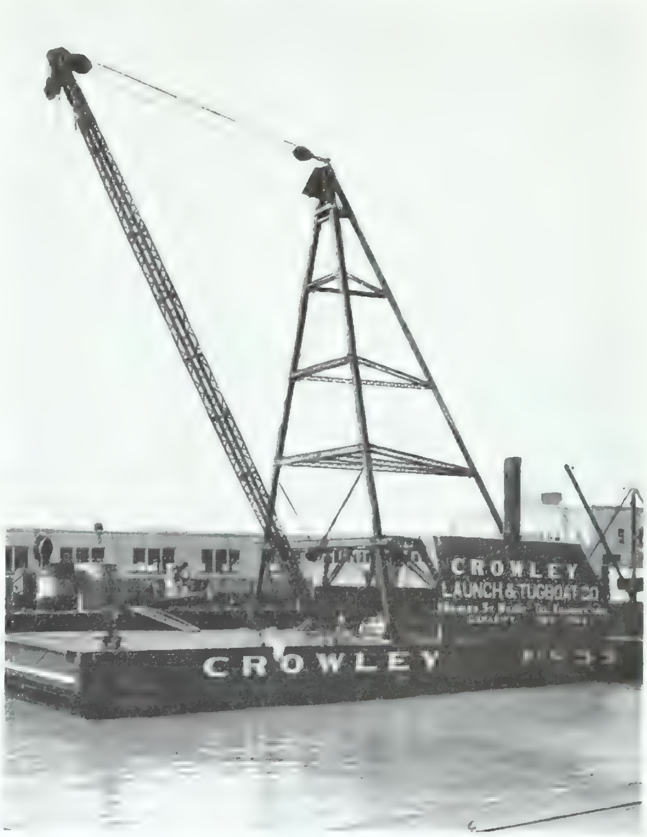
One-Hundred-Ton Wrecking Derrick

AFTER seventeen months of careful, painstaking construction work, the Crowley Launch & Tugboat Company recently finished what is said to be the largest derrick barge of its kind on the Pacific Ocean. Our pictures give a very good idea of the general appearance and arrangement of the barge and of its machinery, which were designed by Leland S. Rosener and built and equipped at the Crowley Shipyard. This craft is as staunch, sound and complete a piece of cargo handling and salvage apparatus as any that floats on waters adjacent to the Pacific Coast.

The barge itself is 100 feet long, 50 feet wide, and 11 feet deep. Above this wooden hull towers a triangular girder frame of steel 85 feet high. The boom is a lattice girder of steel 100 feet long and is designed to take 100 tons at a 50-foot radius and an 18-ton weight on its maximum working radius. The lines for the 18-ton hoist, for the 100-ton hoist and for luffing the boom are all carried from blocks at the top of the boom to blocks at the top of the stiff frame, and from thence down to sheaves on the lower cross member of the frame, thence to the winches in the deckhouse under the frame. This deckhouse encloses an engine room, as shown in the illustration.

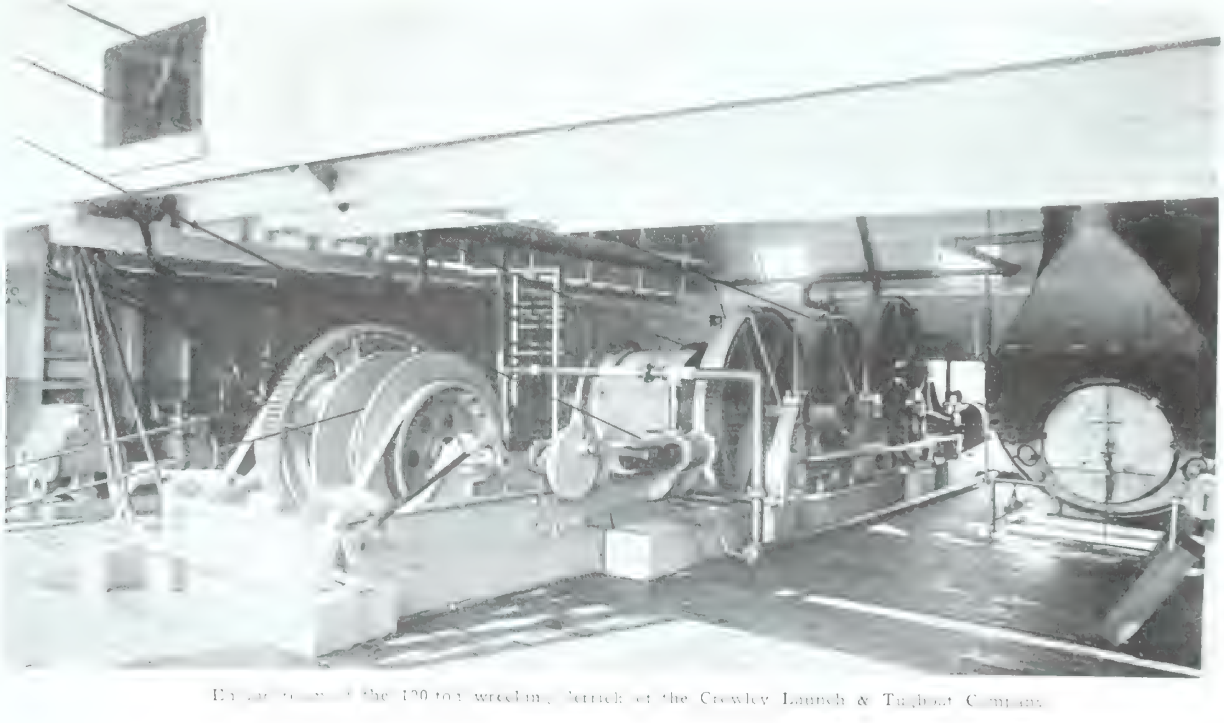
Power is supplied by an oil-burning Scotch marine boiler to a 100-horsepower engine driving a triple drum winch—one drum for the 18-ton hoist; one for the 100-ton hoist, and one for luffing the boom. There is in addition to these a smaller engine driving a double drum winch, which is used for swinging the boom.

Complete electric outfit is provided and a large air compressor for working drills and other tools, or for supplying air to pontoons, or for forcing water out of wrecked hulls.



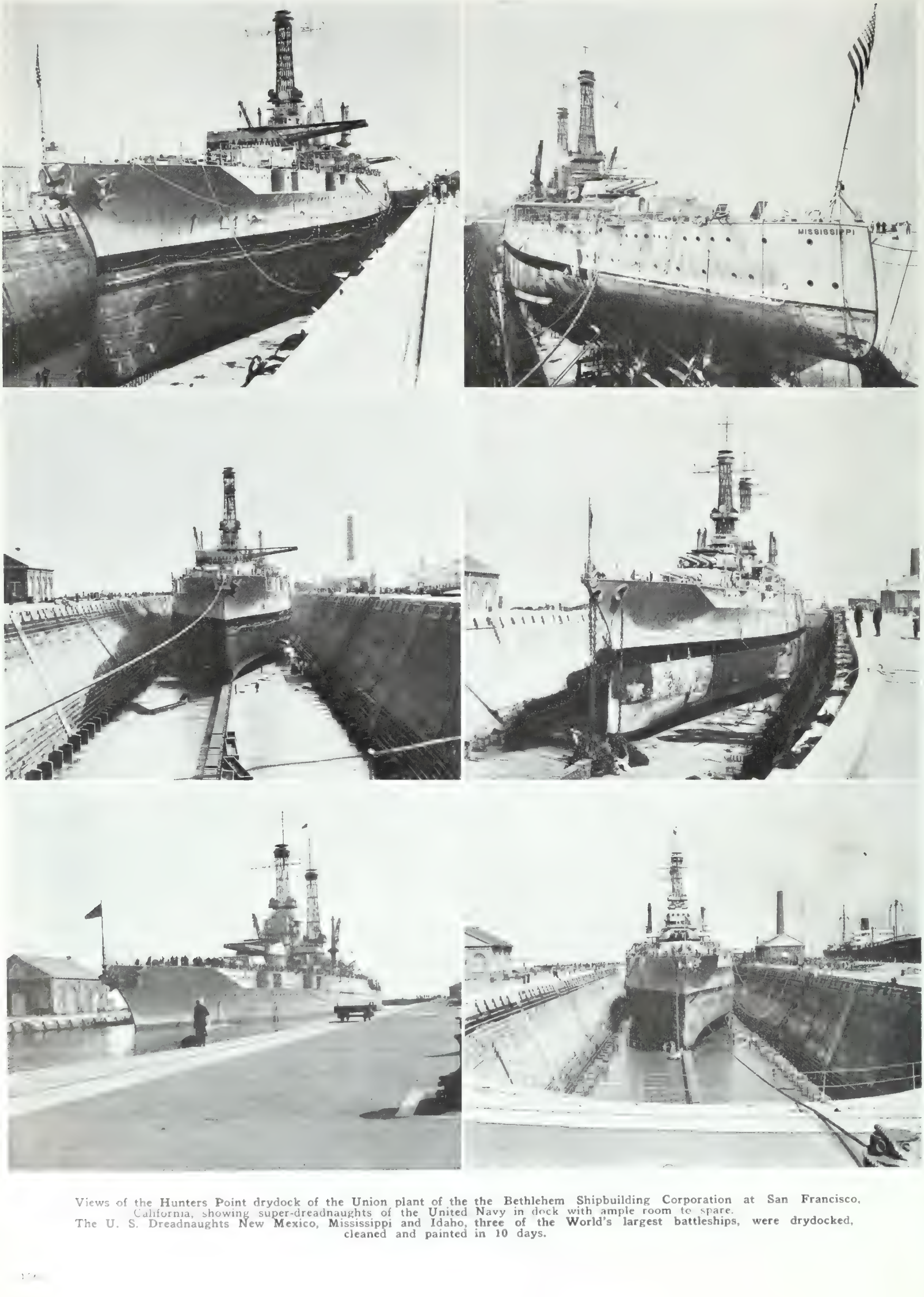
100-ton wrecking derrick of the Crowley Launch & Tugboat Company

Living accommodations are provided for a crew of twenty-five men and the barge carries sufficient fuel and fresh water to remain outside on a wrecking job for several weeks at a time. This derrick will certainly be a very great addition to the waterfront facilities of the harbor of San Francisco.



Engine room of the 100-ton wrecking derrick of the Crowley Launch & Tugboat Company

Largest Drydock on the Pacific Ocean



Views of the Hunters Point drydock of the Union plant of the the Bethlehem Shipbuilding Corporation at San Francisco, California, showing super-dreadnaughts of the United Navy in dock with ample room to spare. The U. S. Dreadnaughts New Mexico, Mississippi and Idaho, three of the World's largest battleships, were drydocked, cleaned and painted in 10 days.

Cleaning and Painting the Bottom

ONE of the most important branches of the ship-painting industry is that which applies to the portion of the hull below the waterline. The corrosive action of salt water on steel, together with animal and vegetable growth which accumulates on all things submerged in the waters of the ocean, requires constant vigilance on the part of the shipowners, and makes necessary the drydocking of vessels at regular intervals, usually from six to ten months, to scrape and repaint the bottoms. This preserves the steel from corrosion and eliminates the multitudinous growths, which vary in volume and character according to the waters in which the vessel sails.

The latter item has a distinct and important bearing on the speed and fuel consumption. Vessels plying between San Francisco and Asiatic ports usually drydock every third voyage. On one occasion the fourth voyage was made without docking and it was discovered that the excess cost of fuel over the first voyage, in order to maintain the required speed, represented more than the entire cost of drydocking and painting the ship.

The conditions under which ships are painted on drydock make it different from any other branch of the painting business. Ships coming into port must discharge their cargo, take on fuel and outbound cargo, and sail on schedule time. The drydock work is sandwiched in and therefore is always done in a hurry. The work is ordered to be done quickly and absolutely according to specifications and this regardless of wind, weather or labor conditions. The entire surface to be scraped, washed and given two coats of paint within twelve or twenty-four hours, depending upon the size of the ship.

When the ship is drydocked it rests on keel blocks with the bottom of the ship four or five feet above the floor of the drydock. Under the old method of handpainting it was necessary to set up complicated staging or sling scaffolds from above. This took considerable time and increased the cost of labor. To increase the speed on this type of work and to reduce the labor cost has been the ambition of the various companies employed in this type of work. The painting problem has been solved by the invention and use of the spraying machine, but various methods of cleaning and scraping are being tried out continuously so as to help reduce the cost as the painting machine has.

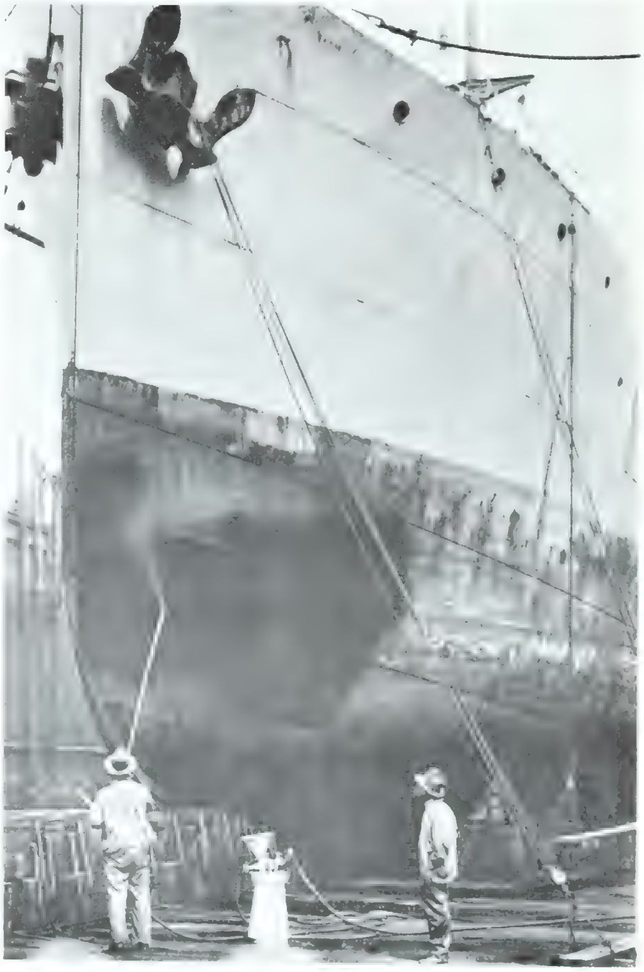
It is to the credit of the men in charge of the painting at the Union Plant of the Bethlehem Shipbuilding Corporation to have invented a practical paint spraying device. It is of simple and fool-proof construction and operated by compressed air. It consists of a paint container and air line with a nozzle. The paint is atomized at the tank and carried through one of the hoses in a suspended condition to the end of the regulating nozzle. This nozzle is fastened to the end of a piece of pipe approximately eight feet long as shown in the accompanying photograph, the advantage of this pipe being that the painter is not required to come into close contact with the atomized paint and also enables him to reach to a considerable height. The ship can be painted up to the 18 or 20 foot mark without the use of staging. The capacity of the machine on straight work is in the neighborhood of 500 square yards an hour. Any kind of paint or liquid, thick or thin, can be sprayed with equal ease.

This method of painting is considered far superior to painting performed by hand as it is almost certain that paint will enter into and completely cover all surfaces, cracks or other indentations and at the same time gives a smoother surface.

There is less paint wasted and a much greater percentage applied to the surface by the spraying method than by the hand and brush method. This amounts to a considerable saving to the shipowner, for as a rule he supplies his own paint.

The wages of a ship painter have increased considerably in the past few years, but the cost of painting ships has not shared in the same rate of increase. This is due to the fact that the paint spraying machine is a labor saving device and that the shipowners have received the benefit of it.

Recently the United States Army transport Mt. Vernon drydocked at the graving dock of the Union Plant of the Bethlehem Shipbuilding Corporation at Hunter's Point. It was cleaned and painted with 680 gallons of paint in seventeen hours. This wonderful record was only made possible by using the paint spraying machine.



Paint spraying as practiced at the Union plant of the Bethlehem Shipbuilding Corporation

Drafting at the Moore Shipbuilding Company

By Frank Mulgrew

Ben Hedstrom and Alec Greig, naval architect and estimator, at the Moore Shipbuilding Company

THE heart of a shipyard may well be said to center in the drafting room, for it is the work of this department that governs the success or failure of any great shipbuilding ter how efficient the concern. No mat- organization and equipment of a yard may be, if the designing department cannot initiate conceptions for work of the highest quality at minimum expense, the yard cannot hope to exist under the present competitive systems of this country and Europe.

In Ben Hedstrom, naval architect, and his corps of assistants, this company has an engineering department that will compare favorably with that of any shipbuilding concern, bar none. Hedstrom's ability and remarkable foresight have in no small way been a factor in the great success of the Moore Shipbuilding Company.

The company, even during the pressure of war conditions, has always designed their own vessels, and the actual records of the various types built prove their practicability, workmanship and seaworthiness of design.

Naval architecture, more than any other profession, requires a complete and working knowledge of practically every known engineering science; consequently the naval architect when he designs a vessel has no small task before him. Also there are many variables in the design of a ship that only one of experience and the keenest judgment can hope for results approaching the desired requirements.

An owner in placing an order for any certain type of vessel is interested in three vital points: namely, tonnage, speed and fuel consumption. For it is these requirements that determine a vessel's worth as a cargo carrier—that is, ability to carry freight at a minimum cost per ton which necessarily demands an economic vessel. Most contracts are based on these requirements and from the naval architect must derive the hundreds of other necessary requirements, but still keep to the original demands. Not only this, but as all vessels are insured, the vessel must also meet the stringent requirements of the classification societies.

As the tonnage of a vessel varies as to its size and shape, the speed of a vessel varies according to shape and horsepower. Likewise the fuel consumption varies with the machinery, design and horsepower, which in turn varies with the speed which varies with the size and shape of the vessel. One can begin to glimpse an idea of what a naval architect has before him when he is asked to design a vessel of certain given requirements. He must also determine an endless number of technical requirements, such as the center of gravity, center of buoyancy, metacenter, tons per inch immersion, fore and aft trim, period of roll, righting moment, docking requirements, and so on. All of this being necessary so that a vessel will be seaworthy, that it will not roll over during storm, or that it will not be "cranky" and jerk itself to pieces with undue straining. He must also see to all necessary machinery and equipment, as boilers, main engines, condensers, pumps, blowers, generators, motors, steering and anchorage requirements, cargo handling equipment, deck machinery, standing and running rigging, piping, wiring, ladders, life saving equipment, living requirements, etc. He must also make proper provision for drainage, ventilation, lighting, sanitation, signaling, heating, refrigeration, living conditions, etc.

After the general requirements of a vessel are determined, the preliminary and line drawings made, the actual detailing of the work is then begun. A quarter inch to the foot model is made and from this and the preceding data the various sections and details are derived.

All drawings pertaining to the hull construction proper, namely, all structural work (both metal and wood), including the hull proper, superstructures, hull and deck attachments, machinery seatings, masts, rigging, wood details, etc., are gotten out by the hull department under the supervision of George Müller, chief draftsman.

All machinery requirements—boilers, propelling machinery, condensers, auxiliaries, pumps, deck machinery, piping, wiring, etc.—are turned over to Chief Engineer P. L. Joslyn, head of the engineering department. Under his and W. C. Williamson's (chief draftsman of the engineering department) personal supervision, all machinery details are made. When one considers the number of machines and fittings, the number of miles of piping and wiring in a vessel, each of which must be properly designed and connected, it is evident that the engineering department is quite as important as the hull department and requires as many, if not more, draftsmen to carry out its mass of detail.

Blue prints, Van Dyke prints, and photo prints are made in the print rooms under the supervision of P. L. Lund. The rooms are thoroughly modern in equipment, having a large Pease blue print machine, with an automatic washing and drying attachment capable of running off from four to six hundred standard sized prints per day.

The estimating is done under the personal supervision of Alec Greig, whose record for accuracy and dependability speaks for itself.

With Hedstrom, naval architect; Joslyn, chief engineer; Greig, estimator; Müller, chief draftsman of hull department; and Williamson, chief draftsman of the mechanical engineering department, the Moore Shipbuilding Company has a corps of men who know.

Alicia Haviside

FEW clearings in late years have drawn so much attention as has that of the barkentine Alicia Haviside on her initial trip from San Francisco to Puget Sound.

This ship, originally the Apama, was started at a Humboldt Bay shipyard as a Ferris type wooden steamer for the United States Shipping Board. Following the armistice she was ordered changed into a barkentine, and before this change was completed she was sold to her present owners, the Pacific Freighters Company, who are completing four other Ferris hulls as barkentines and expect to have the last of the five ready for sea about the end of May. These vessels are all being rigged by Haviside, Withers & Davis of San Francisco.

As a number of other government wooden hulls were being changed into sailing vessels, the performance of the first completed sailer is being watched with great interest. Amongst the vessels changed to a sailing type are: One Ferris type ship for the Chas. Nelson Company; two Peninsula type, the Oregon Fir and the Oregon Pine, being finished as six-masted schooners by Grant Smith & Co.; three Ferris hulls in Oregon purchased by Captain W. Z. Haskins and Captain Reynolds, to be finished as schooners; one Ferris type at the Sommarstrom Shipbuilding Company's property, to be finished as a four-masted barkentine for M. A. Pederson.

This maiden voyage of the Alicia Haviside was made under very adverse conditions; the first fifteen days being all spent in fighting a succession of northerly, northwesterly and easterly winds, so that at the end of the first eleven days she was five hundred miles to the westward of the Farallon Islands and fifteen miles north of San Francisco, and the fifteenth day out she was about abreast of Humboldt Bay. On account of this weather the only possible way to judge her sailing powers is to compare her trip with that of sailing vessels of known ability which were making the same voyage at about the same time.

The schooner G. E. Billings, rated as a very smart sailer, reached Puget Sound from San Francisco on February 26 having been twenty-three days en route. The Alicia Haviside was towed out of the Golden Gate February 12 and made Puget Sound in the same number of days. Her best time was on March 4, when with west, west-southwest and west northwest winds she logged thirty-seven knots in each of two four-hour watches and the least distance covered in any four-hour watch on that day was thirty-one knots. On her arrival at Puget Sound she proceeded to Hasting Mill, Vancouver, B. C., and took on a load of lumber for South Africa.

This vessel has the distinction of being the pioneer American built wooden five-master on the Pacific, but judging her by the interest taken in her initial performance, there will no doubt be many others added to that class in the near future.

Since the above was written we learn that the Alicia Haviside before starting on her maiden voyage as a lumber carrier was loaded as follows: 518 long tons of ballast were distributed fore and aft in the bottom of the hold, 736,000 feet of lumber were stowed in the hold, 666,000 feet 'tween decks and 421,000 feet on deck, making a total of 1,823,000 feet. This brought the ship down to a draft of 22 feet 2 inches aft and 21 feet 3 inches forward, leaving a freeboard of 6 feet 9 inches. The assigned freeboard according to the American Bureau is 5 feet 5 inches, and Captain Hanson maintains that with 625 tons of ballast she could carry 1,925,000 feet of lumber.

Barkentine Alicia Haviside of the Pacific Freighters Company

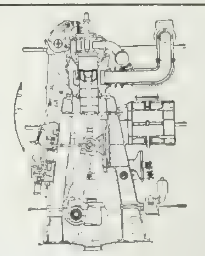
WILL BUILD DIESELS

GEORGE A. ARMES, president and general manager of the Moore Shipbuilding Company of Oakland, and R. S. Moore, chairman of the board of directors, will depart early in May on a trip to Europe, which will have for its purpose the investigation and acquisition of Diesel engine patent rights. Mrs. Armes and Mrs. Moore also will be in the party.

Available Diesel licenses will be investigated carefully with a view to acquiring the best for manufacture by the Moore Company at Oakland. There are several different forms of the Diesel engine, all variants of the primary principle, and some of these already are manufactured on the Pacific. The intention of a company of the magnitude of the Moore Shipbuilding Company to enter the Diesel field is a testimonial of the rapidly-growing importance that the internal combustion engine is assuming in the American marine field.

On the trip Messrs. Armes and Moore will visit London, Paris, Brussels, Copenhagen and Christiania.

Oil Engines and Motorships



Successful Wooden Motorships

RECENTLY a very trim looking motorship caller at San Francisco on her way from San Pedro to Puget Sound. This was the Boobyala, recently purchased from J. E. Chilberg of Seattle by the Pacific Freighters Company. The general appearance of this vessel and the ease with which she was handled attracted a considerable amount of attention and a great deal of favorable comment from experts along the waterfront.

The Boobyala is of 2457 tons net register, 281 feet 6 inches in length, 48 feet beam and 27 feet molded depth. She was built by the Patterson-MacDonald Shipbuilding Company of Seattle, and was one of a contract calling for ten steamers for the Commonwealth Government Line of Australia.

This line had on contract at the same time four wooden motorships at the Sloane Shipyards Company, and these motorships having proved the superior economy of full-powered Diesel engine ships over steamers, the contract with the Patterson-MacDonald Shipbuilding Company for the last five of the original ten steamers was changed to specify full Diesel propulsion.

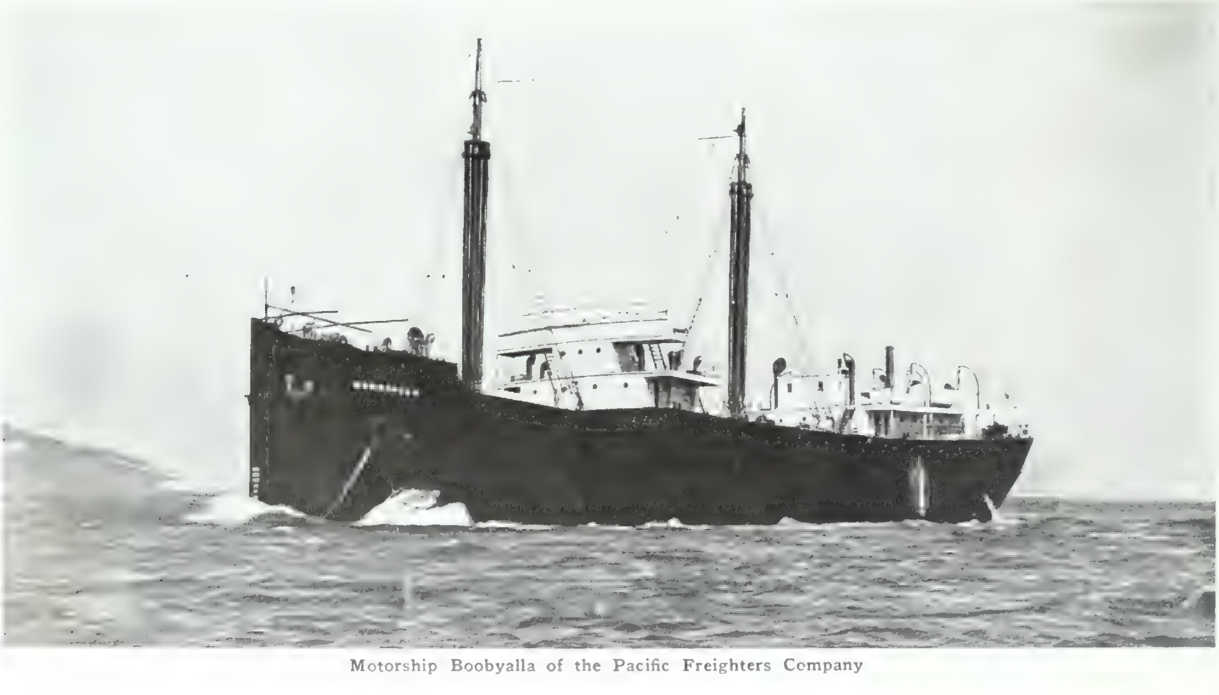
These five motorships were bought from the Australian government by the Chilberg interests at Seattle, together with the four motorships built by the Sloane Shipyards Company.

The Boobyala, now on her maiden voyage, is the fourth of the Patterson-MacDonald ships—the other three being the Benowa, the Babinda and the Balcatta. The four Sloane-built motorships are the Cethana, the Challamba, the Culburra and the Coolcha.

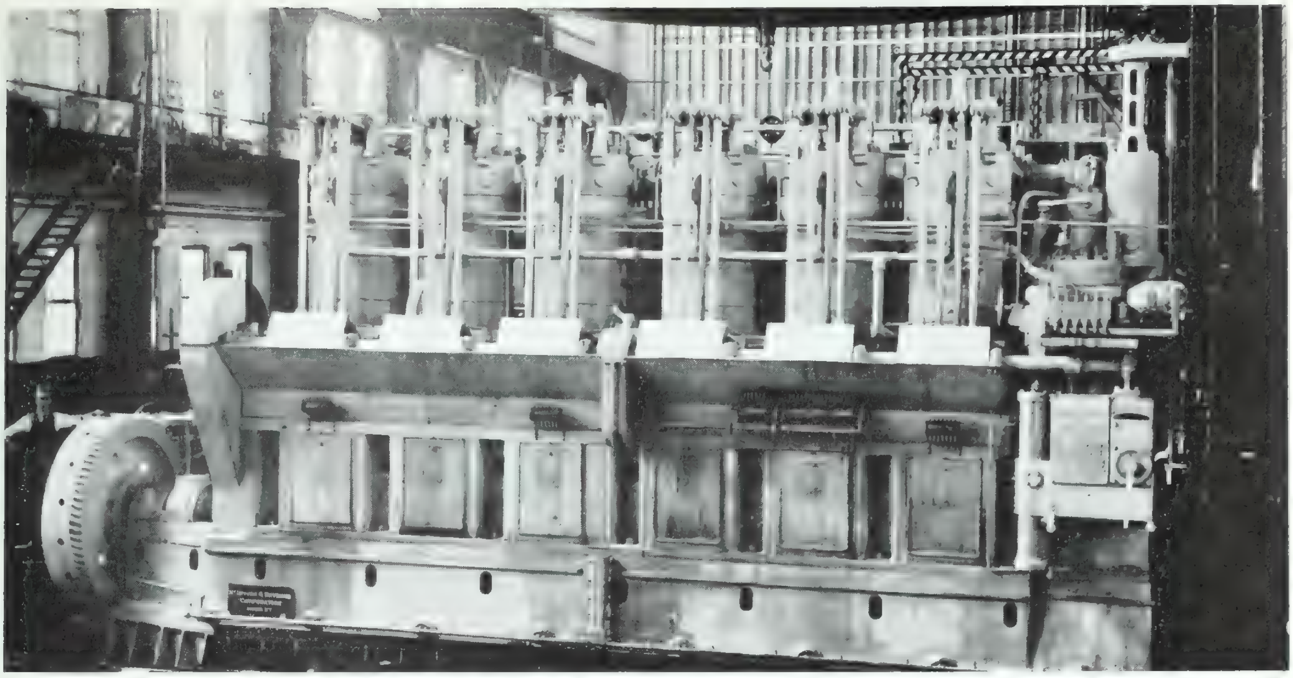
Here is the record of what these ships have been doing since they were taken over from the Australian government: The Benowa took a cargo of 1,700,000 feet of lumber from Seattle to British East Africa, touching at Singapore March 8, and having no trouble of any serious nature whatever. The Babinda took a lumber cargo from Seattle to Bombay, and the captain writes from Bombay that Mr. Taga, manager for the consignees of the cargo at Bombay, was convinced after inspection of the ship that she would carry in good shape any cargo that should be put into her. The Balcatta took a full cargo of lumber from the Columbia River to Melbourne, from whence she proceeded in ballast to Newcastle, where she loaded coal for Callao, arriving there on March 12. The home office had figured that she would be there on the 11th, which in a 6000-mile run with heavy underdeck cargo shows very good consistency in her propulsion.

It is interesting to note that when the Melbourne people had inspected this boat, their newspapers immediately began publishing articles captioned "Why Can Americans Run These Vessels When We Can't?" The answer being, of course, that the Australian government had provided political engineers who had no conception whatever of motorship practice, or, in fact, any kind of marine work.

The Balcatta is now chartered from the west



Motorship Boobyalla of the Pacific Freighters Company



McIntosh & Seymour direct reversible marine Diesel engine of 500 s. h. p.

coast of South America to Honolulu with nitrate. The Boobyala, last of the Patterson - MacDonald ships to be delivered to the Chilberg line, has not yet been so thoroughly tested as the others, having only made a round-trip coastwise run as mentioned above. She is now being loaded with a full cargo of lumber for the west coast of South America and is chartered to carry nitrate back to San Francisco, but so far she has shown a clean pair of heels to everything in her class.

The Cethana took a full cargo of lumber to West Hartlepool, England, and outside of a few minor repairs at the canal which delayed her for a few days, had absolutely no trouble. She is now on her way back across the Atlantic and will bring from the east coast a general cargo. The Culburra is on her way to Antwerp with a full cargo of lumber. The captain of this vessel, writing from the Canal, says: "This vessel has done all I expected of her, and more." The Challamba has arrived with a cargo of lumber at Alexandria from Puget Sound. A letter written by Captain Larsen says: "This vessel, loaded with lumber, is one of the best sea-boats I was ever in. Her engines have been going like a clock ever since we left and she makes 9½ knots in favorable weather. We loaded 1,614,000 feet of lumber at Portland, but after trying the ship out at sea I am confident she can take another 75,000 feet on deck and be seaworthy." The Coolcha took a full cargo of lumber from Puget Sound to Antwerp, where she arrived March 25 all well. According to the testimony of the traffic manager of the Chilberg Line not a single one of these eight ships has given them any trouble which could be traced to the Diesel engines or the wood construction.

An analysis of the log of the Boobyala on her first trip from Port Blakeley to San Pedro with the full cargo of lumber mentioned above shows that on a twenty-four hour day her average fuel consumption was 4.77 tons of fuel oil and 10.4 gallons of lubricating oil for all purposes, and that her average speed was 8.58 knots. This is a very creditable performance in view of the fact that for about thirty hours of the five and one-half days she was bucking a heavy southeast gale with her deck load of lumber, which reduced her average speed during that period to 5.83 knots an hour.

These motorships are all twin screw, driven by twin McIntosh & Seymour six-cylinder, four-cycle direct reversible marine Diesel oil engines of 640 i. h. p. and 500 s. h. p. each. The four Patterson-MacDonald ships are equipped entirely with electric auxiliaries, which greatly aid their showing in economy of operation. The four Sloane ships are equipped with steam auxiliaries driven from a donkey boiler installation, and it has been found in practice that this type of auxiliary plant consumes practically one-third of the total daily consumption, whereas an analysis of the log of the Boobyala would show her total consumption to be in the neighborhood of fifty-eight gallons an hour, of which the electric auxiliary plant uses only four gallons, or less than one-fourteenth of the total.

A comparison of the fuel economy and the practical performance of these motor vessels with any wooden or steel steamer in the same class will show that the motorship, properly managed and manned, will bring in each year a decidedly larger net return than the steamer. The shrewdest ship operators in the world are fact coming to recognize this fact and the most conservative of them are now so confident of the reliability of the marine Diesel engine that they are ordering cargo tramp steamers of the single screw type with 3000 horsepower Diesels to take the place of similar sized reciprocating steam engine Scotch marine boiler tramps that were lost to the enemy submarines in the late war.

No shipowner, considering the propulsion plant for a new ship, can afford to overlook a thorough investigation of the claims of the marine Diesel engine. This is especially true of American ship owners on the Pacific Coast engaged in overseas' trade, because the greater the length of voyage the greater the economies that can be effected by the use of internal combustion heavy oil engines.

Motor Shipbuilding in Europe

Motorship Ansaldo San Giorgio III, one of eight standard motorships being built by the Ansaldo Company in Italy

ONE of the most striking features of the present motor shipbuilding position in Europe is the willingness of shipowners to place orders for internal combustion engined vessels with shipbuilders who, though they have carried out a good deal of experimental work, have hitherto not been responsible for the completion of any motorships in service. No better proof could be afforded of the confidence which is now felt among shipowners generally in this class of vessel. Various instances of this policy could be cited, among the orders which have been placed during the past few weeks. One of the most interesting of these is a contract which has just been fixed by the Transatlantic Steamship Company of Gothenburg with William Doxford & Sons of Sunderland for the construction by the latter firm of a standard motor cargo ship with a deadweight carrying capacity of 10,800 tons. Doxfords already have two of these vessels on the slips and it is not improbable that half a dozen more will be laid down as soon as the berths are available. These ships represent a new departure in the construction of internal combustion engined craft. Most of the vessels that have been built have twin screws, but in the Doxford ships, which are 420 feet in length with a beam of 54 feet and a draught of 25 feet, only one engine is fitted, this being of the new Doxford opposed piston type based on the Junker design. The motor develops 3000 i. h. p. in four cylinders, and the speed is 77 r. p. m. The boat is designed for an average speed of twelve knots, thus representing the most up-to-date class of cargo ship. The Transatlantic Company, who already own three 10,000-ton motor vessels and have two similar crafts on order at Gothenburg, as well as a motor tank ship of 7000 tons, have acquired options on the shipbuilding berths of the Gothenburg Shipbuilding Company for the construction of five more motorships when these berths become vacant. It is one of the best recommendations of the motorship that firms such as the Transatlantic Company, who have had three or four years' experience with their operation, are now embarking upon such extensive programs of construction and are abandoning practically entirely the construction of steamers.

Scandinavian shipowners, having filled up their own shipyards with orders for vessels with Diesel engines, are coming to Great Britain in order to obtain new motorships. Orders have just been placed for two vessels for the Thoresen Line of Christiania, to be built in Scotland, while the manufacture of the machinery is to be undertaken by Hawthorne, Leslie & Company, the well-known Tyne marine engineers, who have during the past month or so obtained a license for the construction of the Dutch Werkspoor Diesel engine, now being built in America by the Skandia Pacific Oil Engine Company.

Another instance of the same policy is provided in the 5000-ton motorship which has been ordered by the Orient Steamship Company of Stockholm with Palmers on the Tyne. This boat, which is 330 feet in length and is considerably smaller than the type usually favored by shipowners, is fitted with an engine operating on the two-cycle principle, built by Sulzers, developing 800 b. h. p. at 140 r. p. m. It is somewhat strange to note that Sulzers Brothers, whose works are situated in the heart of Europe far from the sea, are now becoming one of the leading firms manufacturing marine Diesel engines. Among the orders they have on hand is one for Scandinavian owners for the machinery of two 9000-ton vessels, in each of which a couple of 1350 b. h. p., four-cylinder sets are to be installed. In addition they are providing two 1600 b. h. p., four-cylinder motors for a slightly larger vessel, two of 1350 b. h. p. for another 9000-ton ship, one of 800 b. h. p. for a 5000-ton vessel, and two of 1350 b. h. p. for installation in a motor vessel under construction in Great Britain.

Many engineers who have seen these latest types of Sulzer engines believe that they represent the last word in marine oil engine construction. Owing to the fact that they operate on the two-cycle principle, they are a good deal lighter and occupy less space than the four-cycle type and it is stated that their cost of construction is substantially lower. They are, moreover, designed to run at low speed (85 to 90 r. p. m.), which renders them suitable for the average eleven or twelve-knot cargo ship. Their simplicity is undoubted, since the only mechanically operated valves in the cylinder covers are the fuel inlet and starting air valves, which are arranged within one pocket, and the builders consider that they have developed a motor in which every element of unreliability has been removed. Latterly it has been the fashion to decry the two-cycle motor for marine work, and the majority of orders that have been placed for motorships are for the vessels equipped with four-cycle machinery. If the claims of the builders of the two-cycle type can be confirmed, however, the position may become distinctly modified in the course of the next year or so. Even in the matter of fuel consumption there is very little difference to be noted and the modern two-cycle type with port scavenging usually has a fuel consumption of about 0.42 pounds per b. h. p. hour, or about 5 or 6 per cent in excess of the four-cycle type.

Another peculiarity of the Sulzer installations for the machinery referred to above is that an entirely new system of scavenging has been adopted. Instead of driving the scavenging pumps off the main engine they are arranged as separate machines of the rotary type coupled to electric motors, running at high speed. The advantage of this system is that the pressure and quantity of the scavenging air can be varied and it can also be heated when starting up the engine. Moreover the main propelling machinery occupies a shorter length and the builders are so confirmed in their belief in this arrangement that they have decided to standardize it for all equipments which they are now providing

Standard Motorships for Italy

A further example of the progress of the two-cycle marine oil engine is seen in the completion of the third standard ship by the Ansaldo Company in Italy, which has just started on her maiden voyage. This vessel is named the Ansaldo San Giorgio 111, is one of eight sister motorships which are to trade on the newly inaugurated route between Italy and South America. They are all 8800-ton d. w. c. ships with twin screw machinery developing 2200 b. h. p., giving a speed of 11 knots The type of engine installed, which is also built by the Ansaldo Company, provides for valveless scavenging and, like the Sulzer motors, has four cylinders. This point may be specially noted since four-cycle engines are invariably constructed with six or eight cylinders, while up to about 2000 b. h. p. the two-cycle type is standardized with four cylinders.

It is worthy of note that standardization is being effected throughout Europe in the construction of motorships, but various owners are adopting different standards. In Great Britain, the Glen Line is building a fleet of 10,000-ton ships with 3600 h. p. machinery as well as a number of 13,000-ton vessels with 6400 h. p. machinery. The British India Steam Navigation Company, which has several motor vessels on order, has standardized a type carrying 10,800 tons and fitted with machinery of 4600 i. h. p., giving a speed of twelve knots. In Scandinavia three types have been adopted for the majority of vessels now on order, the first with a carrying capacity of 6500 tons and machinery of 2600 i. h. p., giving a speed of 11½ knots. The second class carries 9400-ton with a speed of twelve knots and a machinery installation of 4000 i. h. p., whilst the third type has a carrying capacity of about 12,000 tons, the speed being 12½ knots and the machinery installation 6000 i. h. p. It will thus be seen that larger powers are gradually being installed in the newer motor vessels, and as shipowners are tending more towards the construction of larger craft it is not unlikely that the number of vessels built in the future will be 12½ to 13 knot ships, having a carrying capacity of about 13000 tons.

The Price of Fuel Oil

Although the increasing price of fuel oil is naturally causing actual and prospective owners of motor ships some little concern, it is not likely (at any rate unless the position becomes much more acute) to have any marked detrimental effect upon the development of internal combustion engined ships in Europe. The prospects of the motor ship depend more upon the relative prices of oil and coal than upon the absolute cost of fuel oil. As the price of bunker coal is increasing much more rapidly (in proportion) than that of liquid fuel, the motor ship, instead of showing to less advantage as compared with the steamer, actually now appears a better proposition than it did a year ago. The price of bunker coal at English ports at the time of writing is somewhere in the neighborhood of £5 per ton, whilst the best Diesel engine fuel oil can be obtained at about £12.10.0 per ton and lower grades at £11.15.0 per ton. As the steamer consumes four times as much fuel as the motor ship, it will be seen that, even comparing ships

New 10,500 deadweight tons British motorship Glenluce which must bunker in British ports, the motor vessel still shows very marked economy.

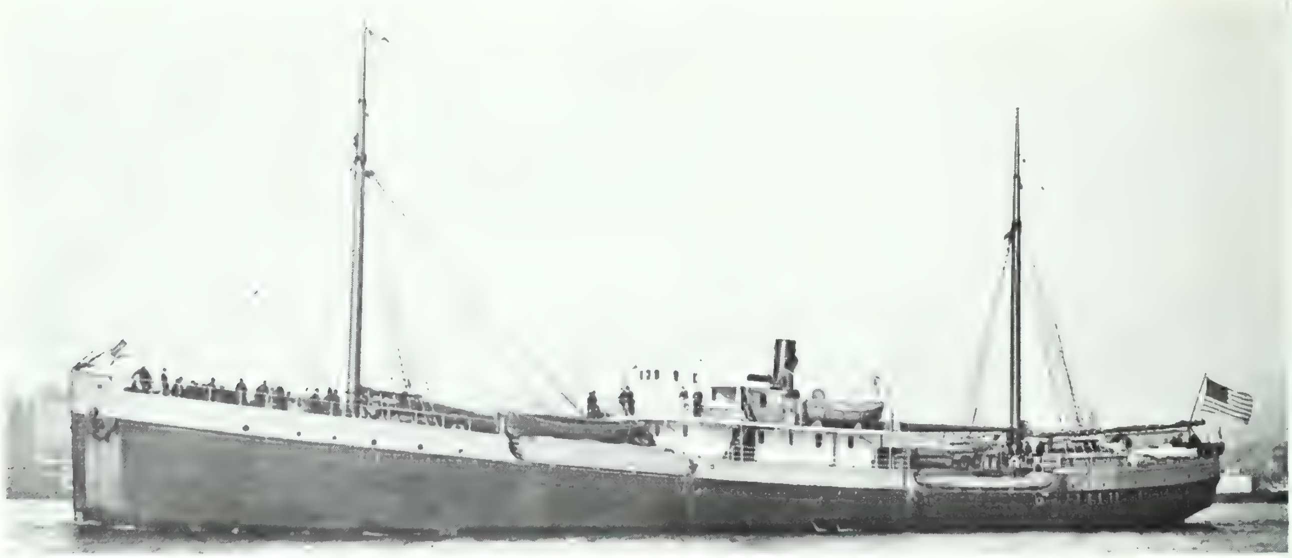
British shipowners are, however arranging that their motor ships shall bunker at ports as near to the oil fields as possible in order to save the excessive cost of transport. For instance, the Glen Line, which has a fleet of motor vessels running to the East, contracts for the supply of fuel oil at Singapore and other eastern ports. It is said that the average price per ton is not more than £4 and although the shipowners are very secretive regarding the profits made by these motor vessels, it is generally understood that they are far in excess of those made by any steamers on the same route. This can well be imagined when it is remembered that vessels going East from Europe have to bunker at Suez or Port Said, where the price of coal is now in the neighborhood of £12 per ton.

Again, if we consider the position of shipowners in the Scandinavian countries and in Italy, it will be seen that the cost of oil fuel can rise to a very considerable extent before the steamer could possibly be as economical as the motor vessel. In Denmark and Sweden bunker coal is now being sold at £11 to £12 per ton and in Italy the price is approximately the same. Fuel oil in both countries is between £15 and £20 per ton as a maximum, with lower figures for large contracts, so that even if the motor vessels have to bunker at the home ports—which is only necessary on the first voyage—the motor ship still shows a saving of approximately 50 per cent in the cost of fuel.

It may be said that the high price of coal is transitory, but expert opinion in England tends quite to the opposite view. It is considered that the demands of the coal miners will increase (as indeed they have done during the past week or two) and that the cost of bunker coal may rise considerably within the course of the next few years. Moreover, it cannot be denied that there is at the present time a very actual shortage of coal and perhaps the most definite indication of the small influence which the increased price of oil fuel will have on the development of the motor ship is the fact that practically all British shipowners who are not building motor vessels are constructing steamers which are to be wholly fired by oil fuel. As such vessels consume between two and three times as much oil as a corresponding motor ship, it is hardly necessary to make any further comment.

It is, in fact, fast becoming apparent that so long as the fuel costs of a motor ship are not greater than those of a steamer, the shipowner will in course of time, prefer the internal combustion engined vessels merely on account of the other advantages that are gained, such as the diminution in labor the smaller space occupied by the machinery, the greater deadweight carrying capacity and the general convenience of bunkering, with the absence of the delays which are now so frequent at British and other ports.

Diesel Engines Prove Equal to Task



The Dow Diesel engined motorship Libby Maine

A REMARKABLE demonstration was recently made by the American-built motorship Libby Maine during a stormy period from March 27 to April 2, while on a voyage from San Francisco to Seattle. The ship has been bucking heavy head winds and seas from the moment she stuck her nose out of the Golden Gate. When off Cape Flattery in the early morning hours of April 2 she was battling against unusually heavy seas, whipped by a sixty-five mile gale. The skipper became cognizant of the fact that the ship was not making any headway and was in danger of being driven upon the rocks. Such a condition warranted the sending out of an S. O. S., which he did. In the meantime, however, the seriousness of the situation was taken up with the chief engineer, Leloh, and it was decided advisable to increase the power output of the engines to their maximum.

After a few hours of hard grind, the battle was won by the engines and the Libby Maine passed serenely into the Straits of Juan de Fuca none the worse for the supreme test to which she had been put.

We wish again to call attention to the fallacy of underpowering motorships, the Libby Maine having a deadweight capacity of approximately 3000 tons and having but 640 shaft horsepower when she should have about 1000 b. h. p.

The Merchant Marine Diesel Engine

By A. A. Tacchella, M. E.

THE one and only reason for the use of the Diesel engine for merchant ship propulsion is its vastly superior economy of operation over any other prime mover known.

The term economy as used above not only signifies low fuel consumption, which is the characteristic of the Diesel engine, but must also include successful operation with **low-grade asphaltic base fuels,** a minimum of engine **weight** and **space,** and absolute **reliability.**

The fulfillment of these points should be the leading factor in the design of the type of engine under discussion, and it is the purpose of these remarks to investigate, from a theoretical standpoint, just what **fundamental features** are necessary to secure the above mentioned requirements.

It may be of importance to the reader to know that the theories as brought out below are proved by the practical experience gained during twenty years of Diesel engine construction, which includes slow and high speed, two and four cycle stationary and marine engines from 5 to 4000 b. h. p., also numerous experimental engines, the latest of which was a 2000 b. h. p. single-acting two-cycle **one-cylinder** engine.

Although the Busch Sulzer merchant marine engine is of the two stroke cycle or short two cycle type, the four stroke cycle or four cycle type of operation will, for the reason of being the original Diesel process, form the basis of this investigation.

In this system the cycle of operation in one cylinder is completed in four strokes of its piston, as follows:

First. **The Admission Stroke,** A to B, Figure 1: During this stroke the piston travels downward, and free air only, entering through the admission valve, fills the cylinder at atmospheric pressure.

1st. Admission Stroke — 2nd Compression Stroke — 3d Working Stroke — 4th Exhaust Stroke

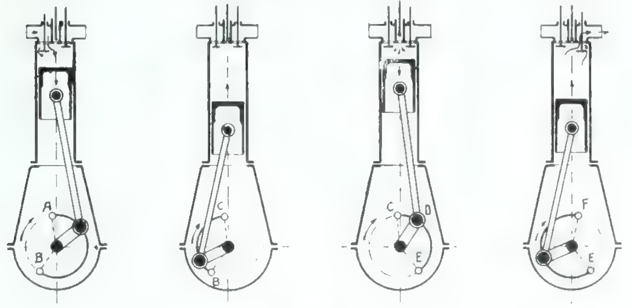


Fig. 1.

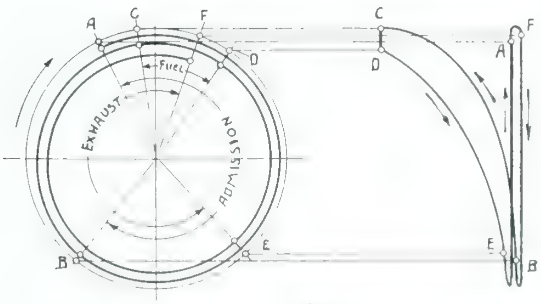


Fig. 2.
Crank & Indicator Diagram to Fig. 1.

Figures 1 and 2

Second. **The Compression Stroke,** B to C, Figure 1: The piston travels upward, and compresses the air to about 500 pounds per square inch, thereby raising its temperature sufficiently to insure a positive ignition of any mineral fuel oil. No valves are open during this stroke.

Third. **The Working Stroke,** C to E, Figure 1: When the picton has reached the limit of the compression stroke, and the crank is crossing the upper dead center, the fuel valve opens, and from C to D a small amount of fuel oil is injected into the cylinder, by means of highly compressed air, in a finely divided spray. The injection continues over a period of 12 to 15 per cent of the stroke, at such a rate that the pressure from the contiuous combustion remains constant throughout this period. The combustion is gradual, and the engine operates without sudden or explosive shock.

Exhaust to Atmospheric Pressure. — Full Scavenging. — Charging.

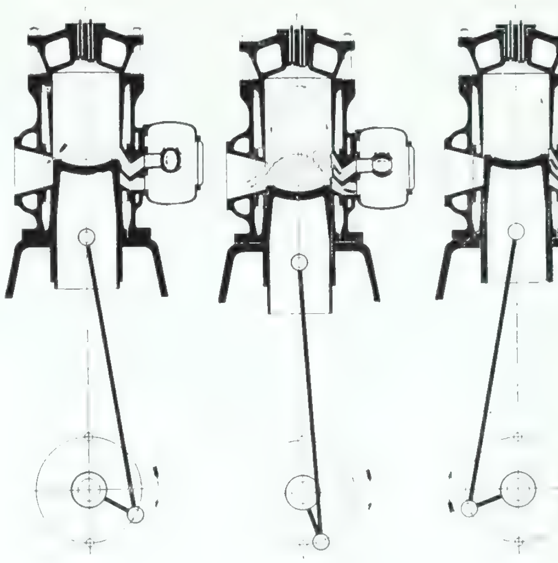


Figure 3

After the fuel valve closes, the fuel is burned, and the gases expand, driving the piston forward until the exhaust valve opens at E, releasing the pressure.

Fourth. **The Exhaust Stroke,** E to F, Figure 1: During this, the last stroke of the cycle, the products of combustion are expelled from the cylinder through the exhaust valve.

From this description of the Diesel cycle, it is now possible to draw conclusions as to the features necessary to accomplish the first mentioned requirement—that is, to insure successful operation with low-grade California and Mexico asphalt base fuel oils.

It is evident that the difficulty of burning low-grade fuels in Diesel engines lies in the short time available for atomizing, gasifying and mixing of the fuel (this time is only a small fraction of a second), and on the perfection of this process depends the completeness of the combustion, which is essential to successful operation.

It is, of course, a well known fact that the Diesel is the only engine which operates successfully on low-grade fuels, and the above statement seems to be out of place, but it is equally true that the

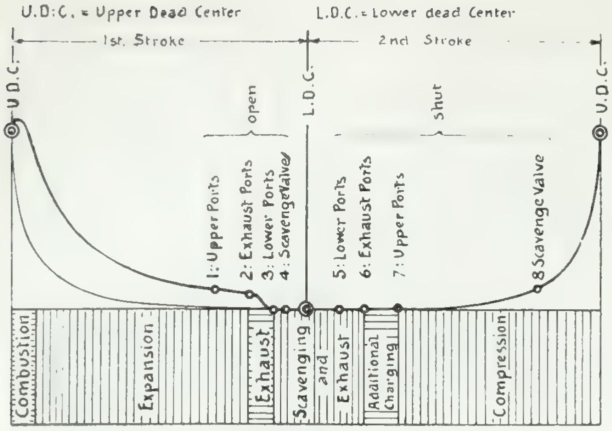


Figure 4

mixture, as obtained in the gasoline engine with the ordinary process of carburetion, is far better than the one obtained in the Diesel process, even with such light fuels as kerosene. This difficulty in the Diesel process accounts for the absence of high-speed Diesel engines as compared with gasoline engines, and it was found that the upper speed limit for Diesels is about 500 r. p. m. even for operation with light-grade fuels.

From the foregoing it is clear that the difficulty of operation with low-grade fuels increases with the speed and this leads to the first conclusion, which signifies that: **A Diesel engine to operate successfully on low-grade asphalt base fuels must be a low-speed engine.**

All attempts to get around this fundamental feature are bound to result in failure.

There is also a factor in the Diesel process which is greatly beneficial to good combustion, and it is in recognition of this fact that the designer may do a great deal to accomplish successful operation. This beneficial factor is the high temperature of the combustion chamber, which is sufficient to insure ignition in any part of it. (See temperature diagram, Figure 5.) That this advantage is greatly influenced by the form of the combustion space is easily recognized and leads to the second feature necessary for successful operation with low-grade fuels, and that is: **The combustion space must be of suitable form.**

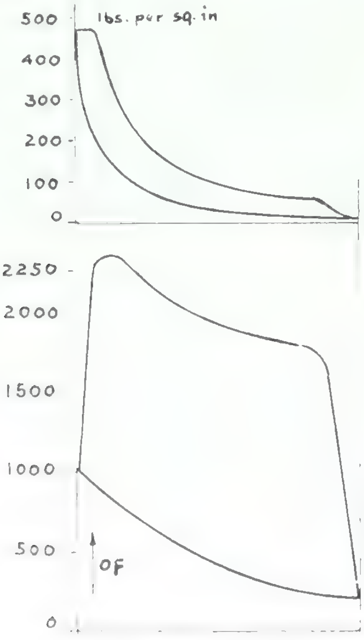
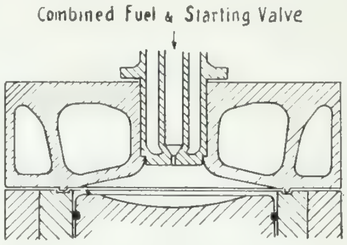


Figure 5

That it cannot be a complicated form with pockets, etc., is evident, and Figure 6 shows that this problem is solved in the Busch Sulzer engine to the fullest extent. The design is of the double convex form without pockets or valves extending into or from it, and is one of the features characteristic of the Busch Sulzer type.

A third essential factor to insure the desired complete combustion of low-grade fuels is easily arrived at from the following well-known fact:

In any case where the mixture of fuel and air is incomplete, a large amount of surplus air is absolutely necessary to insure complete combustion.



The Combustion Chamber is of the ideal double convex form in which perfect Combustion is insured.

Fig. 6 Busch-Sulzer Cylinder Head for Two-Cycle Diesel Engine

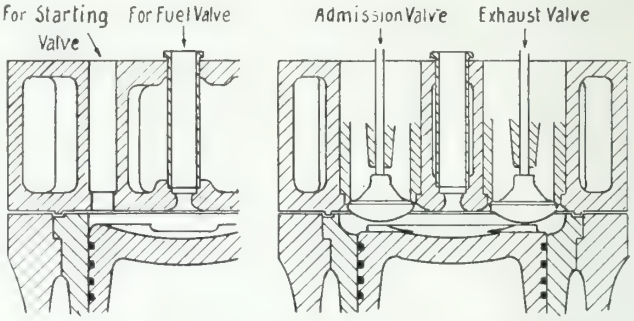


Fig. 7 Typical Cylinder Head for Four-Cycle Diesel Engine.

Figures 6 and 7

This holds true in the Diesel process, and the completeness of combustion and the power output per cylinder are greatly influenced by the amount of free air in the cylinder.

Figure 3 shows the Busch Sulzer system of scavenging and charging.

In Figure 4 the indicator diagram and development of same is shown in conformity to the process as illustrated in Figures 3 to 10.

It is often claimed that the four-cycle system is superior to the two-cycle with regard to the removal of exhaust gases from the cylinder. This holds true for two-cycle engines with ordinary port scavenging, but tests have shown that in the four-cycle system the remaining exhaust gases amount to never less than 8 per cent which remain in the compression space, while with the Busch Sulzer system of scavenging this amount was found to be always below 3 per cent.

The introduction of additional fresh air augments the quantity of combustion air, which allows of a better utilization of the cylinder volume and increases the specific output of the engine.

The three features as mentioned in the foregoing, such as slow speed and suitable form of combustion chamber and most complete removal of

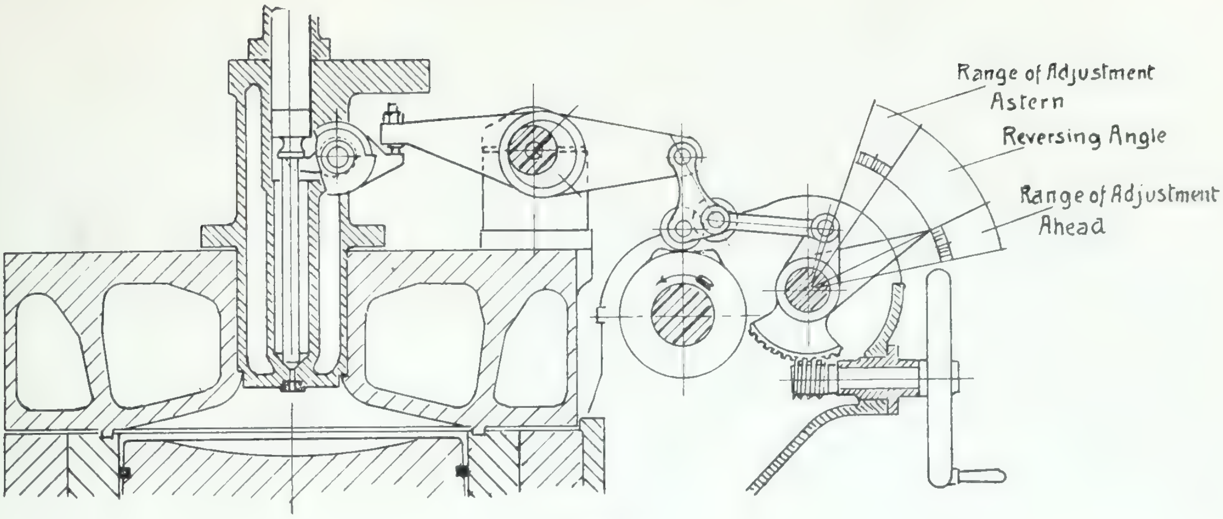


Figure 8

exhaust gases, together with the greatest possible charge of fresh air, are the essentials for complete combustion of low-grade fuels in the Diesel engine for full load conditions.

For light load one more factor has to be considered, and that is the cooling effect of the injection air. As already mentioned, the fuel is atomized and injected into the cylinder by means of highly compressed air. The expansion of this air when entering the cylinder causes a considerable cooling of the charge, which, under light load conditions, where the quantity of fuel injected is small and the amount of injection air in consequence of constant areas is increased, is so strong as to impair combustion and even cause failure of ignition.

This detrimental cooling effect of the injection air cannot be corrected sufficiently by changing its pressure only, and thus we find the fourth essential feature to be incorporated in the design rests on the following facts:

Complete combustion of low-grade fuels under light-load conditions cannot be obtained by simply changing the injection air pressure, but it is necessary to change (reduce) the lift and opening time of the fuel injection valve in accordance with load conditions.

The above is especially important for marine engines where light-load condition means also reduced engine speed, which, in turn, increases instead of decreases as necessary for light-load the absolute time for the fuel valve opening.

The problem is solved in an ideal way in the Busch Sulzer marine engine (see Figure 8). The arrangement is such that the fuel valve always starts to open at practically the same time, but closes earlier or later and decreases or increases the lift of the fuel valve as desired according to load conditions.

Having brought out the essential features necessary for successful operation on low-grade fuels, the question of economy in weight and space can now be considered.

Going back to the original four-stroke Diesel cycle we find that two strokes or one revolution is used to expel the exhaust gases from the cylinder and for the filling of same with fresh air. Only very low pressures are required for this work and it certainly is poor economy to use the heavy working parts of a Diesel engine to accomplish this simple function.

It is quite reasonable that efforts should be made to utilize the working cylinder for power and compression strokes only and provide means to accomplish what is done by the exhaust and admission strokes in the time available at the end of the power and beginning of the compression stroke; the scavenging air for this to be produced by a light air pump designed to work with such low pressures.

In the Busch Sulzer type marine engine this problem has been solved in such a satisfactory way that it not only replaces what is done by the exhaust and admission stroke in the four-cycle system, but also improves it to a considerable extent, as illustrated in Figure 3 and described under the process of surplus air.

This change gives the advantage characteristic to the two-cycle system of operation, which is one impulse or power stroke for every revolution instead of one power stroke for every two revolutions, as obtained with the four-cycle system.

Theoretically, the two-cycle type should therefore develop, under the same conditions, a power double that of the four-cycle type. In practice, however, the said theoretical limit has never been reached, but is about 175 to 180 per cent of that of a four-cycle engine.

This essential advantage of the two-cycle type brings as a consequence a remarkable reduction of weight and space.

The reduction in weight gained with the two-cycle process amounts to 65 to 67 per cent—that is, the weight of a two-cycle engine, including scavenging pump, is 65 to 67 per cent of the weight of a four-cycle engine of the same power.

The turning moment in the two-cycle engine is far more regular (for the same number of cylinders) than in the four-cycle type. This is the case even in a four-cylinder two-cycle engine against a six-cylinder four-cycle engine.

This advantage of the two-cycle engine is not merely theoretical, but in practice results in a minor intensity of the vibrations of the stern of the ship, besides a reduction in size and weight of the line shafting and consequently of its fittings, such as supports, stern tubes, etc.

According to the rules of the American Bureau of Shipping and Lloyd's Register, the section of the shafting of a six-cylinder four-cycle engine (for the same power and the same number revolutions) ought to be 45 per cent greater than that of the six-cylinder two-cycle engine, and 11 per cent greater than that of the four-cylinder two-cycle engine.

It must be noted that the saving in space by the two-cycle type has also as a consequence a considerable saving in the cost and weight of the engine foundation as well as in the dimensions of the engine room.

Reliability: There are many features in the Diesel engine which are important as to its reliability. As a matter of fact, every part of the engine must be of correct design, material and workmanship to insure greatest possible reliability. **This means that the guarantee for such reliability lies fundamentally in the experience of its builders, and a successful marine Diesel design must represent the co-operation of experienced designer and foundry and machine-shop superintendents.** This is true to such an extent that it would often be of better advantage to the buyer to study the man behind the design, rather than the design itself. But the scope of this article is to investigate the features necessary to reliability, and in doing this it is natural to start with parts that are under high temperature and stresses. These are the cylinder head and its valves and the piston.

Figures 6 and 7 show for comparison the cylinder head of the Busch Sulzer Diesel engine and a four-cycle cylinder head, or the four-cycle cylinder head can also illustrate a two-cycle cylinder head with scavenging from above. The admission and exhaust valves would represent, then, the scavenging valves.

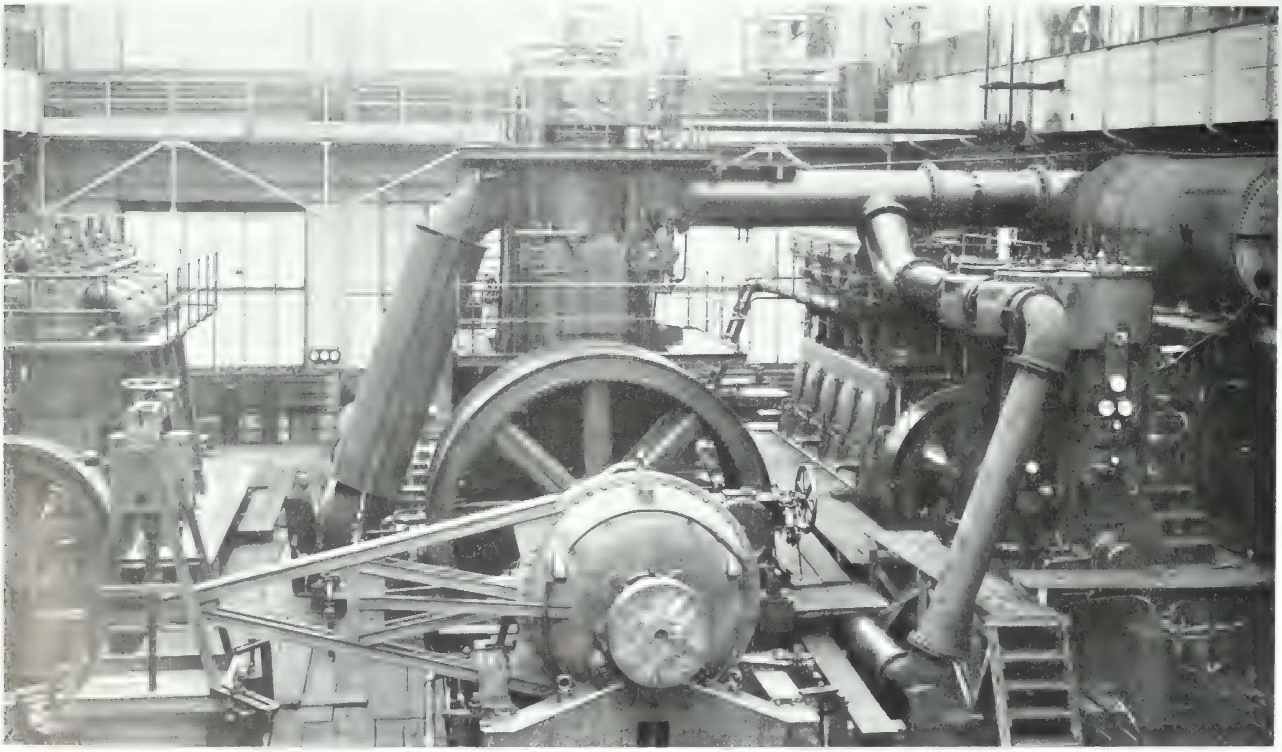
The simplicity of the Busch Sulzer head must appeal to any engineer from the foundry, machinery and operating standpoint. The absence of valves which protrude into the combustion chamber and may become leaky and burn off and fall into the cylinder, is an item not to be overrated. Internal or heat strains are eliminated and effective cooling is assured.

Equal care is observed in the designing of the piston, but it would lead too far to go into details.

Reliability depends largely on the moving parts and in the Busch Sulzer design the number of moving parts has been reduced to a minimum. In this connection the simplicity of the reversing mechanism should be mentioned and it is illustrated in Figure 8.

Referring further to the starting and reversing devices, it may be added that the necessity of being able to start the engine, whatever be the position in which the crankshaft has stopped—that is, to have at least one of the cylinders in the inlet phase of the starting air—does not permit of a reduction in the number of the cylinders to **less than six in the four-cycle type, while the two-cycle can be constructed with but four and keep its perfect maneuverability.** The reduction in the number of cylinders results, of course, in a reduction of many moving parts, and this simplifies in turn the lubricating system. All Busch Sulzer marine engines are of the cross-head type, which insures decided reliability over the trunk piston.

With the two-cycle engine the inertia of the reciprocating parts, such as connecting rods, pistons, etc., is balanced at the top center by the pressure on the piston, which cannot be realized in the four-cycle for the exhaust and suction strokes. As a consequence, in the four-cycle engine the piston rods are subjected to alternative compressive and tensile stresses, so that the caps and bolts of the connectng rod heads and of the main bearings must be necessarily constructed much more substantially than in the two-cycle type in order to avoid the possibility of their breaking and the great damage which would result.



A 2000-horsepower single-cylinder two-cycle Diesel engine of the Sulzer type on the test stand at Winterthur, Switzerland

Pacific Port Notes

As the time approaches for the meeting of the Seventh National Foreign Trade Convention at San Francisco, interest among shipping men, foreign traders, steamship operators and shipbuilders of the whole Pacific Coast continues to increase and crystallize on the part that this convention is to play in the development of foreign trade on the Pacific Ocean. The delegation from Seattle has chartered all of the first-class accommodations on a Pacific Steamship Company's steamer. The Portland delegation is coming on a special train and those from Southern California on a special steamer. Foreign trade commissioners from Oriental countries and from the South American republics are already beginning to arrive in San Francisco and all indications point to a wonderful gathering, which should be truly representative of all the foreign trade interests in the world.

The Pacific Coast is gradually climbing up again to her rightful place in the shipbuilding industry. In addition to the many large contracts for private account which have been listed recently in our columns we are glad to announce the very recent achievement of the Northwest Steel Company of Portland in winning the award of a contract from the Swiftsure Oil Transport Company for the construction of seven 12,200 ton oil tankers. The Swiftsure Oil Transport Company is a subsidiary of the France & Canada Steamship Corporation. It is understood that approximately $20,000,000 is involved in this contract and that the first vessel is to be delivered in December.

While technically the strike of the shipyard workers is still in force, practically all of the shipyards are running on a very satisfactory plane, operating under the American plan of open shop and undoubtedly they will in the long run win out. Many of the yards are introducing practical bonus systems and profit sharing plans which are proving very successful in increasing the efficiency of the personnel and in producing a more satisfied condition among the laboring element, particularly in the skilled trades.

During the last week in March, Stevenson Taylor and Captain C. A. McAllister, president and vice-president respectively of the American Bureau of Shipping, made an extensive tour of the shipyards of the Pacific Coast. Captain McAllister on his return to New York stated that he was particularly impressed by the efficient organization and plant equipment that Pacific Coast shipbuilders have developed. In his opinion some of the yards are on a parity with the best in the world. We of the Pacific Coast have always admitted this fact, but we are glad to have it acknowledged by an Atlantic Coast expert.

While the exchange situation is gradually improving it has had a very depressing effect on trade with Canada and Australia. This is a peculiarly unfortunate condition just now, especially with regard to Australia, which country stands in great need of many of our manufactured articles.

Captain Charles F. Hall, one of the oldest and best known mariners on the Pacific Coast, passed quietly away after a short illness at his home in San Francisco on April 3. Captain Hall was for many years a master in the employ of the Pacific Coast Steamship Company and the Pacific Steamship Company and his son is now in command of the City of Topeka.

Victoria

Work is well under way on the first of the two 8100 ton steel vessels being constructed for the Canadian government at the steel shipbuilding yard of the Harbor Marine Company. On March 21 this yard was thrown open to the general public in order that they might get a first hand idea of the general progress of the work. Officials of the company stated that the first launching would probably take place during the last week in June.

On March 24 citizens of Victoria completed the subscription to Victoria Shipowners, Limited. This insures the $700,000 loan from the Dominion government and work is now commencing on the first of the four wooden barkentines which are to be built by this co-operative company. These barkentines will be of 2500 tons each and it is figured that the cost will be $250,000 each. The development of this enterprise will be watched with great interest by shipbuilders and ship operators on the Pacific Coast.

The preliminary work on the Esquimault dry dock is advancing satisfactorily, and tenders for bids for the construction of the dry dock proper were invited during the last week in April. The huge dock is to be built in two sections and is to be located at Skinners Cove.

Salvage companies have been kept busy by the various marine casualties due to spring storms on the Northwestern coast and to accidents of navigation. The Pacific Steamship Company's steamer Admiral Evans ran ashore in Duncan Bay in shoal water after a collision with the tug City of Lund. The Admiral Evans was lightered of her cargo and floated at high tide without great difficulty.

The Prince John and the Prince Albert of the Grand Trunk Pacific steamer fleet collided near the entrance to Skidegate Harbor. The crash of the collision stove a big hole in the side of the Prince John, and after her passengers had been taken aboard the Prince Albert, an attempt was made to beach the steamer, but she sank in twenty-seven feet of water with her stern submerged. The Albert was damaged considerably, but was able to resume her trip to Vancouver. The salvage steamer Algerine proceeded to the spot and in about five days of work had succeeded in raising the wreck, which will be repaired at the Prince Rupert Drydock & Shipbuilding Works.

Yarrows Limited at Esquimault effected a very pretty job of electric welding on the rudder of the Harrison Direct Line steamship Tactician. Yarrows undertook to perform these repairs without drydocking the steamer, which was fully loaded and drawing 24 feet 6 inches of water astern. The steamer arrived at Esquimault late on Saturday night, the 10th of April. A cofferdam was arranged and the rudder unshipped on Monday morning. Tuesday afternoon the electric welding work was completed; the rudder was shipped Wednesday and at midnight on that day the steamer left for Liverpool.

B. L. Johnson recently resigned the position of superintendent of pilotage for British Columbia to accept the position of managing director of the newly organized Vancouver Island Whaling Company, Ltd. He has departed for Europe to complete the purchase and delivery of several new whaling steamships which he will outfit and bring out to this coast.

Vancouver

DURING the last week in March several marine casualties were reported from local waters. The Clansman, a coast steam freighter, went on the rocks at Mayne Island and knocked a hole in her bottom which was patched sufficiently to allow her to get to Vancouver. The repairs will cost approximately $5000. A fire on board the tug Marry Sea at Vancouver harbor cost $3000 in damage. A storm in English Bay broke up a boom of logs worth $40,000, and it is said that salvage will cost at least half of their value. The motorship Al-ki drove ashore March 19 on a reef in Spring Passage and after survey by Captain W. H. Logan she was declared to be a total loss, "having been cross-sheared and hogged beyond salvage." The Dashing Wave, which was carried ashore in Seymour Narrows on March 12, was also a total loss, although her cargo of cannery supplies was partly salved. She was built in New Hampshire in 1853 and at one time was a crack sailing clipper, and in 1858 she had the distinction of making a run from New York to San Francisco around the Horn in 107 days.

All passenger space for the Orient continues to be at a premium and is booked well in advance of sailing dates. On April 8 the Canadian Pacific steamer Empress of Russia took out seven hundred passengers.

After May 6 compulsory government pilotage in British Columbia waters will cease. To most steamship companies this will make practically no difference, as the pilots will operate individually, but the Pacific Steamship Company will effect a saving of $10,000 a year, as their steamers have been compelled to pay pilotage dues in and out of Vancouver, although as a matter of fact no pilots were ever used or needed by them.

On March 25 the steamer Braeholm was launched from the Coughlan yard. This steamer is being built to the account of the Coughlan & Sons Company and was sold a few weeks ago to the Swedish - American - Mexican Steamship Company for $1,500,000. She has been chartered by Max Houser of Portland to load grain for Oriental ports in June.

On May 9 the San Francisco tug Hercules arrived at this port with the motorship Laurel Whalen in tow from Papeete. This is considered to be the longest tow in the marine history of the Pacific Ocean. The Laurel Whalen had lain in the harbor of Tahiti many months, having been left unmanageable by a storm when on a voyage from Auckland to San Francisco.

The rate on lumber to Asia has recently weakened and been reduced from $40 to $37.50. This reduction was decided on by the shipping companies on account of the fact that more tonnage is available than usual.

The new steamship E. D. Kingsley, described in detail in the March number of Pacific Marine Review, sailed from Blubber Bay on the evening of April 16 and carried a cargo of lime to San Francisco. After carrying her second cargo of lime to that port, she will load there for Central American ports.

The steam whalers took on their crews and equipment and sailed for the northern fishing grounds on April 15.

Seattle

THE report of the port warden for January, 1920, shows the total deep-sea arrivals at Seattle to have numbered 220 with a net tonnage of 284,587, and the departures to have numbered 257 with a total net tonnage of 320,212. The total domestic imports for the month were valued at $7,629,947; the total foreign imports at $24,973,621. The domestic exports aggregated $6,356,045 and foreign exports $16,632,423.

Seattle's waterfront is to be improved in the near future with the addition of two new piers, both to be occupied solely by the Union Oil Company of California. These piers when completed will represent an outlay of approximately $200,000.

The Seattle Warehouse Company has also announced that it will begin in May the construction of five additional warehouse units on its six-acre site on East Marginal Way and will also add a large wharf to its facilities.

Seattle's fresh water harbor, Lake Union, is developing into a very great storage basin and ship market, and in addition to the Shipping Board's fleet of forty-five idle wooden hulls, more than 300 vessels, ranging from small launches to ocean-going ships, are floating in the waters of the lake.

The opening of the government ship canal to Lake Washington lowered the surface of that body of water by about twelve feet and made necessary considerable blasting to remove the trunks of the prehistoric trees which underlie a considerable surface of this body of water. The lowering of the surface has made these trees a menace to navigation, and as many of the trunks were in a semi-petrified condition, their blasting was quite an engineering feat.

The strained, twisted and battered hull of the motorship Al-ki minus her cargo of ore was towed into port here on the night of March 24. She was salved by a Seattle wrecking company after having been declared not worth salving by a British Columbia surveyor. This illustrates again the tendency to "take a chance" which is so markedly a characteristic of many American marine men.

On March 20 the steamship Surveyor of the United States Coast and Geodetic Survey left Seattle for a survey of the dangerous waters around Chignik and Kodiak Island. The vessel was outfitted for this cruise at the Bell street terminal of the port commission. She is commanded by Captain F. H. Hardy and this will be his ninth cruise under the Survey in the northern Pacific .

Considerable concern is being manifested by shipping men at Seattle over the rapidly increasing cost of fueling steam vessels, particularly in the Orient. Deliveries without notice are no longer obtainable in any port in Asia and in most cases it is necessary to place orders from three to four weeks in advance of the arrival of the ship. Blanket standing orders are not permitted.

In all the Asiatic ports there already exists a very serious fuel oil shortage, so much so that the

Pacific Steamship Company has issued orders that the vessels engaged in its Oriental service shall be changed over as rapidly as possible from oil-burning to coal-burning systems in the boiler rooms. This increased cost of steam operation has lent a very great impetus to the plans for converting the Shipping Board hulls into sailing vessels or motorships.

On March 31 seven freight carriers, all engaged in overseas' trade and flying the house flags of five different shipping corporations, were moored at Smiths Cove, Pier "A," of the port commission. This fleet was composed of the Havilah, Iconium and Cross Keys of the Pacific Steamship Company's Oriental fleet; the Hyades of the Matson Navigation Company; the barge Henry Villart of the Coastwise Steamship & Barge Company; the Mitsui & Company's steamship Kaian Maru, and the steamship Alaska of the Alaska Steamship Co.

According to representatives of the Matson Navigation Company, 48,000 tons of box shooks to be used in crating the 1920 crop of pineapples will be moved to the Hawaiian Islands by the ships of that company during the next few months.

On April 6 Fred M. Lathe officially took over the office of port warden of Seattle, succeeding Captain A. A. Paysse. The port warden of Seattle has supervision over a staff of twenty-two deputies and harbor men and operates three harbor patrol launches in the supervision of the mooring of buoys and of the municipal terminals.

On April 9, sixteen hours after they had signed up a wage and working agreement with private concerns represented in the Waterfront Employers' Union, the longshoremen walked out on strike on all the public or municipally owned docks of the port commission. This strike was precipitated through the employment on monthly salaries of a few non-union men, residents and taxpayers of Seattle, by the port commission. No vessel, government or privately owned, could be discharged or loaded by union men at any of the port commission wharves while the strike was on. Fortunately the union longshoremen came to their senses and agreed to return to work on the 14th under the same conditions as when they went on strike, with a supplementary agreement that members of the port commission and officers of the Longshoremen's Association would arbitrate and straighten out the differences now existing between them.

Haviside, Withers & Davis have established a branch outfitting and rigging plant in Seattle and two of the Ferris type hulls belonging to the Pacific Freighters Company are to be towed from San Francisco to Seattle for completion as five-masted barkentines.

On April 20 the 8800-ton steel steamer West Mahwah was launched at the J. F. Duthie & Company shipyard on the East Waterway. This marks the end of the Shipping Board's launching program in Seattle. In the meantime J. F. Duthie & Company has laid the keels for two 650-ton steel ships owned by James Griffith & Sons. Fabrication of steel is well under way for these ships and both will be ready for launching by June 1. One vessel is to be used by the Coastwise Steamship & Barge Company in coast trade. The other will be sent to England to establish a barge-towing service in the coal trade from Wales to Northern France. Both vessels will be equipped with powerful towing machinery.

The repair plant of the Todd Dry Docks, Incorporated, has been employing for the past few weeks an average of one thousand men. The dry docks are kept busy to capacity and many ships are constantly using the outfitting wharves undergoing minor repairs.

The principal topic of discussion in shipbuilding circles and along the waterfront for the past month has been "Dave" Rogers. The veteran shipbuilder arrived in Seattle from Washington on the evening of April 6. Mr. Rogers looked the picture of health and in first-class fighting condition, but absolutely refused to discuss his plans in connection with his purchase of the Skinner & Eddy Yard No. 2 from the Shipping Board. Mr. Louis Jacobs and several foremen of the old Skinner & Eddy organization have joined Mr. Rogers in his new enterprise and recent advices from Washington indicate that the premier shipbuilder has up his sleeve contracts for twenty-five vessels of a total price exceeding $40,000,000. This, of course, will mean a very largely increased payroll for distribution in Seattle and is consequently a very fat morsel for gossip along the waterfront.

Tacoma

WORK is now satisfactorily progressing on the port commission docks and Tacoma hopes soon to have something in the way of docking facilities other than privately-controlled property which she can be proud to offer to outside shipping interests.

On March 27 the Todd Drydock & Construction Corporation launched the 7500-ton steamer Padsnay. This will make the twentieth vessel put in the water at this plant. This vessel has since been completed in record time and her dock and loaded trials having been successful, she was turned over to the Shipping Board on April 24.

Barbare Brothers, boat builders, are putting out twenty-five big seine fishing boats for California. These boats are all being built to the same model and are 65 feet in length by 15 feet beam, powered with 50-horsepower engines. They are being manufactured on a building way along which they are slid to a launching stage progressing in completeness as they arrive at the point of launching.

On March 29 five of these boats cleared for Los Angeles. Fishing boats for California interests are also being turned out at the Skansie yards at Gig Harbor and on April 1 three of these boats were turned over to their owners, who a few days later took them down the coast.

During the last week in March three export flouring mills and their warehouses were congested with 200,000 barrels of flour sold to the United States Grain Corporation and awaiting vessels for shipment.

That the work of the Tacoma Commercial Club in the Orient is proving of great value is shown by recent heavy buying through Tacoma from Shanghai. When the Javary sailed from Tacoma on her last voyage she carried a large shipment of goods from the J. P. Ruddy Ship Chandlery Company to the store of A. Sing at Shanghai.

Astoria

DURING the last week of March the port docks at Astoria were becoming seriously congested with flour and box shooks, but this congestion was relieved by the steamer

Silverado taking out 4000 tons of box shooks from the warehouse and the steamer Otho taking 75,000 barrels or about 7500 tons of flour for Europe.

Work on the construction of the new importing and exporting dock of the port terminals is being rushed by the Foundation Company, who have ninety men at work on pile driving and logging operations. The dredge Natoma is pumping sand for the fill and the indications now are that this pier will be completed early in the fall.

The port commission has decided to construct a marine railway instead of a floating drydock. This marine railway will be built on the port property probably on the slip between piers 2 and 3. This decision was come to at a recent meeting on the recommendation of Engineer Bartlett.

Lumber shipments from the Columbia River during March were very large. Twenty-eight vessels loaded at the mills in the lower river district during that month, and their combined cargoes, totalled 21,629,529 feet of lumber. During the same period ten vessels loaded 14,683,881 feet at upper river mills.

Portland

THE most outstanding marine news in Portland circles during the past month was the announcement by J. R. Bowles, president of the Northwest Steel Company, that arrangements had been made with the Shipping Board enabling that shipbuilding company to build seven 12,000-ton tankers for the Swiftsure Oil Transport Company. This contract means the employment of about 4000 men for a little over a year and means an expenditure in Portland of approximately $20,000,000.

On March 15 the St. Helens Shipbuilding Company launched a new wooden steamer, the City of Everett, for the Charles R. McCormick interests.

W. D. Matthews of the Matthews Shipbuilding Company, Hoquiam, is to build a double end lumber schooner at Portland designed to carry 1,200,000 feet.

During the last seven days of March, Portland shipped out in sea-going vessels 10,000,000 feet of lumber and 10,000,000 tons of general freight. The destinations of this material included Chilean ports, Havana, Mediterranean and West European ports, Taku Bar and Shanghai.

On April 1 there were still remaining in the warehouses of the Columbia River district 200,000 tons of flour intended by the Food Administration for shipment to the Atlantic Coast Local officials of the Grain Corporation are beginning to be rather anxious about tonnage for carrying this flour, as it is all supposed to be en route before June 1.

A committee, recently appointed by Mayor Baker, has filed a report with the city council recommending $10,000,000 worth of harbor improvements, which include the acquisition of all river frontage on the Willamette from the municipal dock No. 1 to the North Bank bridge and including Swan Island, Mocks Bottom and the Guilds Lake lowlands. It is proposed to form a channel [illegible] feet in width dredged to a good depth to use the dredged material for reclaiming adjoining lowlands to be used as industrial sites and additional railroad terminals.

The consolidation of the dock commission with the Port of Portland Commission is also recommended and in all likelihood these proposals will be on the ballot at the municipal election in November.

The Pacific Marine Iron Works has announced the completion of contracts for equipping three Oregon-built ships . Two of these are steam schooners building at the Kruse & Banks yard on Coos Bay and the contracts call for boilers, engines and auxiliaries running to $150,000 on each ship. The third contract is for the wooden steamer of the Hartwood Lumber Company building on the Peninsula Shipbuilding Company's ways.

Rapid progress is being made by the G. M. Standifer Construction Corporation yard at Vancouver in the construction of the five 5500-ton Green Star liners and it is stated that they will all be ready for service by the latter part of June.

Under present schedule the entire program of the Shipping Board's shipbuilding operations in this district will be completed on May 17, when the last of the wooden steamers building at the Peninsula Shipbuilding Company's plant is delivered to the Shipping Board.

During April and May the Pacific Export Lumber Company will move 25,000,000 to 30,000,000 feet of lumber from Portland to Asiatic destinations. K. Doi, manager of the Toyo Kisen Kaisha, has announced that as soon as the phosphate rock bunkers now under construction at municipal terminal No. 4 are completed he will establish a regular service of three steamers of from 8800 to 9500 tons' deadweight capacity with sailings from Portland at intervals of thirty days. This service in all probability will begin very late in August. Already 45,000 tons of the phosphate rock has been booked for shipment through Portland from the mines in Idaho, and if negotiations now under way are successful there will be an additional 100,000 tons to handle.

Gray's Harbor

ANOTHER lumber carrier for the Pacific Coast fleet of the Hart-Wood Lumber Company is to be constructed by the Matthews Shipbuilding Company of Hoquiam, at the ways of the Peninsula Shipbuilding Company at North Portland, according to negotiations recently completed by G. Frazier Matthews, head of the Harbor Shipbuilding Company. The new steam schooner will be named the Quinault, after the name of the first boat owned by the company, which was wrecked last year on the California coast. The original Quinault was built in Aberdeen in 1906. Plans for the new vessel include a length of 220 feet, a 43-foot beam and a depth of 15½ feet. She will be of much the same type as the other members of the Hart-Wood fleet—the San Diego, Avalon, Solano, Claremont, and the Hartwood—and will be designed to carry the same load, 1,200,000 feet of lumber. With the exception of the Solano, which was built on Willapa Harbor, the other ships of the fleet were built at the Matthews yard in Hoquiam, and are sturdy vessels, reckoned as among the best that ply the coast. Machinery for the Quinault will include a 700-horsepower triple expansion engine and two Babcock-Wilcox boilers. Oil will be used for fuel. The vessel will cost about $300,000, it is understood, and will be in commission in October.

Lumber cargoes of the Grays Harbor district show good gains, according to latest shipping figures. It is shown that about 20,000,000 more feet of lumber were exported from Grays Harbor during the first three months of this year than in the same period in 1919. During January, February and March, this year, a total of 70,275,000 feet of lumber was sent from this district to coast and foreign ports. Ninety-one vessels cleared as compared to fifty-one clearing the first three months of 1919.

The whalers Westport, Moran and Aberdeen have been given their annual overhauling at the Chilman Shipyards in Hoquiam, and expect to start the season off the Grays Harbor coast about May 1. The whaling fleet will consist of these three vessels this year, instead of four vessels which have been in operation for several years. The Patterson, sister ship to the Aberdeen, is now hunting in Alaskan waters, and will probably be kept in the north this season.

Vigorous steps are being taken by the Grays Harbor shipping interests to have a strong representation at the National Foreign Trade Convention to be held in May at San Francisco. H. M. Delanty, head of the Grays Harbor Stevedore Company and one of the best informed marine men in the Pacific Northwest, will head the Harbor delegation. With him will go probably a dozen other Grays Harbor men prominent in shipping circles.

San Francisco

On March 31 the Crowley Launch & Tugboat Company brought over from their East Oakland shipbuilding plant the new 100-ton derrick salvage barge. With the exception of the two government barges at the Panama Canal this is said to be the largest of its kind in the United States. This new apparatus is expected to save shipowners a lot of money and cut down the costs of repairs, as it will in many instances eliminate drydocking expense.

William Chisholm has been promoted to the position of assistant district manager here for the Emergency Fleet Corporation and dating from April 1 will have complete charge of all Shipping Board ship repairs.

Thomas Crowley, vice-president and general manager of the Shipowners & Merchants Tugboat Company, announces that his firm has purchased from the government the four new ocean-going tugs now being constructed at the Stone Shipyards in Oakland. The consideration is said to be $1,000,000. These tugs are each 150 feet in length, 30 feet in width and with a molded depth of 20 feet. They will be equipped with 1100 horsepower engines and a fuel oil capacity of 1950 barrels, giving them a steaming radius of nearly 10,000 miles.

On account of the mishap to the China Mail liner China in Japanese waters, the schedule of that company becomes disarranged, so that for three days, the 20th to 23rd of April, there were three China Mail liners in port, the Nile, the China and the Nanking, and incidentally the Associated Terminals Company at piers 34 and 35 had to take care of 3500 passengers going and coming who were listed, tabulated and booked within that time. The stevedores at these piers were also kept on the jump.

The Alameda works of the Union plant of the Bethlehem Shipbuilding Company launched, April 3, the tanker Dungannon, and on April 15 a sister ship, the Dulaney, both of these ships being 90 per cent complete when launched. This yard expects to launch another sister ship, the Halo, on May 15.

On April 17 the Union Construction Company launched successfully another 9400-tonner for the Shipping Board, and on the 18th the Moore Shipbuilding Company launched two vessels, one the cargo steamer Narbo of 8800 tons and the other the tanker Meton of 10,000 deadweight tons. Another keel was laid immediately in one of the slips, but the other has been demolished to make room for excavations for the new floating drydock.

On the 15th the China Mail steamer China steamed into port from Nagasaki direct after a passage of thirteen days, thus adding a new luster to the record of one of the most popular liners on the Pacific Ocean.

During the month of April the famous fleet of windjammers of the Alaska Packers' Association have been quietly slipping out of port for the northern fishing grounds, and the Oakland estuary is once more depleted of its stars.

The National Foreign Trade Council, it is stated, have taken reservations on the Matsonia for a trip to Hawaii following the National Foreign Trade Convention which is to convene in San Francisco May 12. Many of the delegates to the Democratic National Convention are also arranging for a trip to Hawaii and the Matson Navigation Company's offices are being kept busy booking for these excursions.

F. M. Barry, for many years local district executive officer of the Pacific Steamship Company, has recently connected himself with Struthers & Dixon as general manager for that concern. The Pacific Steamship Company has appointed Michael F. Cropley, formerly assistant general freight agent for the company at San Francisco, to succeed F. M. Barry.

As of April 1 it was announced that since November 24, 1919, the bay district shipyards had launched twelve hulls, delivered seventeen completed ships and laid the keels for nine hulls.

On March 24 three freighters were undergoing trials on the bay—the Utacarbon, a 10,100-ton tanker, built at the Bethlehem Union plant; the Quabbin, a 10,100-ton tanker, built at the Moore yard, and the freighter Bellwood, 5350-ton deadweight, built at the Hanlon yard.

On April 12 the Schaw-Batcher Shipbuilding Works had on her bay trials the 8800-ton freighter West Cahokia. On the same date Grace & Company's 4000-ton freighter West Conob got away from port on that company's around-the-world trading service. This is the second vessel to start on this world route.

During April there arrived for the first time in many years a cargo of coal from Newcastle and signs are not wanting to indicate that San Francisco will soon again become a great coaling port for the vessels of the world.

Records recently compiled by the Industrial Bureau of the San Francisco Chamber of Commerce show a marked increase in industrial activity throughout the city for the first three months of 1920, and no less than twenty-five industrial enterprises are listed for that period, eighteen of them being new in San Francisco and seven of them local houses seeking new and larger quarters.

It is a conservative estimate that these new businesses when in full operation will furnish steady employment to over 1500 men and women.

Los Angeles

THE report of the Board of Harbor Commissioners of the city of Los Angeles show that for the month of January, 1920, a total inbound domestic commerce, exclusive of lumber, amounted to 34,239 tons valued at $5,045,512; the total lumber inbound amounted to 85,013 tons valued at $1,952,136. Outside of lumber the principal items of this inbound commerce were automobiles, coffee, butter, dry goods, fertilizer, flour, fresh fish, news paper, sugar and tobacco. The outbound domestic commerce totalled 116,547 tons valued at $3,099,015, the preponderating item on the list being fuel oil and its distillates. Foreign imports came to a total value of $168,032, the largest single item being nitrates from Chile. Foreign exports totalled $1,281,950, the largest items in this export being crude oil and its distillates to Japan and British India, these two items alone amounting to about half of the total. The balance of the foreign exports are very well distributed over Mexico and South American countries and cover a very wide range of products and certainly indicate that the merchants of Los Angeles are wide awake to the opportunities in foreign trade.

The Los Angeles Shipbuilding & Drydock Company have eight vessels left to finish of their Emergency Fleet shipbuilding program. On April 17 the West Holbrook was launched at this plant and at the same time the second section of this company's big new floating drydock was launched from the Chandler yard at Wilmington. This drydock when completed will contain six of these sectional pontoons, each 80 feet long and 125 feet wide. The six sections will be capable of lifting 12,000-ton vessels.

The Southwestern Shipbuilding Company is busily engaged in getting out new work and in finishing and equipping several of the hulls from the Schaw-Batcher yards in San Francisco, which are being towed to this port so that they may receive the attention of the Southwestern organization. Keels have been laid at the Southwestern Shipbuilding yards for the construction of two 12,500-ton oil tankers for the Union Oil Company. This company is also laying down a vessel on its own account of the 8800-ton type which is to be named the Argonne. This ship will be launched in August and will be sold or chartered by the shipbuilding company. The steamer West Norranus was launched at this yard on April 20. She was the sixteenth hull of the Emergency Fleet program and leaves but two more contracted for by the Shipping Board with the Southwestern Shipbuilding Company.

In an address before the World Traders of Los Angeles, Henry Robinson, former member of the United States Shipping Board, declared that the board, as far as operation was concerned, had proved a failure and that the government should sell its merchant ships at a value of approximately $155 per ton and sell them as rapidly as possible.

McCormick & McPherson have been appointed as agents at Los Angeles for Williams, Dimond & Company in connection with their coastwise and European service. This firm also represents the General Steamship Company and the Osaka Shosen Kaisha and are doing sub-agency work for several other owners whose vessels frequent Los Angeles harbor. The firm has recently been allotted shed Number 2 of the municipal docks at Wilmington, which is one of the docks formerly occupied by the American-Hawaiian Steamship Company. This allotment of dock facilities places McCormick & McPherson in a position to handle with efficiency and dispatch the shipping business of their new connections.

Honolulu Harbor News

WHILE not of large commercial importance at the present time, preliminary plans which have been adopted by the territorial board of harbor commissioners relative to the dredging of Kewalo Basin, south of the Honolulu harbor channel, eventually will mean the establishment of a new harbor on Oahu, capable of accommodating all steam and sail schooner traffic in the lumber, feed and fertilizer transportation business.

It is along this line that William D'Esmond, engineer of the harbor board, is at work, and already, acting on his plans, the contract has been let to the Hawaiian Dredging Company for the widening and deepening of the channel through the reef and into the Kewalo Basin. The present contract does not provide for completing the proposed work. The dredging company is only to dredge a channel 1200 feet long, 150 feet wide and 15 feet deep. This channel will open into the basin which, when dredged, will have a navigable area of 700 by 1000 feet. It is proposed eventually to dredge this to a depth of 25 feet and make the channel 250 feet wide.

At present the plans are that as soon as the Hawaiian Dredging Company's contract is completed, at a cost of $39,600, the Japanese sampans, more than fifty in all, which have been causing congestion between piers 15 and 16 in the Honolulu harbor for several years, will be moved to Kewalo Basin as their regular mooring grounds. This will bring them in close connection with the fish canneries in the Kakaako district, and with transportation facilities to the downtown retail markets.

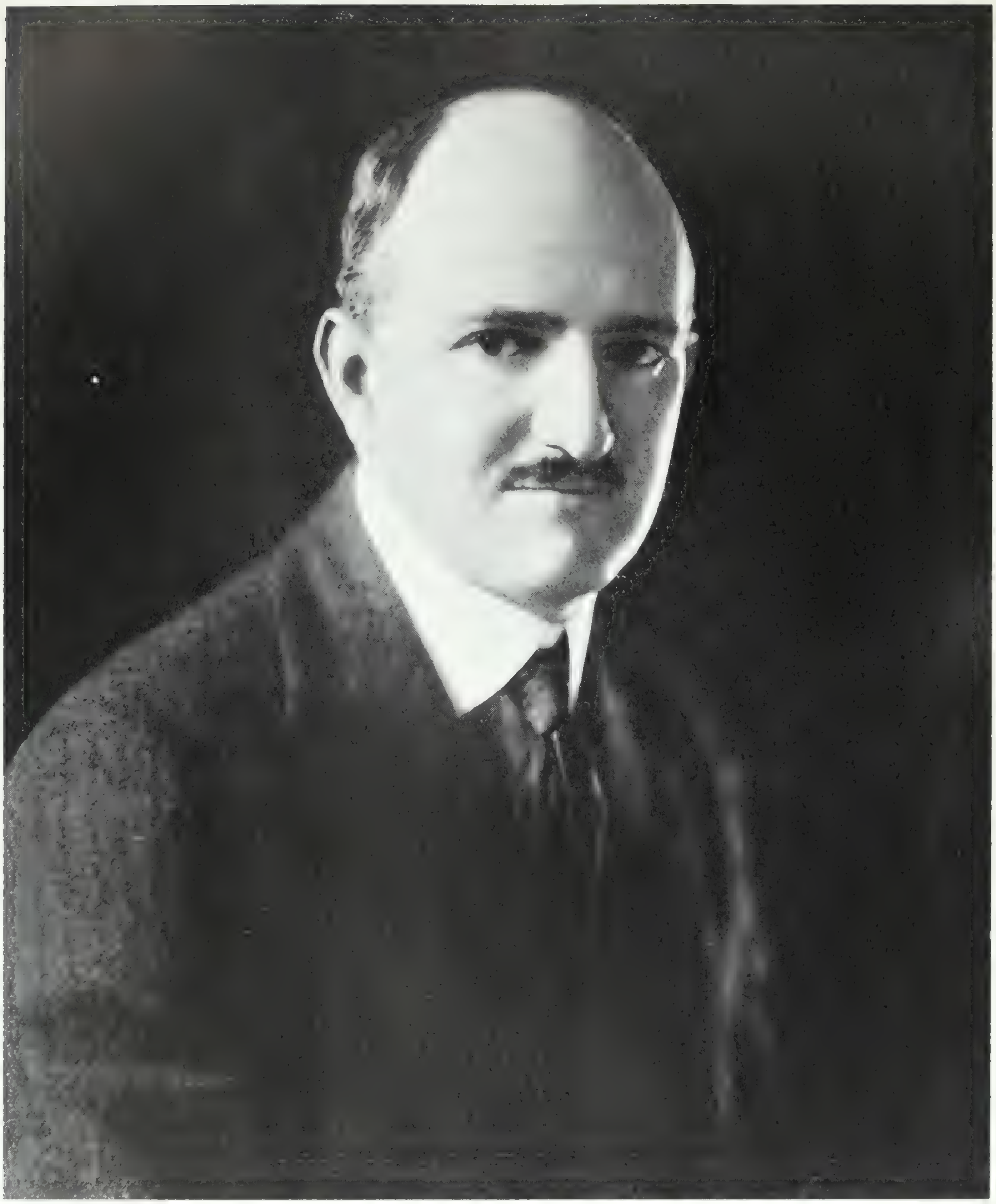
Even now in Kewalo Basin there is considerable industry. Two shipbuilding companies, equipped for the construction of small fishing craft, are located there. The Peter Puck Company has been building sampans in Kewalo harbor for several years and last year reconstructed the Pioneer by adding fifty feet to her length.

But it is the ultimate plan regarding the shifting of the lumber, feed and fertilizer trade to the Kewalo Basin, which is one of the most important in the present proposed improvements in Oahu harbors. Honolulu harbor is becoming so congested now with the heavy steamer traffic of the United States Shipping Board and the Oriental companies which have been increasing their tonnage since the war to an enormous extent, that it is desirous that the small schooners be transferred to another dockage.

The entrance to the Kewalo channel is almost at the same point as the entrance to the Honolulu harbor channel, facilitating customs inspection and piloting. The completion of this harbor plan, and the finish of the work by the government on the Kalihi channel, on the opposite side of Honolulu harbor, will give to Honolulu a main harbor with two wings, more than tripling the dock and wharfage space available.

E. L. BARRY

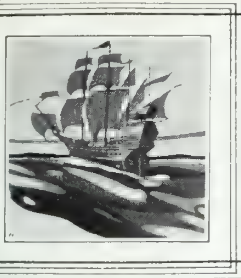
Edward L. Barry, one of the leading young marine insurance experts on California street, is a native son. He was born in Soledad, California, in 1885. His parents moved to San Francisco when Edward was five years old, and after a thorough training in the city schools at the age of twenty-one he entered the employ of Parrot & Company under the guidance of the late J. J. Theobald, manager of the marine department. This section of Parrot & Company represents the Canton Insurance Office, Ltd., of Hongkong, and the Importers & Exporters Insurance Company of New York, and Mr. Barry soon found a fascinating interest in the study of the complex problems of marine insurance. Possessing unusual natural ability, abundant physical energy and great tenacity, he quickly rose to be assistant manager of the department, and in 1916, after the death of Mr. Theobald he became manager, in which position he is serving with great success. Outside of marine insurance, Mr. Barry has two hobbies, Edward L., Jr., and golf, both of which he follows with characteristic enthusiasm



C. H. WILLIAMSON

Charles H. Williamson, who hails from Philadelphia, began his insurance training in 1896 with a well-known firm of brokers and average adjusters in that city. In 1911 he came to the Pacific Coast and located at San Francisco in charge of the branch office for the same concern and as general agent of the Atlantic Mutual Insurance Company of New York. He later accepted a position with another well-known firm of brokers and adjusters at San Francisco, and for four years devoted his time exclusively to average adjusting. During that period he handled some of the most difficult adjustments on the Pacific Coast, among which was that of the steamer Minnesota, which returned to San Francisco with serious boiler trouble. Since the spring of 1919 he has devoted his entire time to marine underwriting. His previous experience as a broker and adjuster gives him a viewpoint of the business that should make his relations with the insuring public much more valuable to them than would otherwise be the case.

Charles H. Williamson continues to represent the Atlantic Mutual and in addition has obtained the agencies of several other well-known marine companies and plans to build up an organization which will be a credit to the Pacific Coast.



Marine Insurance

Recent Developments

By Charles F. Howell

INSURANCE advice to exporters, from an authority of recognized ability, was supplied the Export Managers' Club of New York City on the 6th ult., when William G. Marvin, head of the legal and insurance department of the National City Bank of New York, gave them his views on some of the more important underwriting problems of the hour. He warned his hearers that marine insurance is a highly important subject, and should not be regarded as a thing apart. "Each shipper," he said, "should carefully study his needs, analyze the characteristics of available insurance, carefully scrutinize the responsibility of the companies offering such insurance as he finally determines he needs, and then weigh the advantages of declaring the insurance on an individual risk basis or under a blanket cover. Only by diligent study will the exporter be able to co-ordinate these insurance, banking and shipping functions into one whole of minimum hazard, and only in this way will he be really assured of 'insurance that insures and that will pay in case of loss. . . . I am in daily contact, through my work, with cases where otherwise keen business men are paying the penalty for failure to analyze their insurance needs, and to check up the insurance coverage which they obtain with the risks which they desire to have covered. . . . You cannot buy insurance indiscriminately and then rise in anger against the insurance companies merely because they fail to pay you on account of losses which are not covered by the contract. . . . Insurance not only speeds business, but it saves worry and puts the calculations of business men upon a firmer basis. . . . You should study your insurance as you do your market, not only because it will give you more intelligent insurance, but because such sincere co-operation with responsible insurance brokers and underwriters will find a ready reaction in the insurance market and will effect great economies for the insurance underwriters, which can later be passed on to the shipper."

Mr. Marvin explained the danger of taking out cheap insurance which was often offered to the exporter by irresponsible foreign insurance companies, and cited instances where such policies with certain southern European companies had proved disastrous for the shipper. He particularly treated the question of proper packing, crating, etc., by the shipper, and pointed out the importance of studying the climatic and other conditions of the countries to which the goods are being consigned. Said he: "Much of the theft and pilferage that we hear about is due to improper packing and to the increasing carelessness of the carriers and warehousemen. Theft and pilferage are neither risks of transportation nor navigation, but are moral hazards, and the whole idea of theft and pilferage insurance carries with it some very undesirable consequences. It has not proved profitable to insurance underwriters. Many marine insurance companies are now refusing to write theft and pilferage, particularly on cargoes going to certain parts of Europe and to the west coast of South America. From a purely scientific standpoint, theft and pilferage insurance is against sound economic policy, because it tends to substitute the insurance underwriter for the carrier in bearing the burden of certain risks which are very properly the latter's. It sounds very good to say that the insurance companies are subrogated to the rights of the assured against the carrier, but often this is nothing more than an empty rhetorical phrase because of the impracticability of the insurance companies meeting the carrier's requirements regarding immediate notice of losses by the consignee. Carelessness in transportation, such as negligent stevedoring and improper stowage, and a post-war moral relaxation on the part of many employes, combined with the improper and insecure crating of goods by those who are new in the export trade, make present-day rates for theft and pilferage merely a guess on the part of the underwriter. It may be necessary for the underwriter to actually separate the theft and pilferage coverage from the marine policies altogether, and write theft and pilferage in a separate policy."

In discussing the land risks where goods are covered from the interior of one country to the interior of another, Mr. Marvin emphasized the importance, in many cases, of having the risk of flood and rising waters included in the marine insurance policy, where goods are left on dock subject to these hazards. He also pointed out the importance of strike and civil commotion insurance during the present period of unrest. In conclusion he explained the advantages to the exporters, bankers and insurance underwriters of having a uniform type of certificate and uniform standard cargo policies for cotton, coffee, grain, coal, flour and such other commodities as are big factors in our export and import trade. Such standard commodity forms could have a uniformity in the location of their chief clauses and in their general physical characteristics. In addition to this, if the exporters will join the banks in pressing for a uniform type of certificate, containing certain minimum requirements, a great deal of useless work will be avoided for all parties concerned and a more thorough understanding will be achieved of the definite coverage provided under the policy.

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

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3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

All this uproar one hears about the so-called arbitrary action of the United States government in attempting to compel, through the bill now before Congress, shipbuilders to conform to the construction rules and regulations of the American Bureau of Shipping is without justification, and, in point of fact, sounds decidedly inspired. At the time Congressman Edmonds introduced his bill he distinctly and emphatically denied that it would have any such effect. In the official report that accompanies the measure may be found the following statement: "There are today at least nine classification societies in the world—one, the American Bureau of Shipping, in the United States; two, Lloyd's Registry and the British Corporation, in England; one, the Bureau Veritas, in France; one in (each) Germany, Austria, Norway, Italy and Greece. Japan is about to form a Japanese society. All of these societies have a semi-official status, and the recognition of them by their governments, even in a semi-official manner, leads to an interchange of recognition between these societies which prevents unusual delays and annoyances to ships operating in foreign countries. The American Bureau of Shipping has always had a high standing among American shippers. It is supported entirely by the fees it collects for its services. It is not conducted for profit, and upon its board of managers and in its membership are found the names of the men who are the leading and active spirits in all lines connected with a merchant marine. The value of this association as an aid in building up an American merchant marine is recognized by all, and, as the passage of this bill does not in any way obligate the government financially, nor does it prevent any shipowner who so desires from using another of the classification societies, it is sincerely hoped that the bill will meet with favorable consideration."

Underwriters at Loggerheads

There appears to be little hope of marine underwriters reconciling their differences and getting together on a common ground that will allow of the development of a program upon which the government can base its legislative proposals. It is an open question as to whether this deadlock has resulted from stubbornness or simple stalling. Certain it is that the patience of the Washington authorities is exhausted. They have been postponing action for months, waiting for the underwriters to determine what they want the government to do—and the underwriters continue to procrastinate and squabble. The date of April 10 was finally set by Chairman Edmonds, of the House Committee on Merchant Marine and Fisheries, as the last moment for the underwriters to make up their minds; if they failed to get together on some program by then, Mr. Edmonds declared he would join Senator Jones, chairman of the Senate Commerce Committee, and introduce an identical bill by the provisions of which the government would go into the business of marine insurance. The only reason he has delayed carrying out his threat is because the Republicans have been concentrating their efforts to pass a concurrent resolution on peace with Germany that could become a law without the signature of President Wilson. Meetings of the sub-committee of the Association of Marine Underwriters of the United States have resulted in merely reporting "progress." It would appear as though the differences of the underwriters are irreconcilable. The Old Guard stands out for the admission of foreign admitted companies to any pool that may be arranged, while the all-American group wants American business controlled by American companies. Nothing has come of the proposition, offered as a compromise, for a hull pool for privately owned vessels to which foreign companies would be admitted, but which the American companies would control by a two-thirds vote. As for a cargo pool, the thing is worse than hopeless. The time is at hand when congressional action can be held up no longer, and the underwriters must be prepared to accept what Washington decrees for them.

Coverage for Marine Delays and Perils

The present serious shipping delays have raised a question as to the completeness of insurance coverage, and particularly as to the interpretation placed on the words "ordinary course of transit" as they appear in the institute warehouse-to-warehouse clause which insures goods against all risks covered by the policy "while in ordinary course of transit" from the shippers' to the consignees' warehouse. Ordinarily the meaning would be clear, but prevailing strikes and labor disturbances, with attending disorganization of transportation facilities and congestion on docks and piers, raise the question of just how complete the protection is. It is doubtful whether any stated period can be said to represent such course of transit, although many underwriters have interpreted this clause, with respect to detention on piers at port of loading or discharge, as covering for a period of fifteen days, and insist on additional premium for extending the coverage beyond this period, maintaining that in the absence of such extension the insurance lapses

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W. H. WOODRUFF, Special Agent
230 BYRNE BUILDING
LOS ANGELES

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

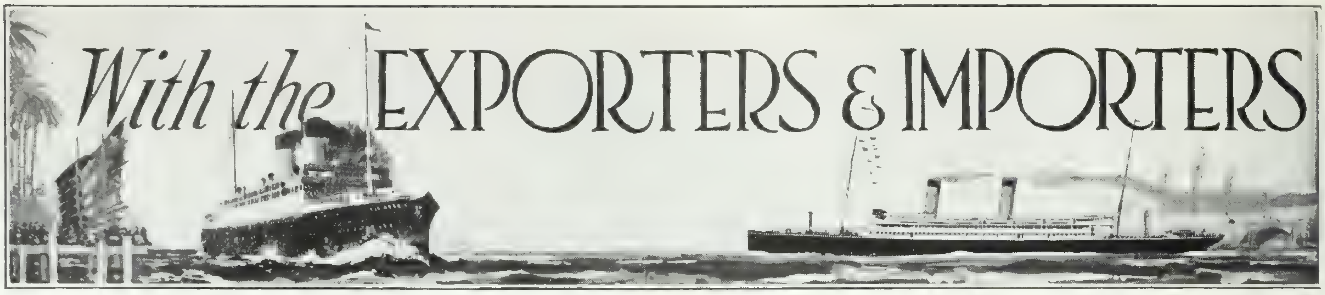
ND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

at the expiration of the fifteen days. Whether the present delays in transit, due to the general unrest, would be held to have extended the ordinary normal course of transit is a matter of speculation and of divided opinion. Assuming that fifteen days is a proper detention period, how is the assured to protect himself against the delays which occur after the goods are beyond his control and of which he may not have knowledge until the lapse of the fifteen days? There is legal authority for the view that an interruption in the ordinary course of transit may be termed a deviation which is defined in marine terms as "a turning aside from the usual course of pursuing the insured venture." When the delay is beyond the control of the assured it is certainly of this nature, and as much so whether it occur after the goods are laden on the steamer as while in transit to or from the vessel. Under this construction, if the assured's policy contains a clause covering deviation and, during an interruption in the ordinary course of transit the goods are lost or damaged through the happening of an insured peril, the insured would have recourse against his underwriter. However, it would not be prudent to rely on this in view of the fact that under a marine policy a distinction has always existed between a deviation and a delay, notwithstanding that the same tests are applied in determining whether either is excusable. The word "delay" ought really to be added to the deviation clause. As it is, it is of the first importance that the assured comply strictly with the provision requiring that he report the deviation to the assurers as soon as known to the assured and pay such additional premium as may be required. If the policy contains a clause excluding "loss or damage caused by strikers, locked out workmen or persons taking part in labor disturbances or riots or civil commotions," the presence of the warehouse-to-warehouse clause or the deviation clause will not give protection against strike risks, because these clauses do not add new insured perils to the policy, but simply define the time during which the goods are covered. In this connection it should be noted that, though the interruption of transit results from a strike, even though the policy excludes loss by strikers, most underwriters hold that the deviation clause cannot be invoked, as here is a deviation occasioned by a peril especially excepted from the policy. It is wise, therefore, to make special provision for such a contingency by the employment of a clause covering all risks as per policy, during delay in transit from any cause. The assured should bear in mind that if his policy excludes loss or damage caused by strikers, locked out workmen, etc., direct damage by strikers, such as smashing of goods, not alone is excluded, but damage from an insured peril which is the result of the acts of strikers, etc. For example, if the strikers set a fire which destroys the insured goods, while fire is an insured peril under the ordinary marine policy, the assured would have no right of recovery at the hands of his underwriters as the proximate cause of the loss is an excepted peril. It would be the same if, after the insured goods had been laden on board a steamer, strikers were to dynamite the vessel, causing it to sink and resulting in serious damage to the goods by seawater. Sinking is a risk insured against, being one of the perils of the sea, but here the sinking is proximately caused by an excepted peril. It would therefore seem necessary, in order to secure complete coverage for loss or damage from the ordinary insured perils, however set in motion, that insurance be taken out against strikes and riots as well as against ordinary policy perils, and that there be an inclusion of the warehouse-to-warehouse clause and the deviation clause. In view of the wide divergence of views among underwriters on these points it should be the duty of the broker to carefully see to it that the policy of his client secures full protection.

NEW CHIEF SURVEYOR FOR THE AMERICAN BUREAU OF SHIPPING

TO fill a vacancy in the position of chief surveyor, caused by the resignation of Mr. George G. Sharp, Mr. Stevenson Taylor, the president of the American Bureau of Shipping, has appointed Mr. Edward Granville Tuck to that important position.

Mr. Tuck was born in the State of Maine in the year 1873, and has spent his entire life in shipbuilding, having served successively as a ship fitter, loftsman, draftsman and charge man in several of the best yards in the country, including the Bath Iron Works, Newport News, Lawley's, and in several of the yards now comprising branches of the present Bethlehem Shipbuilding Corporation. He also took a conspicuous part in the building of the two largest American merchant ships, the Dakota and Minnesota, constructed by the Eastern Shipbuilding Company at Groton, Connecticut. For the past three years he has been a surveyor in the American Bureau, part of which time he served very satisfactorily in the position of assistant to the chief surveyor for the Pacific Coast. His appointment as chief surveyor is therefore in the nature of a well-merited promotion.



Cargo Forwarding Through Los Angeles Harbor

By S. L. Kreider

IT probably will come as a distinct but pleasant surprise to the majority of manufacturers, jobbers and freight forwarders throughout the world that Los Angeles, city of 600,000 people with hundreds of millions of dollars invested in various manufacturing enterprises, has direct steamship connections with practically all world ports, with the exceptions noted below. Even the people of Southern California will be rather amazed to know that at the present time there are three large companies having service direct from Los Angeles harbor to Honolulu, Japan ports, Shanghai, Hongkong, Manila and Singapore, with through bills-of-lading issuable beyond. There are four steamship companies operating from Los Angeles harbor to west coast South American ports as far south as Valparaiso, Chile; five steamship companies operating to Central American ports; five companies regularly scheduled for Mexican ports; five steamship lines Los Angeles harbor to Europe and Scandinavian ports; one steamship company operating between Baltimore, Maryland, via the Canal, making Los Angeles harbor a port of call; one steamship company—namely, the Luckenbach Steamship Company—indicating its return to pre-war service by the sailing of its first steamer, New York to Pacific Coast ports, during April, undoubtedly indicative of the return of the magnificent fleet for this service.

For the period of the war the extensive docking facilities and low harbor costs for shipping were not utilized, but the very list above should be widely known as a concrete result of the efforts and the natural resources of the Southwest; and now trans-continental freight can be handled and routed, space booked and cargo handled for the above destinations on an equality with all Pacific Coast ports.

At the present time there is no direct service for Australia, New Zealand or the Dutch East Indies, but the great demand and the great supply of Southern California products for these latter countries, which are now being shipped via Northern Pacific ports and trans-continentally via Atlantic ports, eventually will be loading at Los Angeles harbor for direct shipment. The unwritten laws of trade and transportation costs will bring about this outcome.

Los Angeles harbor is on a parity, in the matter of trans-continental rates, with all Pacific Coast ports. There is no possibility of freight congestion. Three trans-continental lines serve the port, wharfage and dockage charges are the lowest on the Pacific Coast, pilotage is optional for vessels with navigating officers properly licensed in American ports. Los Angeles harbor is a man-made harbor, none safer in the world, with several miles of wharves now built and future possibilities are for about twenty miles of berthing space.

There is one outstanding definite fact—this harbor within a very short time will be one of the more important export and import ports of the United States.

Freight Report

April 19, 1920.

OUR last circular was dated March 18, and further tonnage for Alexandria and the United Kingdom and the continent has been arranged as follows:

The Sperry Flour Company has chartered two steamers for Alexandria from San Francisco at $30 a ton, and the Portland Flouring Mills has chartered two for the same destination and at the same rate of freight. The Shipping Board has also arranged four more steamer cargoes of grain from the north for about May or June loading at $22.50 a ton to the United Kingdom or continent between Bordeaux and Hamburg. These charters were all made through Williams, Dimond & Company. These charters have given quite a tone to the freight market for Europe, especially as orders for 40,000,000 feet of ties from the north to the United Kingdom have been placed, 20,000,000 to the Ocean Lumber Company and 20,000,000 more to Balfour, Guthrie & Company, for which, it is said on the street, freight has been arranged on the basis of $45 a thousand feet. It is said that 20,000,000 more ties will be placed soon, which will take about fifteen or sixteen steamers altogether, and with the fair prospects for a barley crop that we have in this state, it is quite on the cards to see a good demand for tonnage for July, August, September and October loading.

Should freights improve in the Gulf of Mexico and along the east coast of the United States, there is no doubt but a material advance on the above rates will be forthcoming.

Meanwhile, freights have been quite active on the Pacific. The Vacuum Oil Company chartered the schooner Esther at 70 cents per case, petroleum products to Fiji; also the new barkentine Anne Comyn at 85 cents per case, hence to Sydney or Melbourne, and the fine steel ship Annie M. Reid at 80 cents per case, Sydney or Melbourne.

The steamer Paraiso was chartered for nitrate to James Bay, British Columbia, at $17.50. The Bertie Minor was chartered for nitrate to Fiji at $18 a ton.

Thorndyke-Trenholme & Company time chartered the steamer Juneau, delivery and re-delivery Seattle, for one round voyage to the west coast at about $750 per day, government form.

Steam schooners Admiral Wainright and Alvarado were both chartered by New Orleans firms on time charter, delivery and re-delivery New Orleans, for about three months, at $8.50 per ton per month.

J. J. Moore & Company chartered Conqueror at $57.50 for lumber from Puget Sound or British Columbia to South African port. They also chartered Muscoota, lump sum, for redwood from Eureka and here to Melbourne and Adelaide.

Schooners Camano and Bainbridge are both reported chartered at $35 to a direct nitrate port from the north.

Comyn, Mackall & Company chartered the motorboat Babinda for coal from South Africa to Buenos Aires at reported rate of 70 shillings and they have since chartered her, on private terms, for a cargo from Buenos Aires to this port.

The last three steamers chartered on time for trans-Pacific trade have been three Chinese steamers, formerly German owned, at $4.50 a month on the deadweight, delivery and re-delivery China. One was taken by the Pacific Export Lumber Company, one by Dant & Russell, Inc., and one by the Robert Dollar Company, which firms are all supplying them with lumber for China.

The last charters for copra have been the Honoipu at $16 from the South Seas to this port, taken by Burns, Philip & Company, and the Omega at $17.50 from Samoa here, by Wightman & Crane.

In coal charters from Australia we quote coals to Honolulu at from $9 to $9.50. From Australia to Callao, Admiral Mayo succeeded in chartering at $18.50 to Grace & Company. The schooners C. D. Bryant and Amy Turner have both been chartered at 87/6, coal to a direct nitrate port.

We quote freights to Australia, at $37.50 Sydney, and $40 to $41.50, according to size and position, to Melbourne, Adelaide or Port Pirie. To Africa, $55 to $57.50 for a direct port is quoted To China, the rates are from $35 to $37.50, and to the west coast $35, with quite a fair inquiry for tonnage.

Atkins, Kroll & Company have confirmed the sale of their schooner Mindanao at $45,000 to H. C. Seaborn of Seattle.

J. W. Vance & Company sold the Retriever to a party in Peru at $15,000, delivery Mollendo. News has since been received that this vessel has been abandoned, water-logged, in the South Pacific.

The Slade Lumber Company bought the steam schooner Hornet, delivery Gulf of Mexico, for $85,000. The have made arrangements to bring her to this coast.

Sudden & Christenson are reported to have bought the steam schooner Caoba, ex Coaster, at the same price.

Mr. Stark, formerly of the Stark-Mason Navigation Company, bought the steam schooner Bee at $125,000.

The Vanguard Shipping Corporation bought the steam schooner Centralia from Robert Ringwood at $120,000.

The tug Gleaner was bought by the Petersen Launch & Tugboat Company at $40,000.

The motorboat Boobyalla was bought by Comyn, Mackall & Company at $475,000.

PAGE BROTHERS, Brokers.

CARGO FROM UNITED STATES PACIFIC COAST TO MARSEILLE, FRANCE

THE "Societe Generale de Transports Maritimes a Vapeur," of Marseille, recently inaugurated a semi-monthly freight service between Marseille and San Francisco and other Pacific Coast ports. The first cargo brought by this line to Marseille from the Pacific Coast included 555,000 pounds of canned salmon, 151,424 bushels and 10,735 bags of wheat, 600 boxes of dried apricots, 10,200 cases of prunes, 2550 sacks of rice, 1560 cases of canned peaches, 7537 cases of canned pineapple, 3921 cases of unspecified canned fruits, 1511 cases of dried peaches, 750 cases of dried pears, 10,549 pounds of whalebone, and 340 pounds of staves. These goods, amounting to 5622 tons, were discharged at Marseille.

The remainder of the cargo was intended for various Mediterranean ports, and included 999 cases of prunes and 200 cases of other fruits for Trieste; 800 cases of canned salmon and 14 cases of gas engines and parts for Greece; 240 cases of canned salmon, 356 cases of canned fruit, 15 cases of asparagus, and 8 cases of machinery for Alexandria.

It is expected that the new line will contribute to the establishment of profitable trade relations between the Pacific Coast States and the Mediterranean. No considerable extension of this trade is likely, however, under the existing exchange situation. The present conditions practically restrict imports to food supplies.

WINNING NEW MARKETS WITH MOTION PICTURE FILMS

THE Moving Picture Exhibition of British Industries (Ltd.) was organized in 1914, but owing to the outbreak of the war, its plan for showing the world how British industries manufacture goods and what goods they can make was necessarily delayed. With the armistice, however, this concern resumed its activities.

The scope of the project is most complete. While its ultimate purpose is to widen the markets for English products throughout the world, it will put distant buyers in direct touch with British manufacturers of those products which they most need. Foreign buyers will be able to see with their own eyes the production of British works and factories, from shipbuilding to the making of pins and needles, from plate and cutlery to Worcester sauce, from cotton spinning to calendar making. The explanatory matter on the films is in four languages, English, French, Spanish and Portuguese. The firm plans to send representatives with the pictures who are competent linguists, able to make explanations in the language of the country where the films are being exhibited.

On the first tour it has been decided to divide the world into three sections. One set of films will go to Latin America, another set to South Africa, Australia and the Far Eeast, and the third set to Western Europe, the United States and Canada. By this means ninety-seven of the leading cities of the world will see the exhibition of these films during the next year.

The exhibition of the pictures will be entirely gratuitous. Invitations will be issued through the local chamber of commerce and other official organizations, and in this way the company hopes to be assured of the attendance of actual buyers and to eliminate so far as possible the merely curious. A program and time-table will accompany each invitation so that the recipient may attend the exhibition at the time the films which particularly interest him are being shown. Provision is being made for the quick and methodical attention to all inquiries received during the tour of these pictures.—Commerce Reports.

MARKETS FOR SOAP IN CHINA

SOAP is sold in large quantities in China. Imports of soap and soap-making materials into all China in 1917 were valued at $3,755,000. Imports into Antung during the same year were valued at $130,000; this included 202,939 dozen cakes of toilet and fancy soaps. Apparently, almost all the soap sold in the Antung market is imported from Japan and from Dairen, Manchuria, where a number of Japanese soap factories are located. One of the favorite brands on the local market, however, is made in England and is sold here in bars of almost three pounds' weight, under the Chinese name Hsiang Mao.

In Shanghai over 100 different brands of laundry soap are on the market, and none seems to be pushed properly by intensive advertising methods. In order of the number of brands in the market the various countries are represented as follows: China, Great Britain, America, Japan, France, and Germany. The one German brand being sold in Shanghai is manufactured locally, however. The prices of the best selling soaps for common use range from 5 to 8 cents, United States currency.

American laundry soaps are will and favorably known in the Hankow market, though they do not enjoy the distinction of being either the best or most extensively used of foreign soaps. They are regarded as a little more expensive than soaps for similar purposes imported from Great Britain and Japan. American soaps are increasing in popularity, however, and stand exceedingly high in the mind of the Chinese consumer. Probably the best known of foreign soaps sold on the local market is the "Fragrant Honey Soap," which sells at 10 coppers (about 5 cents gold) per piece of two pounds. A well-known American soap, which also sells readily, weighs slightly less than the above and retails for 14 coppers (about 6½ cents) per piece. During recent years Chinese laundry soaps are becoming more extensively used, and because of their cheapness will probably increase in popularity. The Chinese soaps are sold in smaller packages than the foreign brands and cost slightly less than the cheapest foreign grade.—Commerce Reports.

NEW EXPORT SALES MANAGER

THE B. F. Sturtevant Company of Boston, Mass., have recently appointed Mr. George H. Caffrey as their export sales representative in New York.

Mr. Caffrey has long been well and favorably known in the engineering and construction world. He graduated from Stevens Institute of Technology in 1906 and was almost immediately appointed superintendent of the South Norwalk Branch of the Connecticut Company operating electric light and street railway properties. After holding this position for three years he went to Havana as chief engineer of the Havana Electric Light and Power Company. He then accepted a position in Texas as manager of consolidated gas, light and water interests, and has since held the positions of purchasing engineer for Dodwell & Co., Ltd., and as manager of the Latin-American Department of Viele Blackwell, Inc.

It will be seen that Mr. Caffrey has had a wide and varied experience in the application, distribution and sale of machinery, and an intimate acquaintance with the conditions of export trade, both in the Far East and West Indies and Latin-American countries.

IMPORTANT COMBINATION

THE greatest industrial event that has occurred in the Philippines during the past many years occurred about a month ago when the Honolulu Iron Works, a Hawaiian firm, and Earnshaw's Slipways & Engineering Company, a Filipino concern, were merged into a corporation, known as Earnshaw's Docks & Honolulu Iron Works. This company as merged will engage in the manufacture of sugar milling machinery for the Philippine sugar industry and at the same time operate a great dry dock and ship repairing establishment.

The Honolulu Iron Works is noted for sugar machinery, being the makers of most of the mills in operation in Cuba, Hawaii and the Philippines. The entry of this concern into the Philippine field is of incalculable benefit to the Islands' sugar industry.

The Earnshaw's Shipways & Engineering Company is one of the foremost Filipino concerns in Manila. Its original plant was established in 1872. At present it employs about two thousand men in ship dry docking and repairing.

The Kerr Steamship Company, Inc., announces the inauguration of a regular monthly service from New York to India, commencing with the steamship Polybius, ready to receive cargo about May 1, to Karachi, Bombay, Colombo, Madras and Calcutta. Rates and full particulars may be had by applying to the office of the Kerr Steamship Company, Merchants Exchange Building.

The Electric Furnace Construction Company, Philadelphia, advise the following new orders for "Greaves-Etchells" electric furnaces:

Wayne Steel & Iron Company, Croghan, New York, one 1-ton furnace.

Pacific Coast Shipbuilding Returns

Albatross Metal Furniture Company, Portland, Ore. (Standard Vault & Metal Works)

Purchasing Agent, **K. Kerekes.**

Manufacturing steel cabinets and lockers for ships.

Albina Engine and Machine Works, Inc., Portland Ore.

General Manager, **Mr. William Cornfoot.**

Overhauling and marine repairs a specialty.

American Marine Iron Works, Portland, Oregon

Purchasing Agent, **Carl R. Jones.**

Contracts covering cast iron fittings for steel and wood yards of G. M. Standifer Construction Corporation, Vancouver, Wash.

Ames Shipbuilding and Dry Dock Co., Seattle, Wash.

Purchasing Agent, **J. M. Roth.**

Twenty-seven vessels under contract, mostly 8800- ton freighters.

Apex Manufacturing Company, Emeryville, Cal.

Purchasing Agent, **A. Youngholm.**

Several hundred metallic life boats for U. S. Shipping Board and shipyards.

Astoria Marine Iron Works, Astoria, Ore.

Purchasing Agent, **Mr. J. A. Jackson.**

Completely outfitting 27 Hough and Ferris type wooden vessels.

Contractors for United States and French governments.

Overhauling and repair of ships a specialty.

Marine railway under construction capable of handling ships up to 12,000 tons register. Fabricators of steel buildings, bridges, tanks and other structures.

Babare Bros., Old Town, Tacoma, Wash.

Purchasing Agent, **Mr. Geo. Babare.**

Four wooden freighters, Ferris type.

Ballin Water Tube Boiler Co., Portland, Ore.

Sixteen Ballin type water-tube boilers for eight steamers. For the Supple & Ballin Shipbuilding Co.

Twelve Ballin type water-tube boilers for six steamers building at the G. M. Standifer Construction Corporation.

Barnes & Tibbitts Shipbuilding & Dry Dock Company, Alameda, Cal.

President: **W. G. Tibbitts.**

Vice-President: **J. D. Barnes.**

Secretary: **J. J. Barnes.**

General repair and dry-docking business.

Benicia Shipbuilding Corporation, Benicia, Cal.

Purchasing Agent, **L. S. Jones,** Alaska Commercial Bldg., San Francisco, Cal.

Bethlehem Shipbuilding Corporation, Ltd. Union Plant, Potrero, Hunter's Point, Alameda Works (Alameda Side)

General Manager, **Jos. J. Tynan.**

Assistant General Manager, **A. S. Gunn.**

Secretary and Treasurer, **Arnold Foster.**

Purchasing Agent, **O. W. Streett.**

Contract for eleven 10,100-ton dw. steel tankers, 453 feet 2 inches by 56 feet by 33 feet 6 inches, 2800 h. p.

Three Scotch marine boilers, for the United States Shipping Board Emergency Fleet Corporation.

Contract for three 12,000-ton dw. steel freighters, 457 feet 6 inches by 56 feet by 38 feet, 2800 h. p.

Three Scotch marine boilers, for the United States Shipping Board Emergency Fleet Corporation.

Contract for three 10,100-ton dw. steel tankers, 452 feet 3 inches by 56 feet by 33 feet 6 inches, 2800 h. p.

Three Scotch marine boilers, for the Pan-American Petroleum Co.

Contract for one 10,100-ton dw. steel tanker, 452 feet 3 inches by 56 feet by 33 feet 6 inches, 2800 h. p.

Three Scotch marine boilers, for the Standard Transportation Company of Delaware.

Contract for one 10,100-ton dw. steel tanker, 452 feet 3 inches by 56 feet by 33 feet 6 inches, 2800 h. p.

Three Scotch marine boilers, for the Standard Oil Company of California.

Contract for one 12,000-ton dw. steel tanker, 458 feet by 58 feet 3300 h. p.

Three Scotch marine boilers, for the Standard Oil Company of California.

Contract for one 10,100-ton dw. steel tanker, 452 feet 3 inches by 56 feet by 33 feet 6 inches, 2800 h. p.

Three Scotch marine boilers, for the General Petroleum Company.

The greater proportion of the company's shipbuilding facilities are being used for the construction of war vessels for the United States government.

The largest marine repair and drydocking facilities on the Pacific Coast running to full capacity.

Ralph J. Chandler Shipbuilding Co., Wilmington, Cal.

Building large pontoons for floating dock for Los Angeles Shipbuilding & Drydock Company.

Chilman's Shipyard, Hoquiam, Wash.

Purchasing Agent, **Mr. Iver Chilman.**

Two 3-mast auxiliary schooners 130 by 33 by 14. One 300-h. p. engine, for Belgian interests.

Columbia Engineering Works (Linnton), Portland, Ore.

Purchasing Agent, **Mr. C. W. Steele.**

Capacity of yard: 5 vessels at one time.

Prepared to build any type of wooden ship. Specialize in schooners of 1000 to 3000 tons deadweight.

Columbia River Shipbuilding Corp., Portland, Ore.

Purchasing Agent, **J. C. Bowles.**

Commercial Boiler Works, Seattle, Wash.

Purchasing Agent, **Mr. I. H. Fox.**

J. Coughlan & Sons, Vancouver, B. C.

Purchasing Agent, **F. Brammall.**

Four 8100-ton dw. freighters, 400 by 52 by 31, 3000-h. p., three Scotch marine boilers. For Dominion Government.

Two 8800-ton dw. freighters, 427 feet by 54 feet by 29 feet, 9 inches.

Crowley Launch & Tugboat Co., San Francisco, Cal.

Purchasing Agent, **John L. Crowley.**

Two 28-foot launches with 10-h. p. engines.

Two 38-foot launches with 30-h. p. engines.

Four 45-foot launches with 50-h. p. engines.

Eight covered barges, 125 by 40 by 12.

Derrick barge, 75-ton lifts, 125 by 50 by 12.

J. F. Duthie & Co., Shipbuilders & Engineers, Seattle, Wash.

Purchasing Agent, **E. C. Gaumnitz.**

Elliott Bay Dry Dock Company, Seattle, Wash.

Local repair work, cleaning, painting and overhauling.

Elliott Bay Shipbuilding Co., Seattle, Wash.

Purchasing Dept., **C. A. Morrow.**

Elliott Bay Yacht & Engine Co., Seattle, Wash.

Large amount of repair work.

Foundation Company of British Columbia, Ltd., Victoria, B. C.

Purchasing Agent, **Mr. D. D. Long.**

Foundation Co., Portland, Ore.

Local Purchasing Agent, **G. M. Raymond.**

Foundation Co., Tacoma, Wash.

Purchasing Agent, **Mr. Whiteside.**

Seattle Office: **Smith Building.**

Grant Smith-Porter Ship Company, Aberdeen Yard, Aberdeen, Wash.

Manager: **Charles Albertson.**

Superintendent: **J. C. Langille.**

Grays Harbor Motorship Corporation, Aberdeen, Wash.

Purchasing Agent, **Mr. H. L. Rich.**

Eight building slips, maximum length 350 feet.

Complete machine shop for installing machinery.

Hammond Lumber Co., Eureka, Cal.

Purchasing Agent, **W. R. McMillan.**

Hanlon Dry Dock & Shipbuilding Company, Oakland, Cal.

Purchasing Agent, **H. P. Armes.**

Six cargo vessels, 320 feet 9 inches by 46 feet by 26 feet 9 inches, 22 feet 1½ inch draft; three watertube boilers. For Emergency Fleet Corporation.

Harrison & Lamond, South Vancouver, B. C.

One auxiliary schooner.

Helser Machine Works, Inc., Portland, Ore.

20 large size hawser reels for Pacific Coast Shipbuilding Co.

12 same as above for Pensacola Shipbuilding Co.

Cargo winches, for various steamers.

Hesse-Martin Iron Works, Portland, Ore.

Purchasing Agent, **Mr. W. L. Ireland.**

Steam capstans and miscellaneous deck equipment for various concerns.

Herzog Electric & Engineering Company, San Francisco

Purchasing Agent, **H. C. Toumey.**

G. W. Kneass, San Francisco, Cal.

Purchasing Agent, **G. W. Kneass.**

Two tow boats, 60x15, 125-h. p. engine. For Peterson Tow Boat & Lighterage Company.

King & Winge Shipbuilding Company, Seattle, Wash.

Manager, **J. E. King.**

Kruse & Banks, North Bend, Ore.

Purchasing Agent, **Robert Banks.**

Two steam schooners, 240 feet over all, 43 feet beam, 17 feet depth of hold, double end type. For J. R. Hanify Company.

One five-masted sailing schooner, with a carrying capacity of 1,750,000 feet of lumber. For private interests.

Three building ways.

Llewellyn Iron Works, Los Angeles, Calif.

Builders of Marine Engines, Boilers, Tanks, etc., for Emergency Fleet Corporation.

Present contracts include 1400-h. p. and 2800-h. p. marine engines with marine boilers for same, for most of the ships being built on the Pacific Coast.

Also reinforced concrete bars for concrete ships being built for the Emergency Fleet Corporation at the San Francisco Shipbuilding Company's yard in Oakland and at the Pacific Marine & Construction Company's yards in San Diego.

Long Beach Shipbuilding Company, Long Beach, Calif.

Purchasing Agent, **Frank W. Philpot.**

Three steel steamers, 8800 tons dw., 2700 h. p., triple-Scotch boilers. For U. S. Shipping Board.

One steel motorship for California & Mexican Steamship Company.

One steel vessel for sugar and coal trade, for Cuban interests.

Los Angeles Shipbuilding & Dry Dock Co., Los Angeles, Cal.

President, **F. L. Baker.**

Vice-President and General Manager, **S. L. Naphtaly.**

Works Manager, **John Murray.**

Comptroller, **F. G. Phillips.**

Nine 8800-ton dw. vessels, 410 by 54 by 29.9, 3500 I. H. P.; three Foster water-tube boilers. For Emergency Fleet Corporation. Delivery 1919-1920.

Five 11,000-ton dw. vessels, 430 ft. 3 in. by 54 by 29.9 to second deck, and 38.3 to upper deck. For Emergency Fleet Corporation. Deliveries 1919-1920.

Equipment ample to build passenger, freight and naval vessels of any size and type, including machinery and equipment.

The Wm. Lyall Shipbuilding Co., Ltd., North Vancouver, B. C.

Three auxiliary schooners, 235 W. L. by 44.6 by 20.6 moulded.

Two 200-h. p. Fairbanks Morse Semi-Diesel engines for these boats.

Eight full-powered steamers, 1500 tons deadweight. For Republic of France.

Main Iron Works, San Francisco, Cal.

Four ocean-going tugs; engines 17 by 25 by 42 by 30; complete for Emergency Fleet Corporation.

Shafting for concrete ships for Emergency Fleet Corporation.

Repairs to vessels for Emergency Fleet Corporation.

Mare Island Navy Yard, Mare Island, Cal.

Battleships (superdreadnaughts): California (44), 82.8 per cent completed February 1, 1920; Montana (51), 5 per cent completed February 1, 1920; California displacement, 32,500 tons; Montana displacement, 43,000 tons.

Destroyers: Litchfield (336), 86.9 per cent completed February 1, 1920; Zane (337), 82.3 per cent completed February 1, 1920; Wasmuth (338), 65.1 per cent completed February 1, 1920; Trever (339), 61.4 per cent completed February 1, 1920; Destroyer (340), 36.1 per cent completed February 1, 1920; Destroyer (341), 33.1 per cent completed February 1, 1920.

Seaplane Derrick No. 4, for Naval Air Station, San Diego; 82.5 per cent completed February 1, 1920.

Note: This barge including house and boom is electric welded throughout.

Navy Ambulance Boats Nos. 2 and 3, 6[illegible] foot motor tug type (175 h. p. Union engine): No. 2 (for New York), 85 per cent completed February 1, 1920; No. 3 (for Norfolk), 85 per cent completed February 1, 1920.

Marine Pipe and Machine Works, Inc., Seattle, Wash.

Purchasing Agent, **Mr. E. A. Lamb.**

One 6-cylinder Sumner type heavy oil engine, 650-h. p. For Chilean Government.

Two 1200-h. p. triple exp. steam engines.

Special marine repair department.

Matthews Shipbuilding Company, Hoquiam, Wash.

Purchasing Agent, **G. F. Matthews.**

Five-masted sailing schooner, 262 feet by 44 feet by 21 feet 6 inches. Lumber capacity, 1,750,000 feet. For owner's account.

McAteer Shipbuilding Company, Seattle, Wash.

Purchasing Agent. **Mr. Ramm.**

One steel vessel, 160 by 30 by 16.

Two four-masted schooners, 250 by 44 by 21; Skandia engines

McEachern Ship Co., Astoria, Ore.

Purchasing Agent, **Mr. O. E. Draper.**

Three steamers, 286 by 46 by 28; Hough design.

Moore Shipbuilding Company, Oakland, Cal.

Purchasing Agent, **M. G. Waites.**

Contract for seven 9400 dw. steel freighters, 402 feet 6 inches by 53 feet by 34 feet 6 inches; 2800 h.p. For United States Shipping Board.

Two of the above vessels on the ways; five in outfitting basin.

Contract for nine 10,000-ton dw. steel tankers, 4[illegible] feet 6 inches by 57 feet by 33 feet; 2800 h.p. For United States Shipping Board.

Three of the above vessels on the ways, three in outfitting basin; three keels yet to be laid.

Contract for two 10,100 dw. steel tankers, 4[illegible] feet 6 inches by 57 feet by 33 feet, 3300 h. p., for Vacuum Oil Company. Vessel on ways.

Contract for two 14,000 dw. steel freighters, 480 feet by 6[illegible] feet by 31 feet 10 inches, [illegible] h. p., for Matson Navigation Company. Keels yet to be laid.

Contract for three 10,100 dw. steel tankers, 4[illegible] feet by 57 feet by 33 feet, 3300 h. p., for Standard Oil Company of New Jersey. Keels yet to be laid.

Contract for one [illegible] dw. steel tanker, 330 feet by 46 feet by 19 feet 10 inches, for Standard Oil Company of California. Keel yet to be laid.

One tanker, 500 feet by 71 feet by 39 feet, 4000 h. p. For Southern Pacific Atlantic S. S. Line.

Motorship Construction Co., Vancouver, Wash.

President, **Merrill A. Reed.**

Purchasing Agent, **J. W. Dougherty.**

Builders of cannery tenders, tugs, barges, river steamers, power boats and concrete barges.

National Engineering Corporation, Wilmington, Calif.

Outfitting ships for Emergency Fleet Corporation.

One 500-h. p. triple expansion engine for McAteer Shipbuilding Co.

New Westminster Construction & Engineering Co., New Westminster, B. C.

Purchasing Agent, **Mr. H. M. Fullerton.**

Four 2800 dw. wooden freighters, 250 by 43.6 by 25, 950-h. p.

Five 1500-ton dw. wooden freighters, 204 by 40.6 by 17, 550-h. p. twin engines, watertube boilers.

Northwest Steel Company, Portland, Ore.

Purchasing Agent, **Mr. W. C. Smith.**

Seven 12,200 ton tankers for the Swiftsure Oil Transport Co.; oil burners, Scotch boilers, reciprocating engines.

Pacific American Fisheries, South Bellingham, Wash.

Purchasing Agent, **Mr. B. U. Slyster.**

Pacific Boat & Iron Works, Portland, Ore.

Metal lifeboats and life rafts for steel yard in this district.

Contract for Corser's one-man simultaneous releasing hooks on all lifeboats.

Capacity: Three boats a day.

Pacific Coast Shipbuilding Co., 311 First National Bank Bldg., San Francisco, Cal.; Plant, Bay Point, Cal.

Purchasing Agent, **Mr. J. A. Smiley.**

Seven 9400 dw. steamers.

Two oil barges.

Pacific Construction Co., Ltd., Coquitlam, B. C.

Purchasing Agent, **Mr. R. W. Holland.**

Two 2800-ton dw. wooden freighters, 250 by 43.6 by 25, 950-h. p.

No. 3, Wooden steamer, 250 by 43.6 by 25, 1000-h. p. water-tube boilers.

No. 4, Same as No. 3.

Nos. 5 and 6, 1500-ton full-power barges, 204.8 by 39.8 by 17, 275 I. H. P. engines, 5 water-tube boilers.

Pacific Marine and Construction Company (Scofield Engineering Company) San Diego, Cal.

Contracts for two concrete ships of 7500 tons, 420 by 54, draft loaded 27 feet, light 17 feet, carrying capacity 58,000 barrels.

Thirty-four-acre yard. Two building ways for sidewise launching. Two other ways.

Pacific Marine Iron Works, Portland, Ore.

Purchasing Agent, **Mr. V. L. Hamlin.**

Contracts for four 1600-h. p. triple expansion engines.

Contracts for six 1400-h. p. triple expansion engines.

Pacific Shipbuilding Corpn., Seattle, Wash.

Purchasing Agent, **C. H. Jones.**

Yard designed with six building ways.

Peninsula Shipbuilding Co., Portland, Ore.

Purchasing Agent, **Mr. H. H. Fisher.**

Two sailing vessels, 287 feet by 49 feet 8 inches by 27 feet 6 inches. For United States Shipping Board.

Capacity of yard: Four ways, wood construction, installation wharf 1000 feet by 125 feet.

Puget Sound Boiler Works, Seattle, Wash.

One Scott Patent Water Tube Boiler, 200-h. p. pressure, for Anderson Shipbuilding Co.

Contracts for condensers, water feed tanks, boiler casings and smoke stacks.

Large amount of local marine repair work.

Rolph Shipbuilding Company, Eureka, Cal.

Purchasing Agent, **John D. Stelling.**

One steamer and one barge. For U. S. Shipping Board.

One barkentine, two steam schooners and one tug boat. For Rolph Navigation & Coal Company.

Three barkentines, 3500 tons, converted Ferris type steamers for United States Shipping Board.

San Diego Marine Construction Co., San Diego, Cal.

Purchasing Agent, **C. W. Stose.**

No. 136, Tow-boat "Pullet," 55 by 12 by 7.6; 100 h. p. oil engines.

No. 137, Tow-boat, 56 feet by 12 feet by 7 feet 6 inches; 100 h. p. Fairbanks-Morse type C. O. engine. Immediate delivery. For stock.

No. 138, V-bottom pleasure boat, 40 feet by 9 feet by 2 feet 6 inches; 6-cylinder, 3½ by 5¼ Continental motor. C. W. Stose, owner.

San Francisco Shipbuilding Co., 310 California St., San Francisco, Cal.

General Manager, **V. H. Poss.**

Purchasing Agent, **E. F. Atkinson.**

Two 7500-ton dw. bulk oil steamers, reinforced concrete, at Government Island Plant, Oakland, Cal.

Schaw-Batcher Company Ship Works, South San Francisco

Purchasing Agent, **K. I. Dazey.**

Five single-screw freighters, 8800-ton dw., 427 by 54 by 29.9; 2800-i. h. p. reciprocating engines, 24½ by 41½ by 72 by 48; three Scotch boilers.

Seaborn Shipyards Company, Tacoma, Wash.

Four way yard prepared for any kind of wood construction.

Seattle Machine Works, Inc., Seattle, Wash.

Purchasing Agents, **Frank H. Wheelon and D. Crause.**

Seattle-North Pacific Shipbuilding Co., Seattle, Wash.

Purchasing Agent, **F. H. Magune.**

Skandia Pacific Oil Engine Co., Oakland, Cal.

Purchasing Agent, **Mr. E. B. Brown.**
Ten 825 B. H. P. Werkspoor Diesel engines for installation in 5600 tons steel fabricated motorships.
Two 550-B. H. P. Werkspoor Diesels.
Four 240-h. p. and two 120-h. p. Skandia engines.
Two 850 b. h. p. Werkspoor Diesels for installation in tanker.
Additional engines of smaller capacity.

Skinner & Eddy Corporation, Seattle, Wash

Purchasing Agent, **Ray Anderson.**

Sloan Shipyards Corporation, Olympia, Wash.

Purchasing Agent, **Mr. L. P. Byrne.**
Sixteen freighters, 281.6 by 46 by 26, 19-32-56 by 36; 1400-h. p.

Somarstrom Shipbuilding Co., Columbia City, Ore.

Four wooden steamers, Hough design, 288 feet long.
Four wooden steamers, Ferris type.

Southwestern Shipbuilding Co., Los Angeles, Cal.

Sixteen single screw freighters, 8800 tons dw., 427 by 54 by 29.9; 2800 i. h. p. reciprocating engines; three Scotch boilers. For U. S. Shipping Board.
Two 12,000 dw. tankers, 440 by 58 by 41 feet deep, molded depth to shelter deck. Three Scotch boilers. Quadruple expansion engines, 3300 horsepower. For Union Oil Company.

G. M. Standifer Construction Corp., North Portland, Ore., and Vancouver, Wash.

Purchasing Agent, **Mr. H. Luckett,** Vancouver, Wash.
Three shipyards, fifteen building berths.

Stephens Bros., Stockton, Cal.

Eight boats, from 25 to 50 feet long, for various companies.

St. Helens Shipbuilding Co., St. Helens, Ore.

Purchasing Agent, **Mr. A. F. Barnett.**
No. 49, steam schooner, 250 over all by 46 by 22, to the order of Charles R. McCormick & Co., San Francisco, Cal.

W. F. Stone Shipbuilding Co., Oakland, Cal.

Purchasing Agent, **Mr. Lester F. Stone....**
Four 150-foot wooden hulls for seagoing tugs, 30-foot molded beam by 17 ft. depth.
One tug, 95 feet by 21 feet by 11 feet, 500 horsepower gas engine.
Miscellaneous repair work.

T. R. Trahey, Ballard, Wash.

One oil barge, 110 feet long and 32 feet wide, capacity 150,000 gallons. For General Petroleum Company

Tregoning Boat Co., Seattle, Wash.

Purchasing Agent, **Mr. C. Tregoning.**
A large number of lifeboats and ship power launches.

Todd Dry Dock & Shipbuilding Co., Tacoma, Wash.

Purchasing Agent, **Mr. C. L. Bankson.**

Todd DryDocks, Inc., Harbor Island, Seattle, Wash.

Purchasing Agent, **Mr. C. R. English.**
General drydock and repair work.

Union Construction Company, Oakland, Cal.

President: **W. W. Johnson.**
Vice-President and General Manager: **H. G. Peake.**
Purchasing Agent, **Mr. Chas. L. Froding.**
Contracts for seven steel ships of 9400 tons, Isherwood type, 402.5 by 53 by 34.5; three watertube boilers, 2800 h. p. turbines. For the U. S. Shipping Board.
One 1685-ton Diesel-engined oil tanker for the Standard Oil Company of California.
One 10,000-ton tanker for the General Petroleum Company.
One 10,200-ton steel tanker for the Standard Oil Co. of California.
One 10,200-ton steel tanker for the Anglo-Saxon Petroleum Co.
Four revenue cutters, turbines and electric drives.
One sea-going tug for Coast Guard.

Vancouver Shipyards & Engine Works, Ltd., Vancouver, B. C.

Contracts in hand for two wooden vessels.

Wallace Shipyards, Ltd., North Vancouver, B. C.

Purchasing Agent, **Mr. C. Wallace.**
Contracts for four 8,100 dw. steel vessels.
One steamer, 320 by 44 by 25, single screw, triple-expansion, reciprocating engines, 1800 h. p., 4300-ton dw. capacity.
Two steamers, 331 by 46 by 25, single screw, triple expansion, reciprocating engines, 2500 i. h.p., 5100-ton dw. capacity.

Western Canada Shipyards, Ltd., Vancouver, B. C.

Five 195 by 39.8 by 17 watertube boilers.

Willamette Iron & Steel Works, Portland, Ore.

Purchasing Agent, **S. F. Woodbury.**
Nine Scotch marine boilers for vessels building in Pacific Coast yards for Emergency Fleet Corporation.
Two gunboat type boilers, 7 feet 8½ inches diameter by 17 foot 7 inches long, for Rodeo Vallejo Ferry Company, San Francisco, Cal.
Five submerged flue type boilers for Haviside, Withers & Davis, San Francisco, California.
One submerged flue type boiler for Union Construction Company, San Francisco, California.
Eighteen 15 feet diameter, 11 feet 9 inches long, Scotch marine boilers, for the Union plant of the Bethlehem Shipbuilding Corporation, San Francisco.

Wright Shipyards, Tacoma, Wash.

Purchasing Agent, **Mr. Geo. P. Wright.**

Yarrows, Ltd., Victoria, B. C.

Two slipways suitable for building vessels up to 350 feet in length.
Marine railway, 315 feet long, 3000 tons dw. capacity.
Graving dock, 480 feet long, 65-foot beam.
Makers of manganese bronze propellers and large marine engine castings.
Engaged chiefly with repair work.

CHICAGO PNEUMATIC GENERAL OFFICES REMOVED FROM CHICAGO TO NEW YORK

THE general offices of the Chicago Pneumatic Tool Company, effective March 31, have been transferred to the Chicago Pneumatic building, a new ten-story structure erected for the exclusive use of the company at 6 East Forty-fourth street, New York.

The move was accomplished without appreciable interruption to business over the week-end. Arrangements, carefully made in advance, made possible the jump of this large organization across half the continent without interference to the normal routine of business except for a brief period.

The Chicago district sales branch, previously in the Fisher building, has been moved at the same time to commodious new quarters on Chicago's new Boulevard Link, at 300 North Michigan Boulevard. The Chicago service branch, formerly at 521 South Dearborn street, has been consolidated with the sales branch at the new address, occupy-the first floor of the building, while the sales offices will be on the second floor or boulevard level. The location is ideal for both departments of the Chicago branch, which, under the direction of Mr. J. L. Canby, district manager, will continue to serve the company's customers in the Chicago and Milwaukee territories with increased efficiency with the improved facilities at its disposal.

NEW SALES MANAGERS

THE Metal & Thermit Corporation, New York City, N. Y., in order to more adequately take care of its rapidly increasing business in the New England States and in Canada, has appointed Mr. James G. McCarthy manager of its Canadian branch, with headquarters in Toronto, and has transferred Mr. Robert L. Browne from its New York office to Boston, where he will have charge of all sales in the New England States.

Mr. McCarthy was graduated from Stevens Institute of Technology in 1906 and became affiliated with the Metal & Thermit Corporation in 1909. He has had a wide and varied experience with all phases of the Thermit Process and has represented the company in many sections of the United States and Canada.

Mr. Browne has been associated with the New York office of this company since 1917. His assignment to the New England States will enable customers in that territory to receive much closer attention and co-operation than has been possible in the past, a service for which Mr. Browne is eminently fitted both by technical education and practical experience.

PACIFIC MACHINERY

Modern Lathe Construction Features

By E. N. Moor, Jr

THE speed with which metal may be removed with a cutting tool on various machine tools is limited by certain conditions, which must be given careful thought by the operator if best results are to be obtained.

The material from which the cutting tool is made, the distribution of metal in the machine tool and features in design, which help to make the tool as rigid as possible to give it the ability to withstand the service it is designed for, the method and rigidity with which the work is held and the character of the work itself, all are points that must be considered.

The first point mentioned, the cutting tool, has been taken care of by the steel manufacturer, who is constantly improving his product to allow higher cutting speeds. The modern alloy high-speed steel and "Stellite" are commonly in use at the present time, and to those who were familiar with machine practice twenty years ago their use may be appreciated.

To keep pace with the development of cutting tools it has been necessary for the lathe builder to alter and improve his design so that his machine may be capable of standing the severe stresses imposed on it under modern shop conditions when high-speed tools are used.

The R. K. LeBlond Machine Tool Company of Cincinnati, Ohio, maker of lathes, milling machines and universal tool and cutter grinders, has developed such a lathe. One constructional feature, which in the writer's mind is a step far in advance of any other lathe builder, is the elimination of all friction clutches in the apron. Figures 1 and 2 show in detail the apron construction. The required strength of parts is made possible, first by the selection of material (all gears are drop-forged steel and all studs are hardened and ground), and second, by their patented design, which reduces the number of parts to about half the number usually used, with a consequent increase in efficiency. In this construction both feeds are engaged with a positive jaw clutch, which engages the back of the bevel gear, where it has light duty to perform. This clutch is shown at "E" in Figure 1. The feed is tripped in or out by the lever "A" in Figure 2, and to change from longitudinal to cross, or vice versa, the knurled knob "B" is pulled out or pushed in to give the change. This knob operates the sliding gear "F" in Figure 1. It may also be set to a central position, in which all gears are disconnected, which is of value when threading. The three positions of the knob are accurately located by a spring plunger. The feed is reversed with

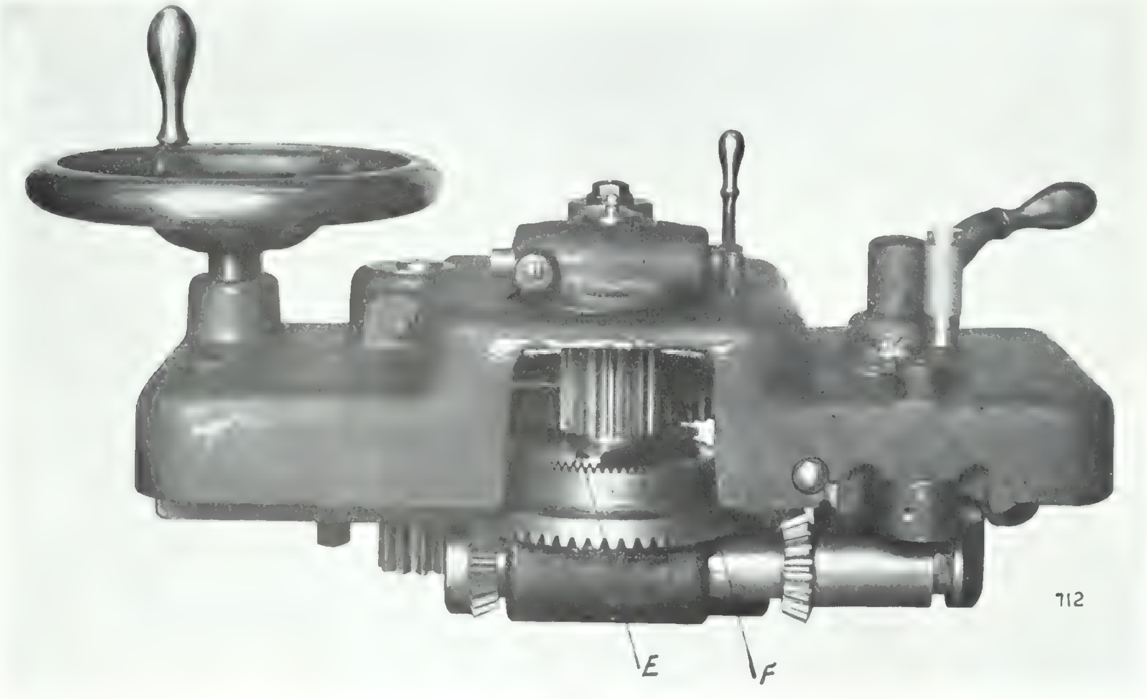


Figure 1

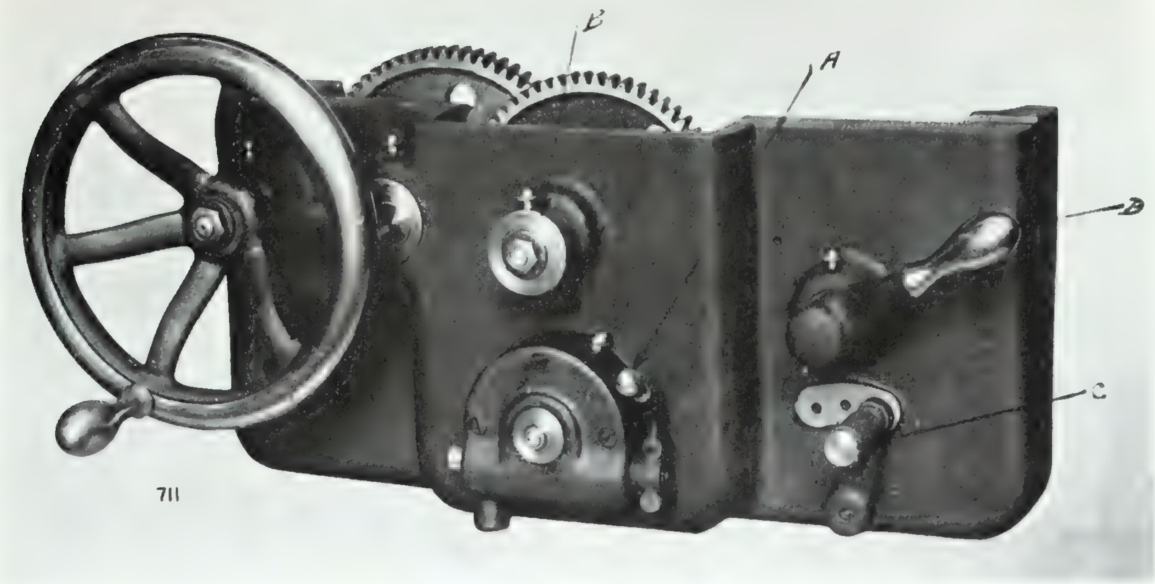


Figure 2

the lever "C," and the half-nut engaged with the lead screw by lever "D" as on the old-style apron. The apron also is provided with a locking device which eliminates the chance of engaging the feeds and lead screws at the same time.

The V-type ways used by most lathe manufacturers have some very objectionable features, prominent among which are rapid wear due to small wearing surface and the impossibility of keeping the carriage from climbing the V under heavy cuts. These two features in themselves are sufficient to condemn the ordinary lathe for heavy work. To overcome these objections and to furnish a construction capable of handling high-speed tools to the limit, the R. K. LeBlond Machine Tool Company designed its new type of bed, the chief feature of which is the "improved compensating V." In this construction the back of the carriage travels on a flat surface and is held down by a flat gib, while the front of the carriage slides on a guide of approximately V shape, one side of which is machined on an angle of 15 degrees, the other on an angle of 70 degrees. The carriage is held to position with relation to this guide by means of adjustable taper gibs at its extreme ends, which take a bearing on the front vertical surface of the bed. It is also gibbed down in front by gib blocks screwed to either end of the front of the carriage, which bear underneath the front way. This construction prevents the carriage from climbing the V way under the most severe cuts that could be imposed on it. The 15-degree angle on the back of the V serves a double purpose. It prevents a thrust surface at right angles to the combined forces of the tool, and thus prevents all tendency of the carriage to climb. As the 70-degree side wears, the 15-degree angle compensates for the drop and keeps the taper gibs, which are tongued to the carriage, in constant adjustment.

The effective bearing surface between the bed and carriage is from three to four times that found on lathes of the usual construction, which tends to prolong the life of the V.

Another very handy feature on this tool is the

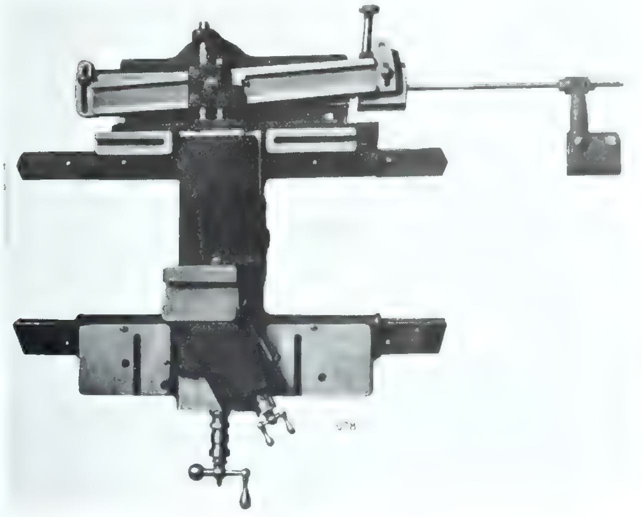


Figure 4

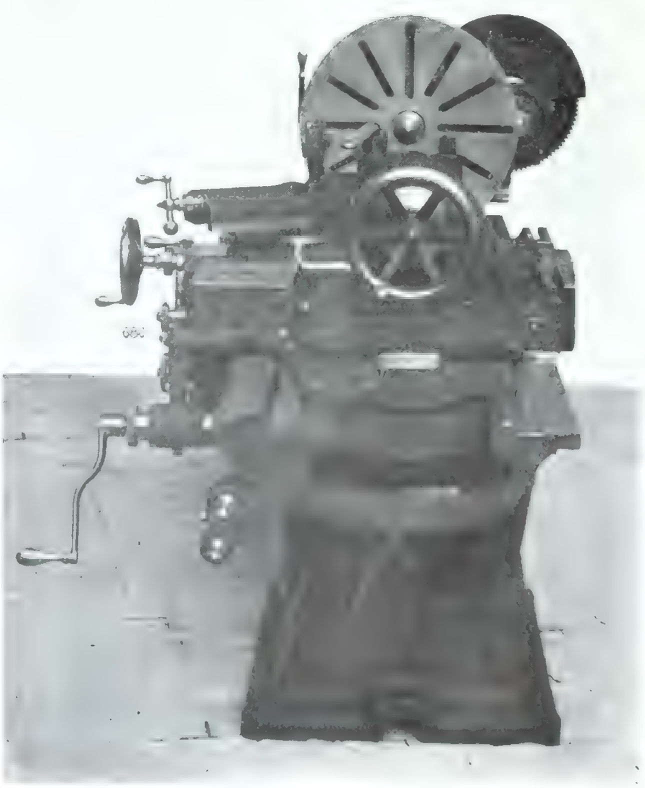


Figure 3

compound rest which is shown in Figure IV. The slide of the rest is offset 30 degrees from a line vertical to the T-slot. With this construction the T-slot may be kept parallel to the bed and the slide offset to clear the cross feed handle when working on large diameters where the two interfere. When threading this rest may be set at 30 degrees to the cross slide and the T-slot kept parallel to the bed.

To increase the driving power of the headstock and to make a machine that will pull any cut the job and tool will stand, the cone pulleys are made larger in diameter than those ordinarily found. This is made possible by dropping the webbing of the headstock down between the ways of the bed, as shown in Figure V. Figure VI gives a view of the headstock bearings and spindle. The front spindle bearing on this lathe consists of a hardened and ground steel sleeve pressed on the spindle nose which runs in the cast iron bearing of the headstock itself. This does away with the extra joint where a liner is used and makes a much stiffer head.

The rear bearing is babbitt fastened in the headstock and cap. To those who are familiar with cast iron as a bearing, the value of this construction will be appreciated. Cast iron wears to a glaze when properly oiled, which is practically indestructible, and with the hardened and ground journal a long life combination is the result. This construction is found in all LeBlond lathes from 15-inch to 23-inch swing, but may be varied to bronze or babbitt if preferred by the purchaser.

The LeBlond line of machine tools is sold in San Francisco, Los Angeles, Seattle and Portland by the Eccles & Smith Company.

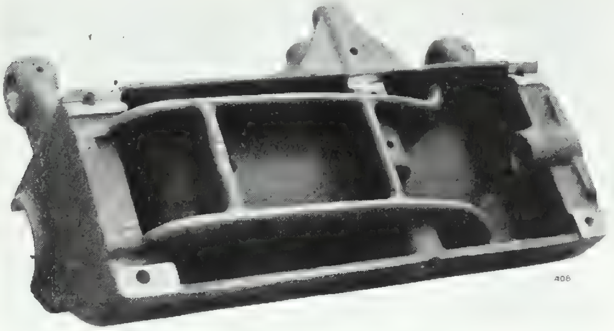


Figure 5

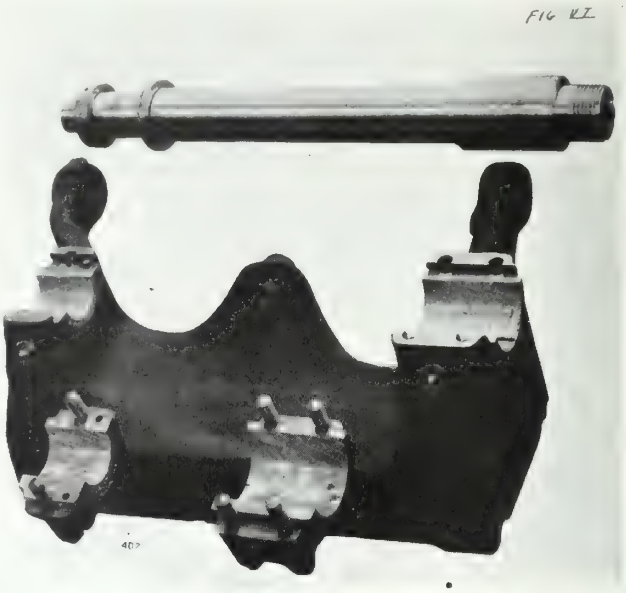
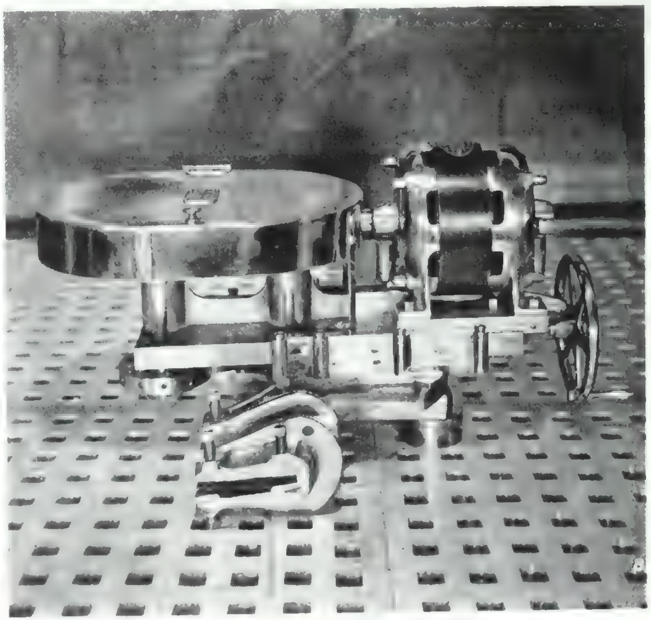


Figure 6

Skinner & Eddy Models

AT the National Marine Exposition in New York the exhibits in the booth of the Skinner & Eddy Shipbuilding Corporation are attracting a great deal of attention. The walls display a large number of hand-colored pictures of the many ships built by this great Puget Sound shipbuilding plant, but the interest has centered in the wonderful miniature models of two of the machines developed by Skinner & Eddy for increasing production in shipyards. These models are of the scarphing machine and of a very powerful and efficient pneumatic ram which has been found very useful for forming ship shapes on the bending slab. One of these—the well-known portable plate scarphing machine—is also exhibited in full size, handsomely finished in white enamel, as shown in our illustration.

These models were beautifully made by Joseph Mayer & Brothers of Seattle and are complete in every way, and capable of performing the same work as the large machine up to the limits of their capacity. It will be noted in the illustrations that the models are mounted on a miniature bending slab. This slab is made of aluminum and in the exhibit is fitted with miniature models of all the accessories which would be used on the big bending slab at the shipyards. The bending slab is in many ways the heart of a real shipbuilding operation, so that this exhibit is of splendid educational value and is thus carrying out the motives for which the National Marine Exposition was established—namely, to create a deeper interest for the things pertaining to the sea in the mind of America.



Model of Skinner & Eddy scarphing machine exhibited at National Merchant Marine Exposition

How Ball Bearings Increase Efficiency

By P. N. Case

THE day has passed, never to return, when old-fashioned bearings will suffice to meet the inexorable demands for efficiency in all types of mechanisms. Friction must be reduced, heating and wear eliminated as factors, shaft alignment accurately mantained, and replacements made unnecessary. Before proceeding further, let us examine the three general types of bearings.

Types of Bearing

Broadly speaking, there are three types of bearings—plain bearings, roller bearings, and ball bearings. In order to observe their relative efficiency we will consider each of these three types of bearings separately.

(1) The Plain Bearing:

In the case of the plain bearing, the revolution of the shaft in its bushing constitutes pure sliding friction. This friction is so great that unless thorough lubrication is constantly maintained the abrasion will soon ruin the bearing. Therefore, in addition to excessive power loss, this type of bearing is entirely inadequate to withstand the severe service and frequent abuse to which automobile bearings are subjected.

(2) The Roller Bearing:

In the roller bearing the attempt is made to substitute rolling friction for sliding friction. This is only partially successful.

The reason for this is very simple. A roller has only one axis of rotation. Therefore, in order to obtain pure rolling friction, it is essential that each roller be maintained constantly in perfect alignment with the shaft—a condition practically impossible of accomplishment.

Moreover, sliding friction and wear are inseparable. That serious wear takes place in roller bearings is attested by the fact that the sole purpose of making roller bearings adjustable is in order to compensate for wear.

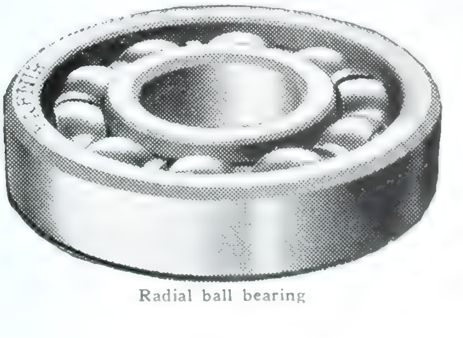
Consequently, both in regard to friction and wear, the roller bearing is intermediate between the plain bearing and the type of highest efficiency.

(3) The Ball Bearing:

Finally, in the ball bearing the load is carried on a row of spheres surrounding the shaft. Everyone knows that a sphere will roll in every direction; that is, every axis is an axis of rotation. Consequently, it matters not how the balls turn in moving around the shaft, for they will invariably roll. Thus, in this type of bearing, friction and wear are reduced to a minimum.

Durability

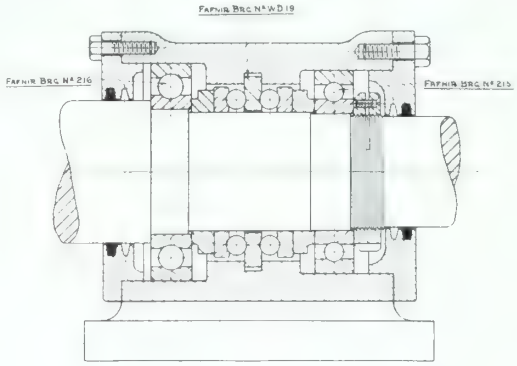
Though elimination of power loss through bearing friction is extremely important, it would avail nothing unless accompanied by durability. In this connection it is merely necessary to point out that lack of durability is the result of wear, and that wear is caused by friction. By reducing friction to the point where it is negligible, wear is almost unknown in the case of the ball bearing. The ball bearing is extremely durable and cannot suffer injury unless it is overloaded or improperly mounted or subjected to abuse. However, it is assumed that the ball bearing in question is a type embodying scientific design, the best grade of material, and accurate workmanship. In order that the reader may form an idea of what constitutes a high-grade American-made ball bearing, a brief outline of the way in which Fafnir ball bearings are made is given in the next few paragraphs.



Radial ball bearing

Making Fafnir Ball Bearings

Fafnir ball bearings of all types are manufactured exclusively from the highest grade American-made high carbon chrome alloy steel. Before being permitted to enter the production department, numerous samples of each lot of steel are systematically and thoroughly examined in the laboratory. Chemical analysis of each sample is made to prove that the composition of the steel is in complete accord with specified standards; the Brinell test determines whether or not the steel has been properly annealed; a careful examination of fracture reveals the soundness and uniformity of structure which qualities are highly essential; and finally, a preliminary hardening test is conducted to ascertain the ability of the steel properly to harden and become tough under the influence of heat treatment. Only the raw material which fully coincides with these exacting requirements is accepted for the manufacture of Fafnir ball bearings; all other steel is rejected.



Combination radial and thrust ball bearing

The steel which is approved in this series of tests now enters the production department, and the inner and outer rings are turned or forged roughly to shape and size. The next step consists in the heat treatment of these rings. This operation is conducted by skilled workmen in the most approved type of furnaces. In this way the steel is greatly refined, becoming hard and fine grained throughout the mass, making it extremely durable. At the same time the steel becomes very tough, enabling it successfully to withstand the severe shocks to which the bearings may be exposed when placed in service. In addition to this, the heat treatment results in greatly increasing the strength of the steel, which is essential in order that the bearings may at all times carry the loads placed upon them with perfect safety. On completion of the hardening operation, each piece is thoroughly inspected and the slightest defect is sufficient to cause rejection.

The pieces approved by the inspection department are then ground on machines designed to turn out work with extreme accuracy. In no kind of work is perfection in grinding more essential than in the manufacture of ball bearings. The severe tests to which ball bearings are often subjected make it of paramount importance that the abutting parts be ground perfectly to shape and size. This may best be illustrated by the fact that certain parts of Fafnir ball bearings are ground to within one ten-thousandths of an inch of the standard size.

Moreover, an ordinary surface finish is entirely inadequate for the races of ball bearings. The slightest mark on the surface of a race, even though not visible to the naked eye, might in time become magnified and ultimately result in serious injury to the bearing. Therefore,(in order that Fafnir ball bearings may be relied upon to operate perfectly during a long period of continual service, the grinding of all important parts is accomplished in two operations, each followed by critical inspections by the mechanic, the foreman, and in the inspection department. Finally, all surfaces are polished in mirror-like smoothness.

Last of all, each completed bearing is re-examined in every detail of construction and finish in the inspection department. The chief inspector supervises this examination and possesses supreme authority. Twenty-six per cent of all employes engaged in the production of Fafnir ball bearings are inspectors, and regardless of any other consideration, such as output, every Fafnir ball bearing shipped must conform to inflexible standards of material and workmanship.

Field of Ball Bearings

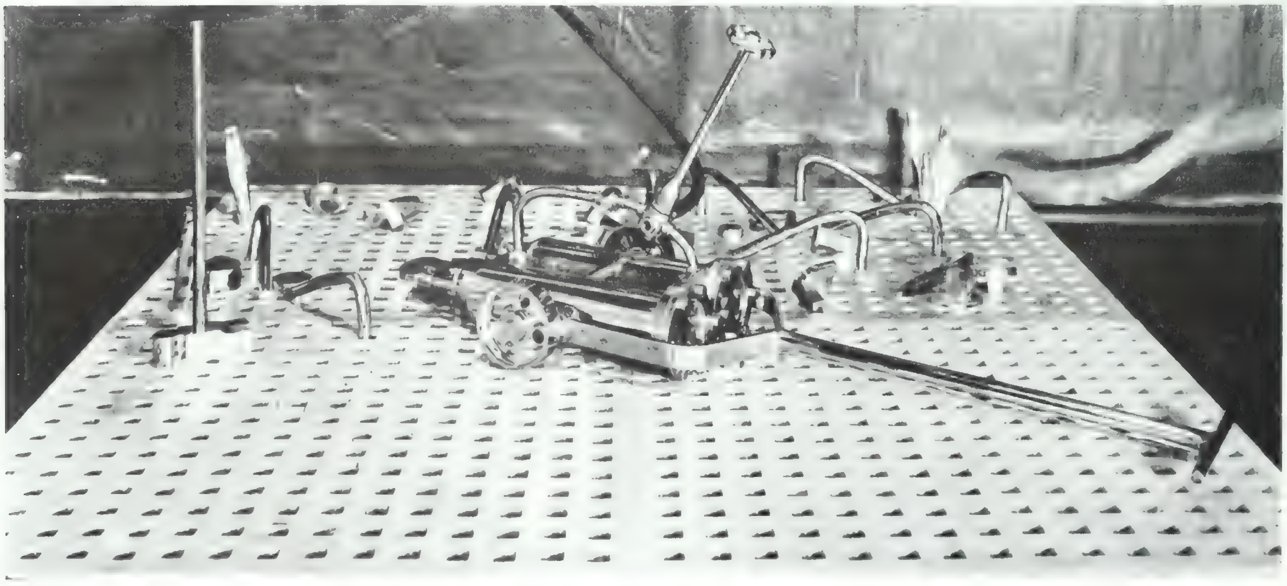
Ball bearings are applicable in practically every instance where a shaft revolves or a wheel rotates. For instance, Fafnir ball bearings will be found in America's leading motor cars—both passenger cars and trucks—in tractors, machine tools, electric motors, farm lighting units, vegetable peelers, washing machines and innumerable other machines. To give a concrete example, without ball bearings it would be virtually impossible permanently to maintain the accurate alignment required of high-speed grinding machine spindles, which frequently run at 20,000 or more r. p. m. Equally remarkable results have been attained through the agency of ball bearings in high-duty, sensitive drilling machine tools. Moreover, by mounting the armature shaft of an electric motor on ball bearings, wear is eliminated, making possible the maintenance of an extremely minute air gap without danger that the armature will ever drop and strike the pole pieces. In this way, the magnetic leakage is reduced to a minimum and the efficiency of the motor is correspondingly increased.

Moreover, in the marine field, ball bearings have come to extensive use for carrying the crankshaft, propeller shaft, and for carrying the propeller thrust. Moreover, the clutch and reverse gear affords an excellent example of the application of ball bearings to marine engines, and there are numerous other applications which might be cited. However, the accompanying illustration is typical and shows the application of Fafnir ball bearings in connection with a 75-horsepower marine engine propeller block. Though this is only an outline of the subject, it is hoped that it will afford the reader an idea of the vast range of installations in which ball bearings have greatly promoted the efficiency of the units.

F. Somers Peterson Company of San Francisco are distributors of Fafnir ball bearings for the Pacific Coast. Stocks are carried in all the principal Pacific Coast cities.

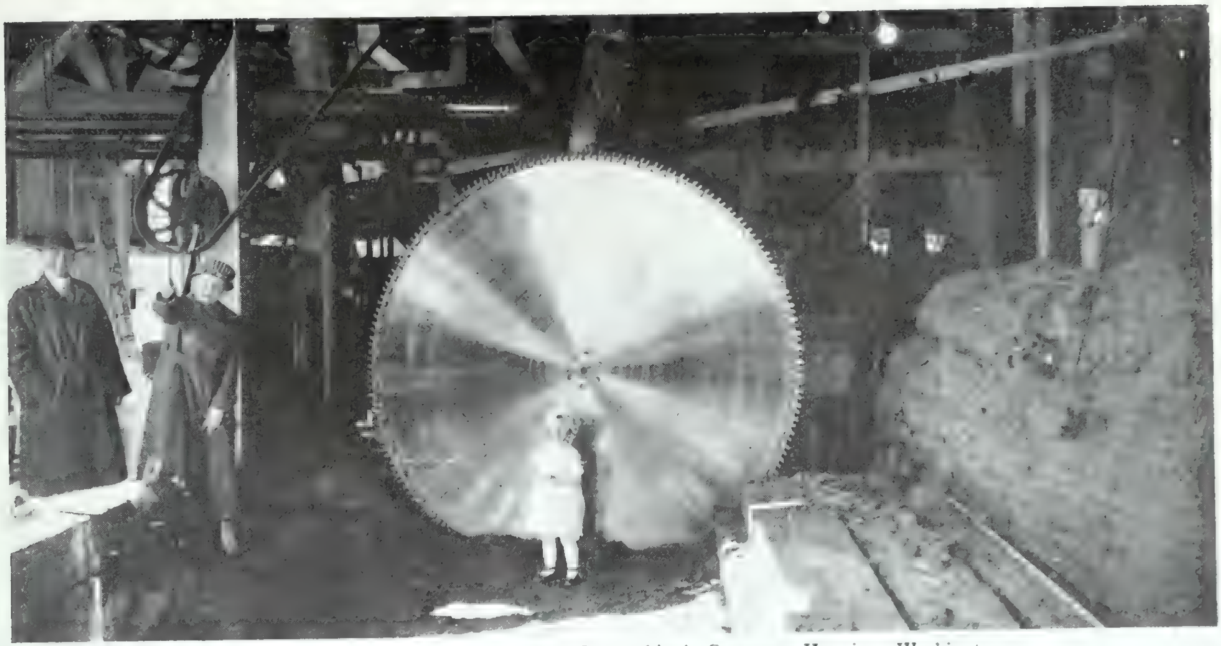
THOMAS S. HUTTON NOW REPRESENTS SOUTHERN CALIFORNIA IRON & STEEL COMPANY

THOMAS S. HUTTON, with offices in the Rialto Building, has been appointed San Francisco sales manager for the Southern California Iron & Steel Company. This announcement will be pleasing to Mr. Hutton's friends in the iron and steel trade and with his other representatives lines this new account, which includes all rolling mill products, completes Mr. Hutton's facilities for supplying the trade.



Model of bending slabs and tools at the National Merchant Marine Exposition exhibit of Skinner & Eddy, Seattle. Described on page 180

Largest Saw in the World



The new saw at the shingle mill of the Coats Shingle Company, Hoquiam, Washington

HENRY DISSTON & SONS, INC., of Philadelphia, recently supplied to the Coats Shingle Company of Hoquiam, Washington, two circular saws of the inserted tooth type, which are said to be the largest in the world. Our illustrations show very graphically the comparative size of these huge discs, which measure 108 inches in diameter and have 190 teeth inserted in the rim. The ingot from which these saws were made weighed 1140 pounds. After re-heating, rolling and trimming, the weight of the disc was about 795 pounds.

At full speed the teeth on the rim of this saw are traveling at the rate of 130 miles an hour, and with the weight of the disc behind this speed, the flying teeth cut into the immense logs for which Washington is famous in a way that is almost indescribable.

On April 10, at the invitation of the Coats Shingle Company, lumbermen and shingle manufacturers from various parts of the Northwest assembled to witness a trial of these blades. The largest logs were cut through with an ease and rapidity which astonished the experienced mill men.

With ordinary saw installations, shingle weavers frequently have to wait for the bolts to accumulate, but this saw piled up the bolts so quickly that the rest of the mill was practically overwhelmed and had to call a halt.

Henry Disston & Sons have had a very long and successful experience in the manufacture of saws. As long ago as 1876 they manufactured a circular saw 100 inches in diameter for the Centennial Exposition, and some years afterwards they made another 100-inch saw disc for cutting stone, each tooth of which was studded with a black diamond.

The ingots out of which are fashioned the disc plate which holds the teeth of these saws had to be worked with very great care in order to insure uniformity in quality of the steel throughout every section of the plate. The plate must be perfectly straight and true and must be carefully heat-treated in order to make these qualities lasting, and it is a very great recommendation for the Disston Saw Works that they are able to produce such wonderful quality in saws of so great dimensions.

SAFETY WORK AT MARE ISLAND

A MOST radical reduction of accident frequency is shown in records of the safety department of the United States Navy Yard at Mare Island, California, over the period of July, 1917, to December, 1919, recently received by the National Safety Council. Comparing the end of this period with the beginning, the records show a reduction of 75 per cent in the accident frequency rate per 100 employes in the face of an increase of 115 per cent in the working force over that period.

An accident frequency chart shows that in July, 1917, with a working force of 4500 men, this plant had an accident frequency rate of 1.25 per 100 workmen. From then on there was an almost steady decline in the accident frequency rate and at the same time a steady increase in the size of the working force. In December, 1919, the accident frequency rate had dropped to a little less than .35 per 100 men employed and the working force had risen to 9700 men.

The chart is based on the records of accidents involving at least three days' disability or compensation cases. The full significance of this wonderful record will be appreciated when it is recalled that during the greater part of the time involved the industrial world was going through its most trying period, especially with respect to the problem of labor turnover.

The safety work at this navy yard, like that in all other government navy yards and arsenals, was inaugurated under the supervision of the field secretary of the National Safety Council, and later was managed by Clarence E. Ralston, safety engineer at the Mare Island Navy Yard. Mr. Ralston on February 1, of this year, left this position to become assistant to Lew Palmer, director of safety and personnel of the Equitable Life Assurance Society of the United States, New York City.

Some Operations on a Van Norman Miller

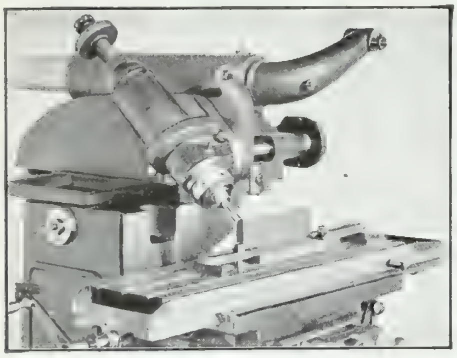


Figure 1
A beveled surface on a fixture is being milled, with the cutter inserted in the interior spindle

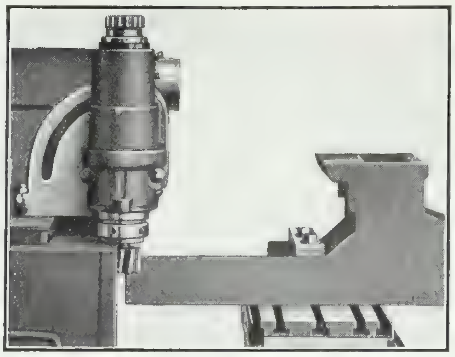


Figure 3
Ram drawn back and cutter in main head operating close to the column of the machine

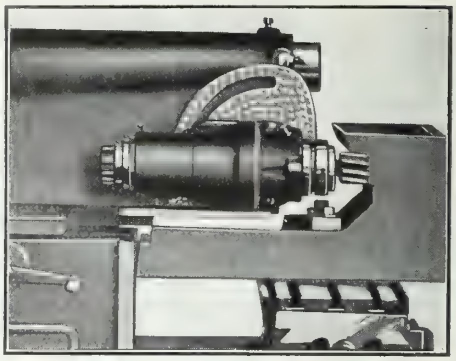


Figure 4
Cutter in main head in horizontal position operating 17 inches away from the column

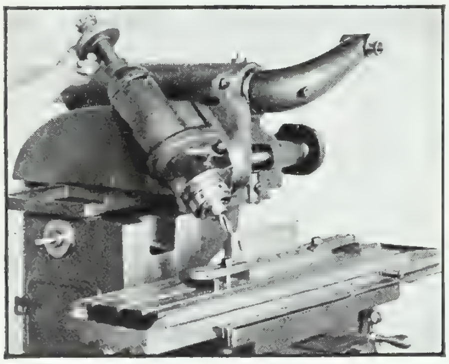


Figure 2
Drilling holes with interior spindle at the same angle as the milled surface in Figure 1

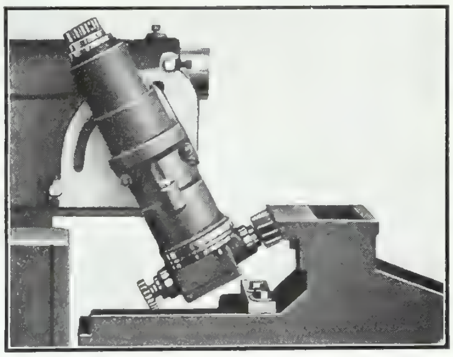


Figure 5
Cutter in sub-head milling bevel surface 17 inches from the column

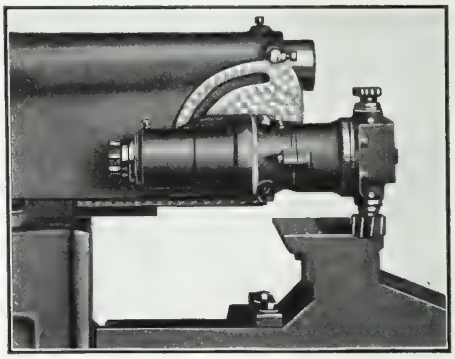


Figure 6
Sub-head mounted on main head, cutting 22 inches from the face of column

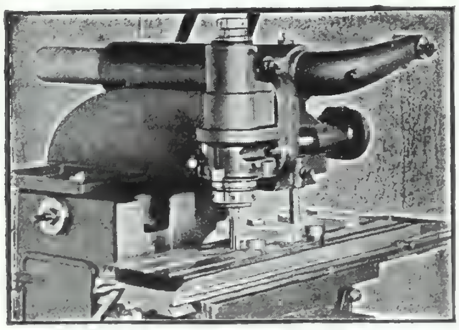


Figure 7
Using the profile stud in cutting a cam or irregular form from a pattern

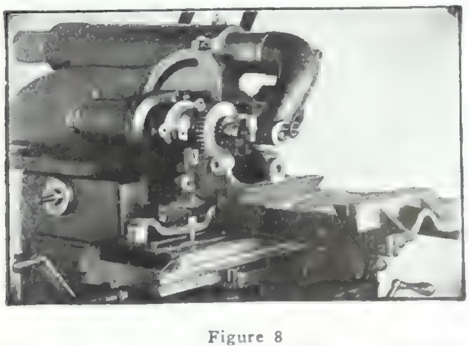
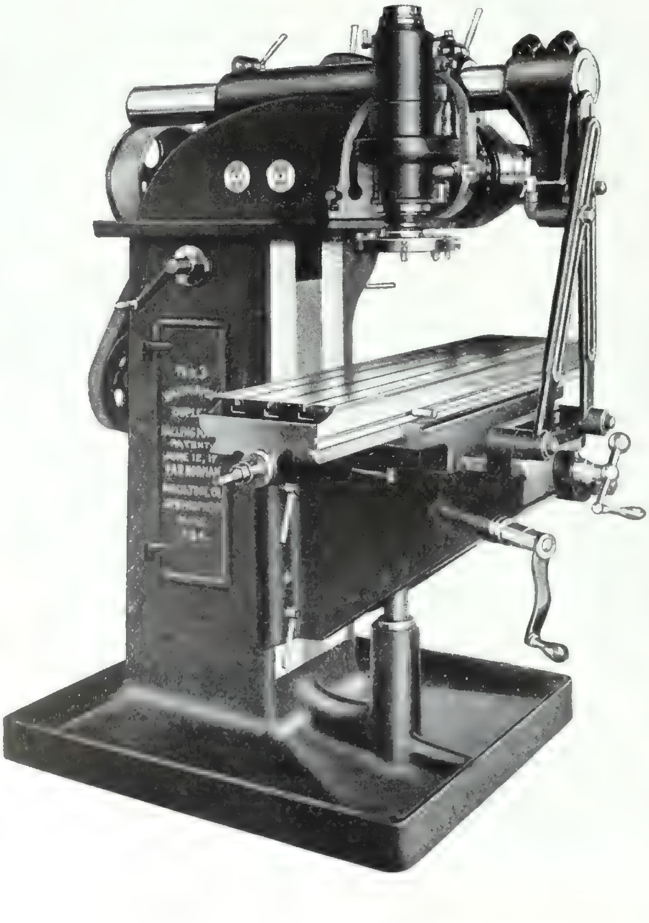


Figure 8
An ordinary milling operation with overhanging arm supporting the cutter arbor



Figures 1 and 2 show two operations with the interior sliding spindle in use in the main head. Drilling, milling, boring, etc., can be done, with feed in line with the spindle, at any angle.

Figures 3 to 6 illustrate the great range or reach of the machine. The fixture shown is 40 inches long, 15 inches wide, and 10 inches high, and was milled on the end surfaces next to the column and all over the top surfaces with but one clamping of the piece to the table, using the same cutter.

For profiling (Figure 7) the pattern and the blank or cam to be formed are clamped to the table, and by operation of the table slides the pattern is moved in contact with the profile stud, and the cutter at the same time duplicates the pattern.

The Axelson Heavy Duty Lathe

LOOKING down the avenue of history on the Pacific Coast, we see conspicuous developments of industry. Within the last decade we have seen great industrial centers born, we have seen the progress of distribution of California products to the four corners of the earth, and holding in mind this perspective of marvellous development, it is hard to even hazard a guess as to the potentialities in store for the next decade.

A concrete example of how one California product has gained leadership on the Coast, and how, in competition with Eastern manufacturers, a California firm has been able to successfully establish world-wide distribution, is represented by the Axelson Machine Company of Los Angeles. When this concern first decided to produce heavy-duty engine lathes in addition to their well-known line of oil well machinery, they had to overcome several obstinate problems. The first problem was to overcome the popular though erroneous impression in the mind of the trade that good lathes were only available from Eastern sources. There being no other lathe manufacturers on the coast, it was natural that some very definite inducements should be offered to reverse this impression. Before a single pattern was made, the officials of the company scoured the country for the best designing and production talent to be found. The result was that the organization of the lathe department was soon comprised of men of unusual ability—specialists who know lathe construction from A to Z.

Standardized methods of production were studied by efficiency experts so that each operation produced the maximum results. Labor-saving devices were installed in the factory and the employes were trained to perform their work with exacting accuracy. By producing lathes with the very latest features, many of the features being of exclusive design, the Los Angeles manufacturers were soon attracting the attention of the industrial trade throughout the coast. The company was placed to a greater advantage also because of their proximity to the coast trade, it being possible to make deliveries several weeks sooner than the Eastern manufacturers. This same feature has been one of the present causes of the demand for Axelson lathes in various countries touching the Pacific Ocean.

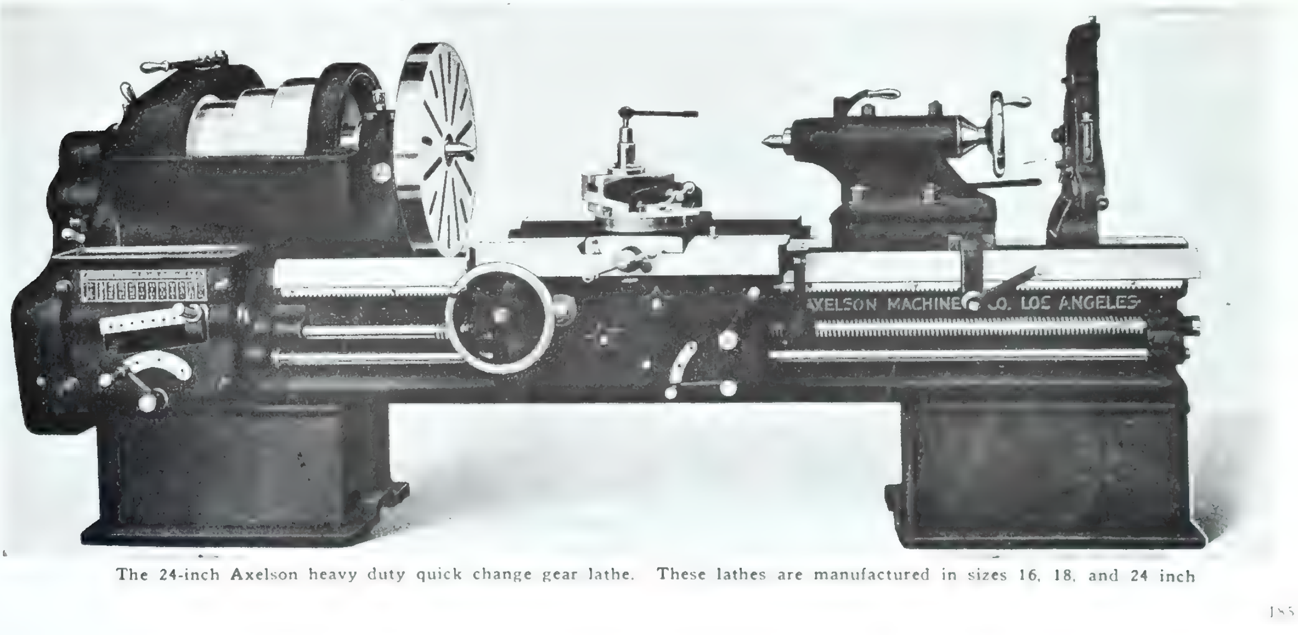
Not only has the Axelson Machine Company been able to compete successfully on the coast, but owing to the fact that their lathes can be shipped direct from Los Angeles through the Panama Canal to Eastern points, they are able to compete with manufacturers of similar products situated at interior points throughout the country and in almost every case have been able to ship at a lower transportation cost.

The Axelson lathe is a Pacific Coast product in every sense of the word, and although built for quality rather than price competition, its manufacturers have been able to quote prices that have been productive of large sales. Every part of the lathe is made in the Axelson factory. The rough castings are poured in the manufacturers' own foundry. Painstaking care is exercised at every stage of the production, permitting a predominance of quality at every point. All of the iron is poured from an accurately analyzed mixture. The analyses of all steel parts are predetermined through years of practice and perfecting. The machine parts are finished with the aid of carefully cut templates and accurately adjusted gauges and jigs which are checked up with master gauges. In this way each part of the lathe is absolutely standard, so that if a worn or broken part requires replacement it can be done with ease and safety.

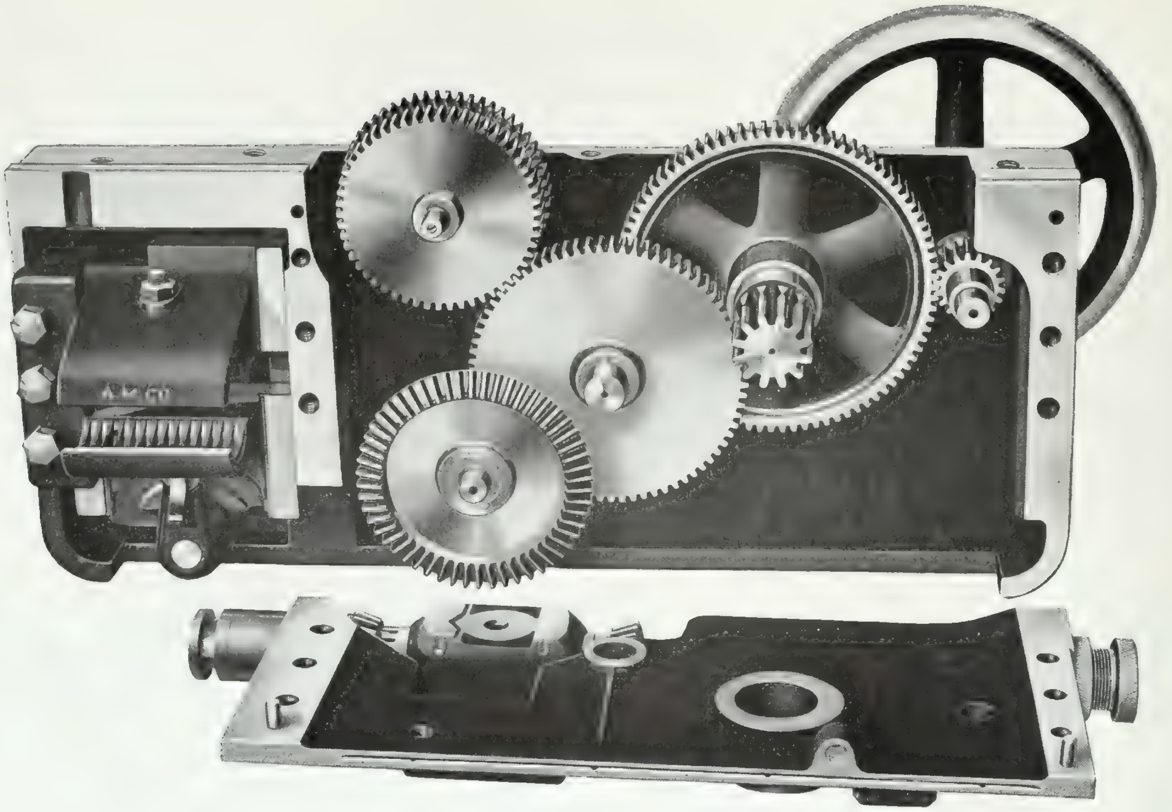
Axelson lathes are produced in quantity and a large stock of parts are carried at all times ready for immediate assembling. Each assembled lathe is given a thorough test, such as the alignment of bed, the alignment of face plate, compound rest and tail stock with the bed. A 12-inch boring and turning test is made which is not allowed to run out beyond standard limits. A facing test is made by means of the actual facing of the face plate belonging to the individual tool and an accuracy test is made of this which must test to .0015 concave. Each piece of iron must meet scientific tests and the metals vary in analysis according to the predetermined composition desired. For instance, the lathe bed is of semi-steel, an extremely close grain hard mixture running 30 per cent steel, 50 per cent high manganese pig and the balance made up of the factory's own clean scrap which is accumulated through discarded defective castings and foundry work commonly known as "weighback." This mixture of iron produces a wearing surface said to be unsurpassed by any other mixture. The head stock of the lathe is a soft gray close grain iron, made of about 10 per cent steel, 50 per cent high manganese pig and 40 per cent scrap. The tail stock and the carriage apron are of the same mixture. The carriage of the lathe receives the most careful attention and is one of the finest finished parts of the lathe. It is finished with absolute accuracy. Each part is made up of uniform material and is cast of a softer material than that of the bed in order that the bed will not have a bow worn on its top. To secure this softer metal composition in the carriage top, the manganese in the steel is reduced and a soft gray Allegheny iron is used. The remainder of the small castings of the lathe are made of practically the same mixture as that used in the head and is claimed to be the finest iron available.

The bed of the lathe is extremely heavy throughout, having a great thickness of walls. As an excess precaution for rigidity, a traveler's rim is provided at top and bottom and cross braces are set throughout the length of the bed and two heavy legs are used to support the bed, up to 12 feet in length. If longer beds are made, an extra leg is added every six feet or part thereof.

As the front vee of a lathe receives the greatest strain, the Axelson lathe is constructed with a massive vee



The 24-inch Axelson heavy duty quick change gear lathe. These lathes are manufactured in sizes 16, 18, and 24 inch

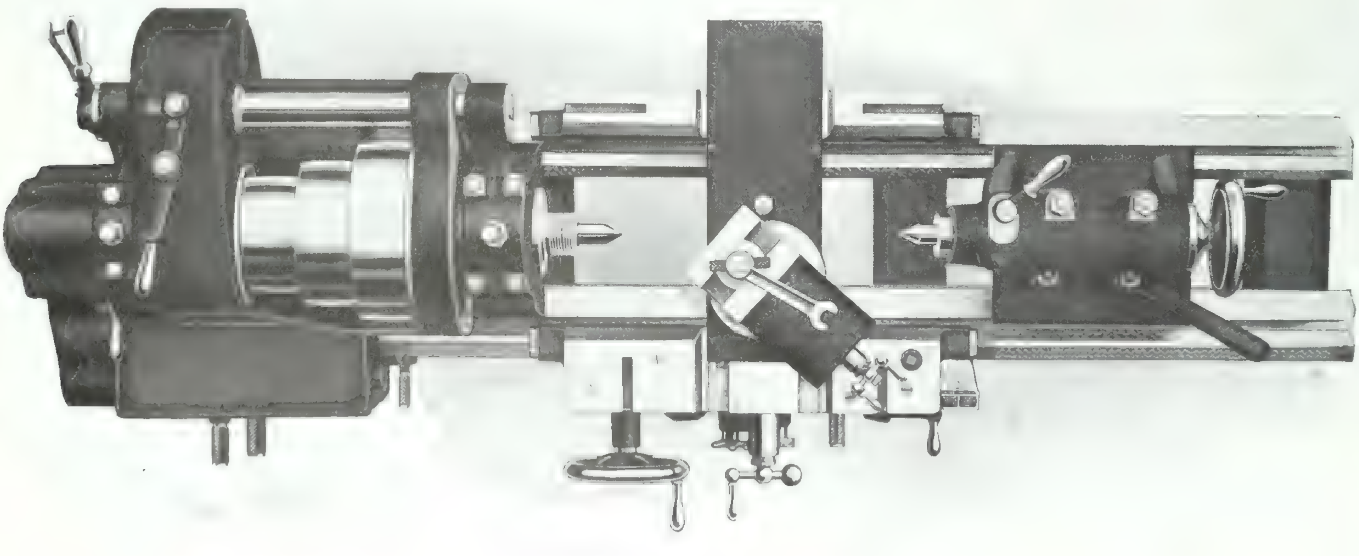


Rear view of apron for the 18-inch Axelson heavy duty lathe

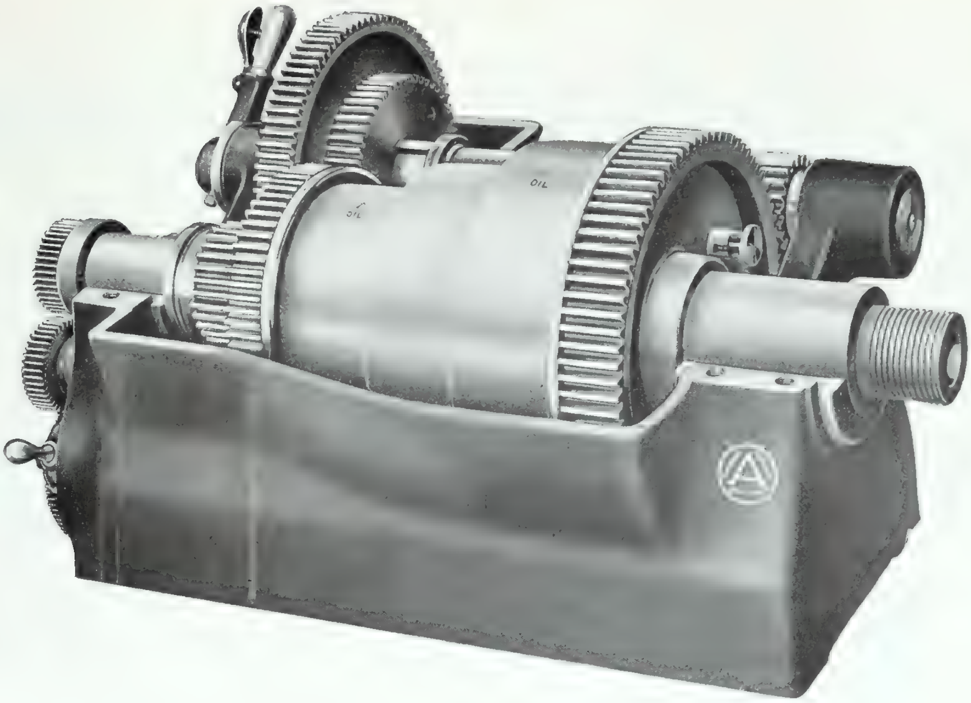
which affords great bearing surface for the extremely long carriage. The vee is of the overhanging type, allowing the lead screw and feed rod to come practically directly over the vee. Forty-point carbon stock with a four-pitch thread on 16 and 18-inch sizes and two-pitch thread on the 24-inch size are used for the lead screw.

The head stock is of bucket type design, providing a very rigid base for front and rear bearings and offering a safety feature. Owing to the extreme width of the bed, the head stock has ample width and extreme length which allows for a very rigid construction in fastening to the bed. The main bearings are of a special bronze mixture with large diameter and heavily walled, with walls ranging from one-half inch thickness on the 16-inch size to three-quarter inch thickness on the 24-inch size. The spindle is made of chrome spindle steel and is bored and reamed from the solid bar stock. The main bearing or front bearing consists of a chrome nickel steel sleeve bored to .001 small, hardened, ground and then forced into place on spindle. The spindle is then ground and finished throughout. Every thread on the lathe, such as the spindle nose thread, lead screw, close feed screw, tail stock screw and taper attachment screw, are all milled from a master screw. The cone is of a 50 per cent steel mixture and is highly polished and finished in and out with great accuracy, creating a perfect running balance. The drive gears and back gears on the head are of a semi-steel casting of extremely heavy pitch and are face ground. All of the above parts, gears, spindle and cone, are assembled in a unit, mounted between centers and tested for running balance before mounted in the head. The back gear quill is a semi-steel casting, with small pinions cut integral. In the double back gear head the small back gear is finished with a long hub which serves as a sleeve supporting the large gear which is placed into position and then bolted to the smaller gear by means of fillister head bolts. The small gear in sleeve serves as a bearing for the slide. Reverse gears on the head are cut from the steel bar.

An interesting feature of the construction is the quick change gear box. Three shafts are supported in this box, carrying cone, tumbler and sliding gears. Nineteen gears in all afford thirty-two changes without the reversing of quadrant gears. These shafts are supported on long, well-lubricated bearings and are of ample



Top view of 16-inch Axelson heavy duty lathe



Head stock on the 18-inch Axelson heavy duty lathe

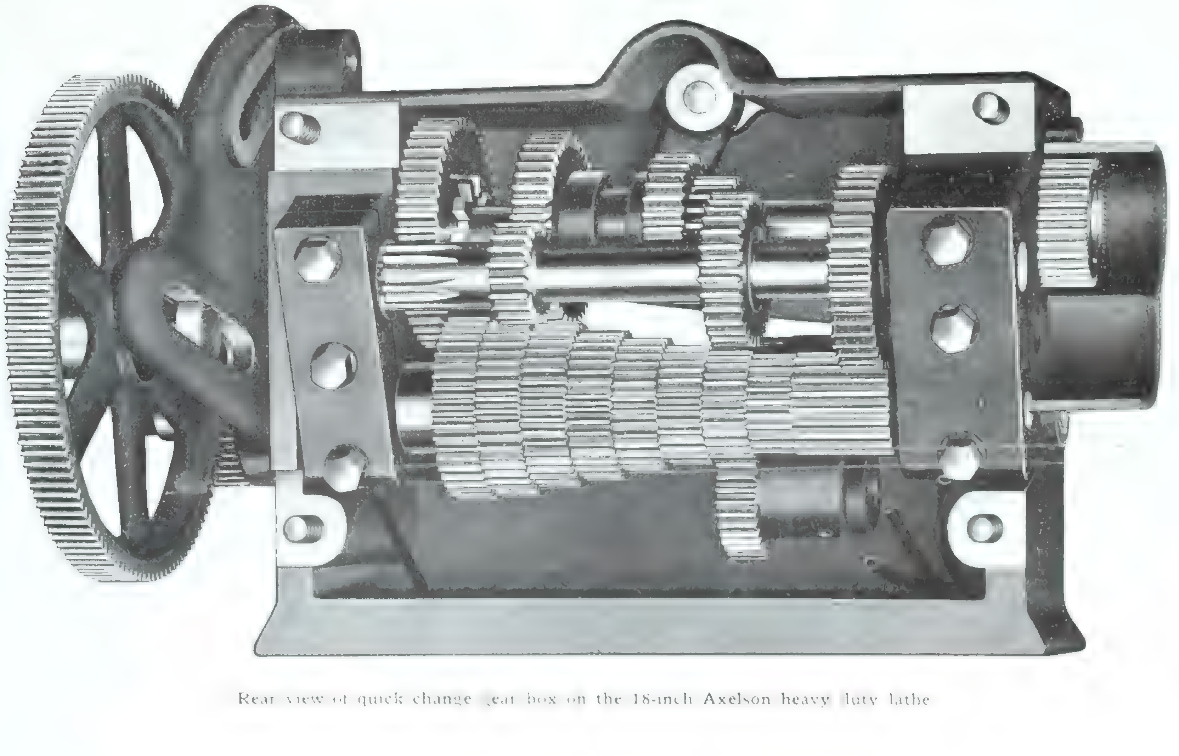
diameter. The gears are of heavy pitch. For example, on the 16-inch size the cone gears are of soft steel and are twelve-pitch. The sliding gears are hardened and are of ten-pitch. The tumbler gears are of twelvt-pitch, hardened and cut with 20 degrees' relief, allowing instant engagement or changing of gears while in operation. A sliding gear is provided at the end of the box for engaging the screw, or vice versa. This sliding gear is controlled by means of a hand lever and not the ordinary furled end, the latter, according to the Axelson builders, being unsatisfactory, as it is soon battered to pieces by the operator.

The carriage assembly, consisting of the apron and cross slide compound, is fitted extremely close. The apron is of the commonly called box type pattern with a back wall provided with long rear bearings for studs, spindles, etc. These bearings are lubricated by means of an oil bowl cut in top of the back wall with oil tubes leading to the various bearings. This oil bowl is replenished through two dust-proof spring oilers located in top of the bridge.

The front plate of the apron supports provide ample bearing support. Felt wipers and oilers are provided on the four corners of the carriage. The rack pinion is cut of steel and is operated by an extremely large diameter hand wheel at the front of the carriage which avoids the tendency to bind when moved by hand.

The lathes now offered by this Los Angeles manufacturer are to be found in many parts of the world and plans are now being made to widen the distribution so that adequate representation will be made in every country touching the Pacific.

The Axelson Machine Company has been established more than twenty five years and has grown from a shack erected a quarter of a century ago to its modern plant now standing in the southeast part of Los Angeles and covering 103,000 square feet. J. C. Axelson, general manager of the well-known concern, with his genial personality and adherence to high business ethics, has contributed largely to the success of the Axelson Machine Company.



Rear view of quick change gear box on the 18-inch Axelson heavy duty lathe

Herzog Elec. & Engr. Co., Enlarges Organization

DICK CHISHOLM is one of the best known marine repair men on the San Francisco waterfront, having spent most of his life on the waterfront supervising and handling repairing and overhauling practically every type of vessel entering the harbor.

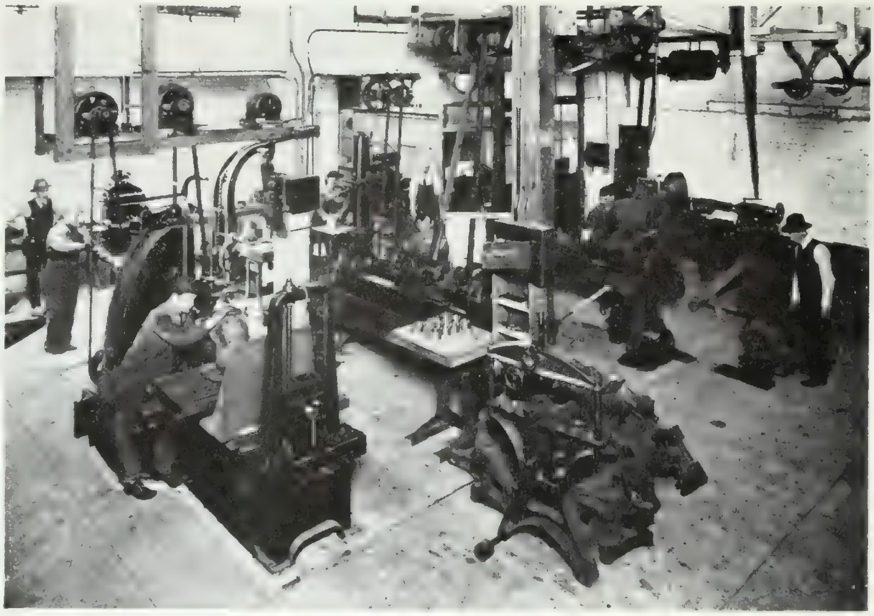
Dick Chisholm has recently become associated with the Herzog Electric & Engineering Company as superintending engineer in charge of all marine work for this company. Mr. Chisholm has handled many noteworthy repair jobs and installations, a noteworthy example being on the concrete steamer Faith where all machinery was installed under his direction. San Francisco has the reputation the world over for having ship and machinery repair men who are capable of handling any class of work, and Chisholm, as well as the Herzog Company, have been contributing factors in building up the port's reputation for skillful repairing.

The Herzog Electric & Engineering Company for many years has been one of the leading headquarters for all classes of ship repair work and installation. Some of the recent jobs handled by this firm include the complete electrical installation and wiring for the steam schooners Capto and Thordis, the steamer Frank D. Stout and the motorship Katherine. This latter vessel is equipped with some very interesting electrical installations including a generator set and air compressors, both of which are directly connected with Bolinder engine, which were designed and built by the Herzog Company.

The main shop of the Herzog Electric & Engineering Company, located at 172 Steuart street, San Francisco, is at present undergoing changes and improvements under the direction of Dick Chisholm to handle heavier and a more varied line of ship repair work. Our illustration shows one corner of the company's modern shop. This view shows some of the machine tools on which the light work is done. Only high-grade machine tools have been installed, which include Giddings & Lewis horizontal boring mills, La Blond milling machines, cylindrical grinding machines, etc., etc.

The Herzog Electric & Engineering Company, which is sales engineer for the De Laval Steam Turbine Company, has had an extensive experience in handling marine power plants and auxiliaries, and in addition to its work of installing Eastern equipment has developed some highly successful marine equipment, including the Herzog electric steering gears, Herzog telemotors, rudder angle indicators, and Herzog Ohmen engines.

With the association of Dick Chisholm with the Herzog Company, the general manager, J. L. Lawrence, has outlined a program for handling ship repair work to be turned out in the quickest time consistent with good workmanship. The experience of the members of this firm on the San Francisco waterfront admirably fits them to handle the particular requirements of ship operators and engineers of this district.



A corner of the machine shop of the Herzog Electric & Engineering Company, where some of lighter work is handled

ACME ENGINE MOVE TO LARGER PLANT

THE Acme Engine Company of San Francisco have taken over the shop on Main street formerly occupied by the Main Iron Works. The premises are being entirely refitted and equipped with machinery and tools for gas engine manufacture. The officers of the Acme Engine Company have long anticipated the necessity of larger quarters to take care of the increasing demand for Acme engines, but at all times expecting that at some future time their business would slow down and permit the moving of their plant. The demand for gas engines, however, has not diminished, and this concern has found it necessary to enlarge its quarters and still not interfere with their production program. A practical program was followed in making the move to the new quarters so that none of their machine tools were idle during the move except during the actual time required to take the machine out of the old building and install it in the new plant. This necessitated careful planning in regard to power transmission, installation and the assembly of rough castings and machine parts so as to avoid any unnecessary interruption in the various manufacturing process of their engines.

With their added facilities and greater room, the Acme Engine Company anticipate that they will now be able to better handle the demands for Acme engines.

The officers of the Acme Engine Company include James S. Hawkins, Conrad C. Kriemler, Richard Froboese and George A. Feldman. These practical business men are to be congratulated on their accomplishments in the gas engine field. The great number of Acme engines now in Pacific waters are building up an enviable reputation for their designers and makers.

CHOOSE CUNNINGHAM EQUIPMENT

THE Allan Cunningham Company of Seattle, builder of steam and electric auxiliary machinery, recently closed a number of large orders for its equipment with several prominent shipbuilding firms in the California district.

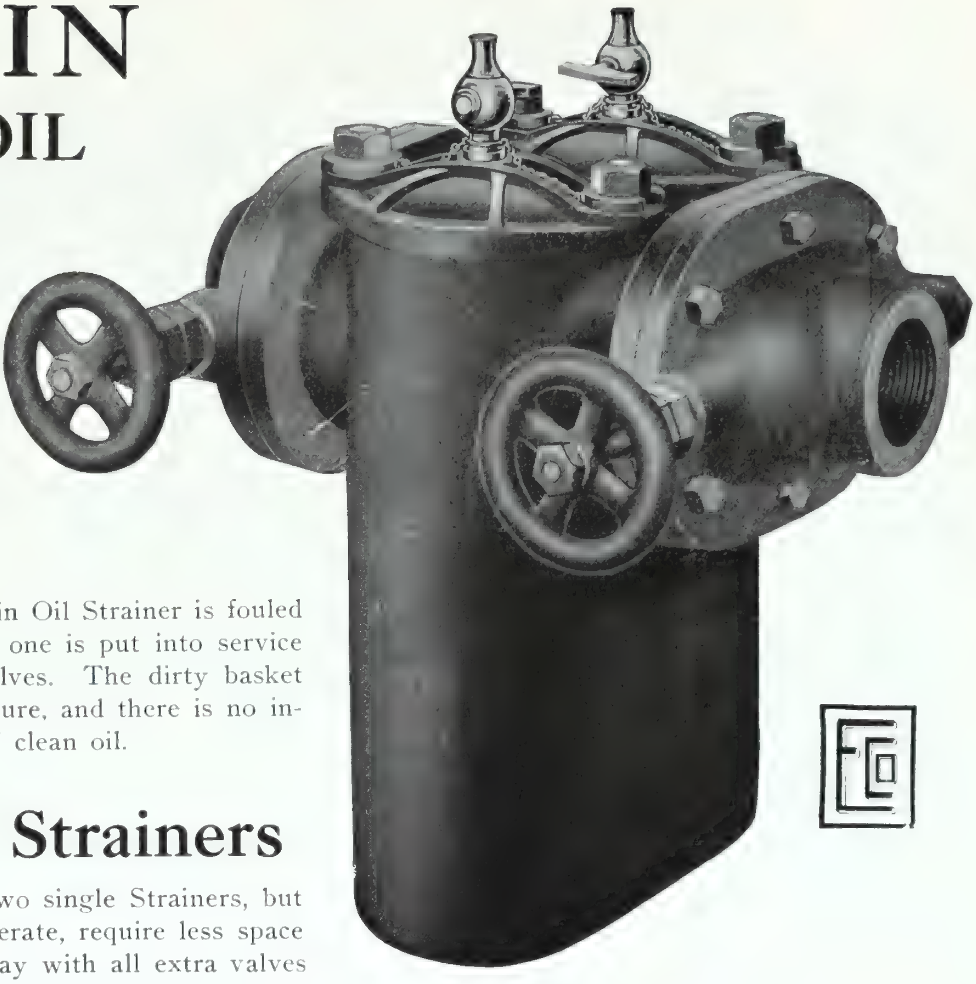
Through the efforts of George E. Swett, assistant manager of the Allan Cunningham Company, the Standard Oil Company and the General Petroleum Company have adopted the Allan Cunningham equipment on the steam tankers now in course of construction at the Union Construction Company. Both the engineers for the shipbuilding company as well as the engineers representing the owners were quick to appreciate the splendid features of the equipment as developed by the Seattle concern.

On these tank ships Allan Cunningham steam-driven-steering gear and steam anchor windlasses will be installed. The geared spring quadrant steering gear, which has proved very successful, is arranged with a quadrant floating on the rudder stock which drives the tiller through springs. This eliminates the possibility of shocks being transmitted to engine or gearing. Teeth are bolted to quadrant in blocks of five teeth, enabling center blocks of teeth to be readily replaced when worn. Adjustment of gear mesh is secured by sliding engine on subbase. Worm eccentrics and thrust all are forged solid with crankshaft, and the worm gear is phosphor bronze with milled teeth. All bearings are fitted with adjustable brasses. No babbit is used. Thrust bearings are adjustable to compensate for wear. Hand steering gear can be operated either from same deck as engine or deck above.

Another important contract secured by the Allan Cunningham Company covers all electric steering gear and deck auxiliaries for the motor tankers which are also being built for the Standard Oil Company at the Union Construction Company and at the Moore Shipbuilding Company.

STRAIN

YOUR OIL



Both fuel and lubricating oils contain some solid matter which must be removed from them before they can be used with any degree of satisfaction. To do this it is necessary to use some kind of a strainer, so why not use the Twin—a Strainer that can be cleaned without shutting off the supply?

When one basket of a Twin Oil Strainer is fouled with solid matter, a clean one is put into service by simply shifting two valves. The dirty basket can then be cleaned at leisure, and there is no interruption in the supply of clean oil.

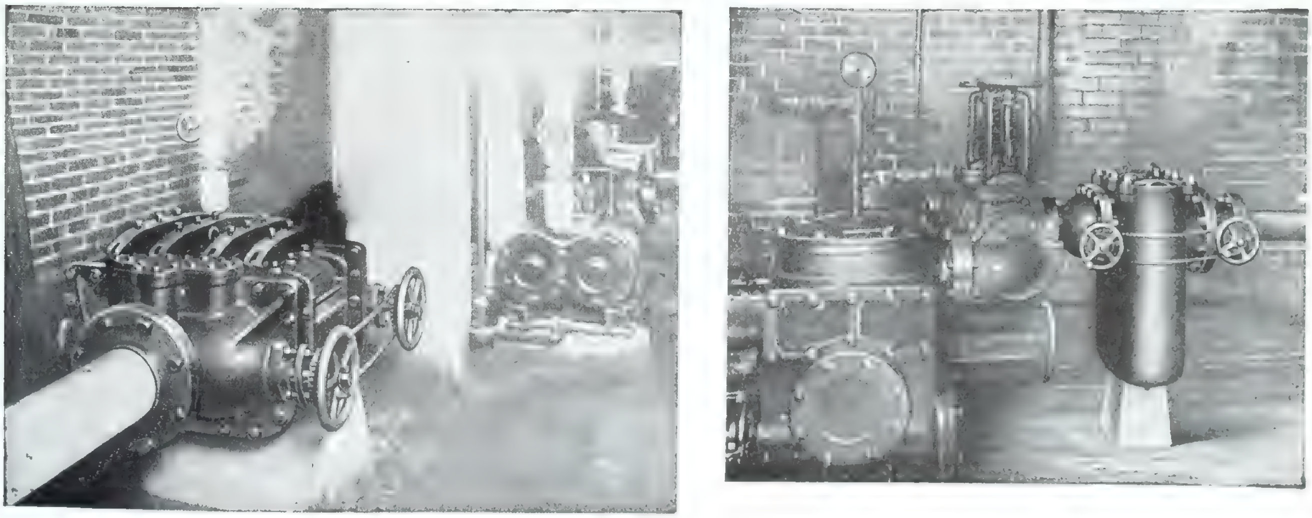
Twin Oil Strainers

give the same service as two single Strainers, but are more convenient to operate, require less space for installation and do away with all extra valves and piping necessary to connect up. These are features that led to their being used in submarines and destroyers for the Navy and in cargo boats for the Merchant Marine.

Twin Oil Strainers are furnished in sizes from 1 in. to 5 in. (2½ in. and larger sizes have flanged connections). Baskets of any perforation from 1/64 in. up. **Complete information in Bulletin "AA."**

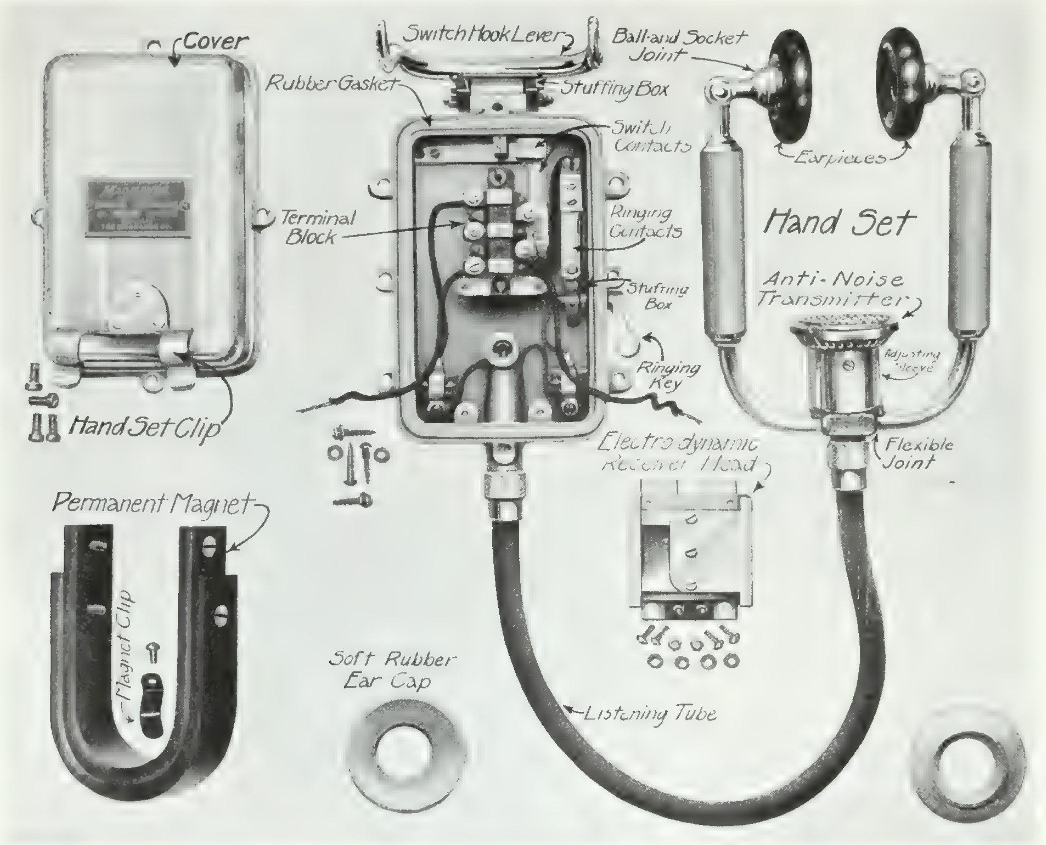
ELLIOTT COMPANY

433 Grant St., Pittsburgh, Pa.



Twin Oil Strainers in lubricating oil system of a turbine installation at Carnegie Institute of Technology. The strainer at the left is an 8-in. Type "S" and is installed in the lubricating oil suction line. The strainer at the right is a 5 in. Type "V" and is installed in the lubricating oil discharge line. This installation was made for the benefit of engineers sent to Carnegie "Tech" for a course of instruction by the Shipping Board during the war emergency.

Magnavox Telephones on Shipboard



A Magnavox hand-set partly dissembled with names indicating the different parts. Excepting for the permanent magnets of the receiver and the soft iron receiver head and pole pieces (which are rust-proofed) no iron is used in the instrument. Metallic parts are of brass, bronze or copper. Stuffing boxes and gaskets complete the water-tight factors.

THE inter-communication system of a ship is one of the important factors entering into the safety-first operation of the vessel.

Probably the most important stations on a ship where absolute reliability must be available at all times are the bridge, main engine room, and steering engine room. Other stations, such as the radio room, officers' quarters, fire room, etc., are not so important as the three stations mentioned, because the safety of the ship mainly depends upon whether or not the captain can give the man at the throttle the proper orders at the critical moment.

The engine telegraph is essential in transmitting certain fixed orders to the main engine under normal operations of the ship, but suppose an emergency arises where the captain could prevent damage to his vessel if he could only say a few words to his engineer. This is where the engine telegraph will not answer the purpose, as it will not talk and the only orders possible with this method of communication are limited to such as half or full speed ahead; half or full speed astern, stop, etc.

It is obvious that in addition to the engine telegraph there must be some method of voice communication between the bridge and the engine room and to other parts of the ship where mechanical telegraph is not practical. With the slow-moving reciprocating engine and hand-fired boilers, the noise in the fire rooms and engine rooms was not of such volume as to interfere to a great extent with the voice tube method of communication, which answered the purpose within certain limits. Today we have the noise of the reduction gears of the high speed turbine and the roar of oil burners and this noise is of such volume as to render the old voice tube method of communication practically useless.

It was at first thought that a very loud speaking telephone would be a very efficient solution of the problem and a very loud speaking telephone system was developed and installed on many ships. This did not, however, satisfactorily overcome the noise conditions for the same reason that it is impossible to understand a conversation, if the one listening is standing near a shallow, swift-moving stream of water. It is the babble in the brook that is heard, and if the listener steps back a few steps from the running water he can understand the speaker's voice much better, for he is then out of range of the noise of the running water, but in the engine room of a ship the noise of the engine, which in this case is the babble in the brook, that interferes with the loud speaking telephone, is as strong in one part of the engine room as another, and the engineer cannot step back a few paces and be out of range of this noise.

It is true, the loud speaking telephone is very convenient and will give good satisfaction when used in quiet surroundings, but on board ship there are very few quiet places when the ship is under way. On the bridge where the orders originate there is almost as much noise as in the engine room, which is due to the fact that the wind whistles through the rigging and the seas break over the bow, running of deck winches, etc.

There are many marine telephones on the market today, but most of them are no different than the ordinary office telephone except that they are made watertight by placing them in water-tight cases. The principle of transmitters and receivers is the same as that of the long standard commercial instrument.

Did you ever try to carry on a telphone conversation with a typewriter in operation near by? If you did, the chances are you stopped the typewriter so you could hear what the party on the other end had to say. The noise from the typewriter entered the telephone transmitter in the same way as your voice and this noise is transmitted back into your own ear, being mixed in with the voice, and the result is a jumble of sound without any meaning. The noise of the machine goes over the line along with the voice and the same jumble in the other fellow's ear is the result.

The Magnavox anti-noise marine telephone does not pick up any noise except the voice of the speaker. This is how it gets the name of anti-noise. Noise from the engine or other sources is entirely eliminated from the Magnavox telephone system by an extremely simple balanced diaphragm transmitter. The diaphragm of this transmitter is exposed to extraneous noise on both the back and front, allowing all such noise to strike with equal force on both sides of the diaphragm. Under this condition there is no vibration of the diaphragm, the electrical circuit lines are undisturbed, and nothing goes over the line. But in speaking into the Magnavox telephone the voice strikes only one side of the diaphragm, setting up vibrations which send over the wire electric impulses correctly attuned to faithfully reproduce at the receiver the words, inflection and tone of the speaker.

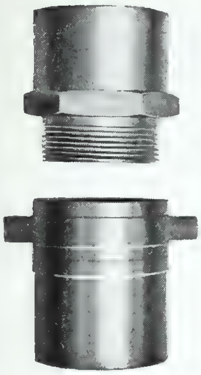
In addition to the anti-noise transmitter, Magnavox marine telephones are equipped with an electro-dynamic receiver which is recognized as being the most efficient reproducer of voice yet constructed. The voice, when reproduced by this receiver, gives clear articulation and is slightly amplified, making it extremely easy to understand. The anti-noise transmitter and electro-dynamic receivers are considered the greatest improvement made in telephone instruments in years and marine men all over the country are enthusiastic about the high efficiency and reliability of the Magnavox anti-noise ship communicating system.

Figure 1 shows the bridge sets of a five-station semi-selective ringing system. In this system the master station can ring any of the line stations, but the line stations can only ring the master station. In the complete selective ringing system, any line station can ring any other station on the system. Systems from two to nine stations, semi-selective or complete selective ringing, are being supplied and the cost per set of the semi-selective ringing system is approximately $100 and for complete selective ringing approximately $135 per station.

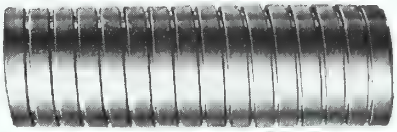
Many cargo ships and tankers have been equipped with Magnavox anti-noise telephone sets and after a series of exhaustive tests, extending over a period of several months, the Navy Department has decided to install the Magnavox marine telephones on board destroyers. The anti-noise transmitters on the Magnavox marine telephones are practically the same type as was used on the Magnavox telephone sets of the Navy flying boats that crossed the Atlantic. The Navy Department recognized the merits of the anti-noise airplane transmitters during the war and now that they have decided to use marine telephone equipment with their transmitter is further proof of the merits of the Magnavox anti-noise telephones.

Flexible Metal Hose

By G. B. Peterson

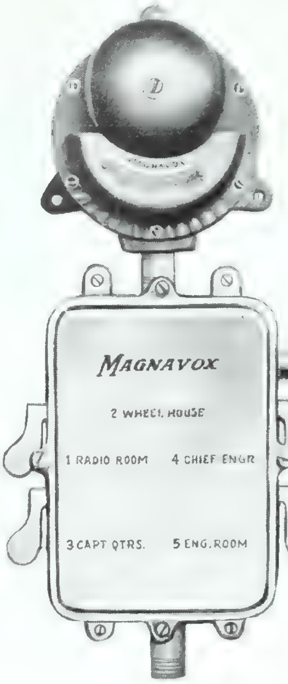


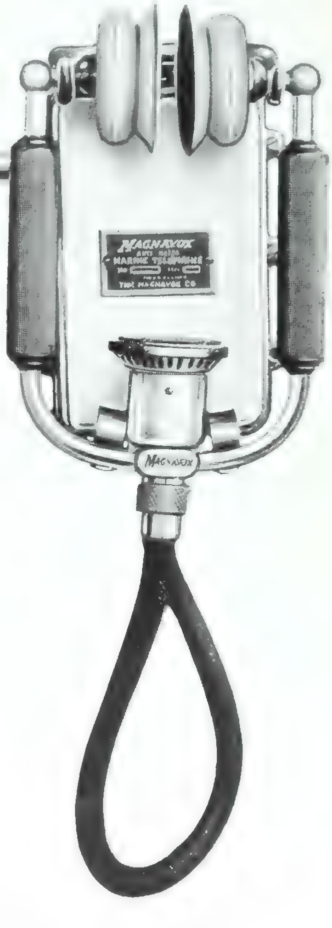
Soldered couplings



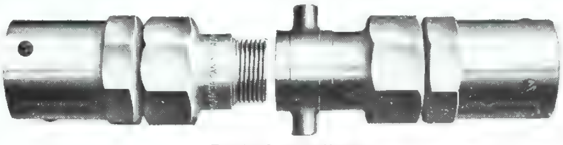
Asbestos packed carburetor hose

Type BD15 with couplings and covered end for boiler tube blowing

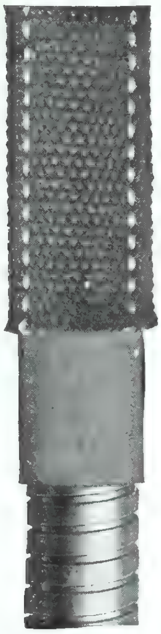




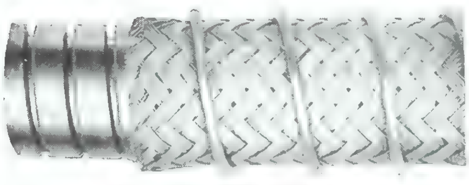
Master Station Magnavox marine telephones



Packed couplings



Gasoline hose



Type BD20 hose

FLEXIBLE metal hose is supplanting rubber hose in numerous capacities and is also finding a place where nothing else will suffice. Some idea of the diversity of uses to which metal hose is applied may be obtained from the following brief list:

Blowing boiler tubes.
Operating steam and water-driven turbine cleaners.
Operating steam drills, pumps and hammers.
Temporary steam lines.
Washing out boilers.
Connecting up moving parts on steam-heated presses.
Conveying steam to the cups on gas holders.
Loading and unloading oils and oil products.
Conveying gasoline, naphtha and kerosene.
Spraying paint and varnish.
Oil feed lines on machine tools.
Carrying exhaust gases and steam.
Covering electric wires.
Covering flexible shafts.
Conveying gas to heaters, hot plates, etc.
Vacuum cleaner work.

Flexible metal hose is exactly what the name implies—a hose or flexible tube made of metal. It is manufactured from a continuous strip of high tensile strength bronze or galvanized steel, which is first profiled to the desired shape and then wound spirally over itself in such a manner that the joints interlock. It is made tight with a cord packing which is fed into place during the winding operation. It combines a flexibility equal to that of rubber hose with the strength and wear resisting qualities of steel—to all practical purposes a flexible metal pipe.

For conveying steam and oils, and for an endless line of special services, American Metal Hose is recommended as the cheapest and most satisfactory hose on the market.

Type BD, as shown in the cut, is the most extensively used. It is suitable for high pressure work and comes in both bronze and steel. Bronze hose in these patterns is primarily a steam hose, and the galvanized steel an oil hose, but both can be used to advantage in many other duties. For extremes of pressure and rough service a covering of bronze or steel wire brading and spiraled steel armor wire is added. This type is called BD20 in distinction to the above BD15, and is also shown in the accompanying cut.

It is extremely difficult, if not impossible, to select a rubber hose which will resist the chemical action of oils, acids, gasoline, etc., for any length of time. The superiority of American Metal Steel Hose in this service is self-evident. Its first cost is less. Oils have no pernicious effect upon it, but, on the contrary, keep the bearing surfaces lubricated, increase its flexibility and prolong its life.

The Bronze BD style hose offers a practical solution to the steam hose problem. Under the high temperatures generated by steam, even at low pressures, the best grades of rubber hose will quickly burn out, harden and disintegrate, while bronze hose can be counted on to render long and satisfactory service. Though in general (owing to the fact that bronze is free from any tendency to rust), bronze hose is advocated for conveying steam, there are some places where a hose made of steel can be used with equally good results. For carrying superheated steam, or where a hose is subjected to hard and constant service—as, for example, blowing boiler tubes—steel hose will give an excellent account of itself. Steel hose should always be oiled frequently, both inside and out, to prevent it from rusting.

The bronze BD15 style hose offers a practical hose for a variety of uses around chemical plants and in marine work, where salt air and water would cause rubber or steel hose to deteriorate very rapidly.

The question of pressure does not need to be given serious consideration when deciding upon the proper style of steam hose, for either BD15 or BD20 is strong enough to withstand any pressure that is liable to be encountered in ordinary service.

Gasoline, like oil, is a solvent of rubber, but a hose made entirely of metal, like that for oil, is comparatively heavy and hard to handle. American Metal Gasoline Hose, therefore, consists of a lining of very flexible, smooth bore metal tubing, made tight by means of an asbestos cord packing. This lining keeps the gasoline from coming in contact with a rubber tube, which is vulcanized over it. A heavy woven cotton jacket on the outside protects it from external wear, and besides gives the hose additional strength and an attractive, finished appearance, this meets every requirement.

Exhaust tubing is adapted for conveying exhaust gases or steam, and for either temporary or permanent connections has many decided advantages over piping.

Carburetor tubing is made in two styles, packed and unpacked, the latter being less expensive but very serviceable.

Conduit tubing is manufactured in galvanized steel, brass or bronze; packed or unpacked, in sizes from 3/6 inch I. D. up to 1 inch I. D. It is used for covering electric wiring in automobiles, and wherever a covering for wires is required.

Flexible metallic voice tubing is used in marine work.

Rubber packed metallic tubing is employed for vacuum cleaning work, and is suitable for all purposes where vacuums are high and an extremely light and flexible hose is desired. This tubing is supplied with a woven cotton jacket to prevent marring of polished surfaces.

American Metal Hose is handled on the Pacific Coast by F. Somers Peterson Company of San Francisco.

Test of New Line Throwing Gun

Government officials testing new line throwing gun manufactured by the General Ordnance Company

THE United States Transport Service has just completed an exhaustive test of a new line throwing gun which shows many big advantages over the line throwing guns now in use.

This test is one phase of the government's endeavor to urge by example that all ship owners take every voluntary precaution possible to insure the safety of ships and the lives and cargoes they carry.

Under the auspices of the United States Army Transport Service the test was conducted at No Man's Land, Fort Hamilton, New Jersey, and was superintended by Captain W. J. Barnard, chief of Army Transport Service, Hoboken, New Jersey. He was assisted by Captain Robert Bartlett, of Peary polar expedition fame, and Captain J. S. Allen, both of whom are attached to the same service and stationed at Hoboken, New Jersey.

Ex-Senator Long and many prominent representatives of the mercantile marine were also in attendance. The ordnance facilities of Fort Hamilton were accorded by Captain R. J. Imperatori, United States Coast Defense ordnance officer, who with other ordnance experts co-operated in conducting the test.

A long stretch of beach within the precincts of Fort Hamilton was used for the testing grounds. Close watch was kept to note the time necessary to make complete preparations for firing, as speed in doing this is one of the claims made for the new gun. It was found that there were only one and a half minutes between the gun reaching the desired spot and the pulling of the lanyard. This is due to the patented features eliminating charging and priming, the new gun having its powder charge in a water-proof cartridge which is attached to the projectile, permitting complete loading in a single operation.

An imaginary ship at a distance of 1400 feet was pointed out to the gunner. With the barrel at an angle of 30 degrees, the line crossed the vessel squarely amidships and passed well over. The total linear distance covered by the line was found to be considerably more than 1400 feet, required by the United States Steamship Inspection Board. Shots were fired with the muzzle at every conceivable angle that a gun would be expected to fire to have the line cross the deck of a ship in distress. This is made possible for the new gun, having a changeable elevation from 30 to 80 degrees. In all the shots fired, not one was less than 100 per cent successful.

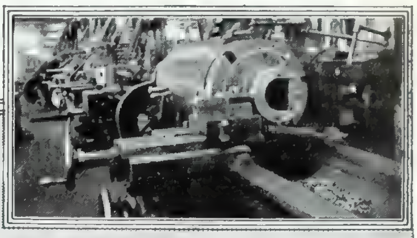
During tests of this nature the government specifies that the durability of the guns shall be tested by having the projectile fired from the gun without the line being attached. In this way any flaws in the gun's mechanism will be shown up. The new gun passed this test with ease. It fired the shot from a 45-degree angle and used a 9¼-ounce powder charge. After examining the gun following this test, Captain Imperatori said the gun's mechanism was not affected in the least.

At the close of the test Captain Barnard gave a verdict of entire satisfaction for the new gun's safety, simplicity and efficiency, and assured the inventor's representative that the gun will be adopted by the United States Transport Service with as little delay as possible.

This new gun is manufactured by the General Ordnance Company, and is named the G-O Line Throwing Gun. This same company also invented and manufactured the famous Y gun used by the United States Navy for anti-submarine warfare.

How the other fellow does it

A
Contest



$45.00 FOR A FEW KINKS!

CAN YOU USE A TEN DOLLAR BILL?

1st Prize	$10.00
2nd "	5.00
3rd "	5.00
4th Prize	$5.00
5th "	5.00

and four awards of yearly subscriptions.

THROUGHOUT the war emergency shipbuilding program, which is now about at its close, the shipbuilders of the Pacific Coast and the machinists in the shops working on marine machinery have made a very wonderful record in production. A great deal of credit for this record is undoubtedly due to ingenuity of men and foremen in the yards and shops. While this work was going on at top speed, no one connected with it had time or opportunity to properly analyze and describe the methods used and so spread the good knowledge around for the mutual benefit of all the other fellows in a similar line of work.

It has occurred to the Pacific Marine Review that many of the originators of schemes in ships and yard practice might like an opportunity to put their ideas into print, and we are, therefore, setting aside two or three pages each month under the above heading.

In order to make it worth while, we are offering a $10.00 prize each month for the best shop or yard "kink" sent in during that month, and a $5.00 prize each month for each of the four next best "kinks." We are also offering five yearly subscriptions to Pacific Marine Review each month for those "kinks" which may be sent in but which, not being published in full, shall receive honorable mention.

By the word "kink" we mean some unusual or new method of obtaining better production on machine tools, or of speeding up work in bolting up, or in the use of pneumatic tools in the yard, or some scheme for a better system in the forwarding of work to the ship, or any new idea that would tend to efficiency in machine work. This need not necessarily be confined to shop or yard practice. Repairs at sea or emergency shop work on board ship would be just as eligible for the prize as the other.

Where necessary to make the "kink" clear, sketch or sketches should accompany each article. Articles should not be longer than four hundred words and preferably should be confined to two hundred and fifty words. Remember that "brevity is the soul of wit" and many words make much confusion. All sketches should be made on white paper or tracing cloth with black ink.

This contest will be open beginning with the June issue of Pacific Marine Review and the names of winners will be published each month. It is hoped by this friendly competition to bring out many new and helpful ideas.

Pacific
Marine Review
SAN FRANCISCO, CAL.

Toxikil Paint Undergoes Severe Test

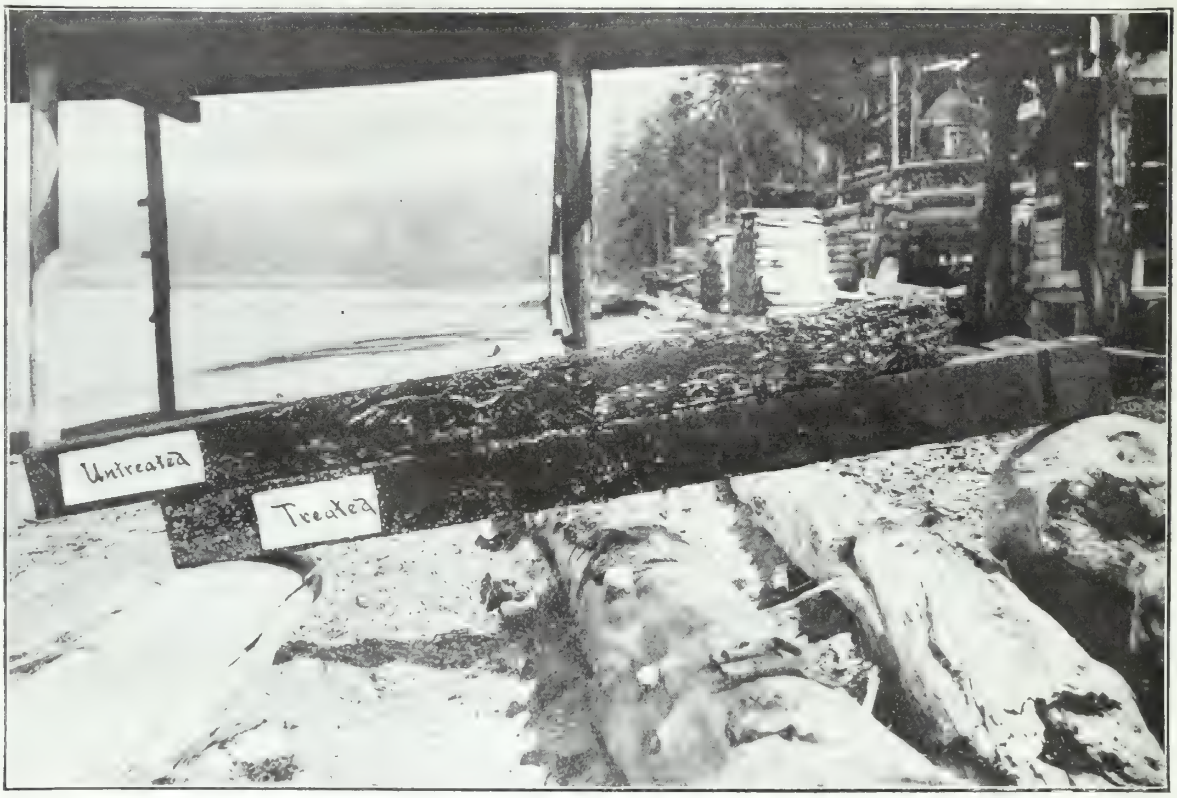
THE Department of Forestry at the University of Washington, Seattle, has recently completed a very interesting test of toxikil teredo-resisting paint, which is known as "Four-in-One" paint and is distributed by the Suess Glass Company.

In this test two timbers of No. 1 Douglas fir, 8 by 8 inches in section and 8 feet long, were selected for comparison. One timber was left in its natural state and the other was painted with the "Four-in-One" paint, half receiving a single well-brushed-out coat and the other half being given two ordinary good coats of the mixture. These two timbers were then placed in a Douglas fir box so constructed that the side planks were spaced half an inch apart and sea water could circulate freely within the box. The timbers were firmly nailed to the bottom planking of the box and to a cross bar at the upper end, and the upper end of the box was left open. The box was submerged in fresh sea water and a piece of drift wood infested with ship worms and limnoria was placed within the box so as to expose the two timbers to the attack of teredos in as short a time as possible.

The box and its contents were submerged July 7, 1918, and removed April 11, 1920. Many of the planks on the sides of the box were found to be almost completely destroyed by ship worms. The untreated timber was so completely bored and galleried by teredos that it was kept intact only by very careful handling, while the timber treated with the paint was entirely unaffected by teredos, with the exception of a corner about two inches long that had been partially broken in filling the box with heavy stones to sink it. The treated timber was re-submerged in the same water and will be re-inspected each year to determine just how effective the paint will be after a period of years.

The conclusion of the assistant professor of forestry who carried out this experiment was "that this paint offers complete resistance to the entrance of teredos when the film of paint on the surface of the wood is unbroken. This film appears to resist abrasion to a satisfactory degree and was unaffected by the exposure to the action of sea water during a period of twenty-two months."

Undoubtedly this protective paint will find many uses in marine work on iron and steel hulls and dock work and on pleasure boats and on the foundations of dwellings and other buildings along the seashore.



Result after testing two timbers, one of which was coated with Toxikil "Four-in-One" paint

Statement of the Ownership, Management, Circulation, Etc., Required by the Act of Congress of August 24, 1912

Of Pacific Marine Review, published monthly at San Francisco, California, for April, 1920.
State of California,
County of San Francisco—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared B. N. De Rochie, who, having been duly sworn according to law, deposes and says that he is the business manager of the Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, J. S. Hines, 9 Scenic Way, San Francisco, Cal.

Editor, A. J. Dickie, San Mateo, California.

Managing editor, none.

Business manager, B. N. De Rochie, 942 Fresno street, Berkeley, Cal.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) J. S. Hines.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is: (This information is required from daily newspapers only.)

B. N. DE ROCHIE.

Sworn to and subscribed before me this 19th day of March, 1920.

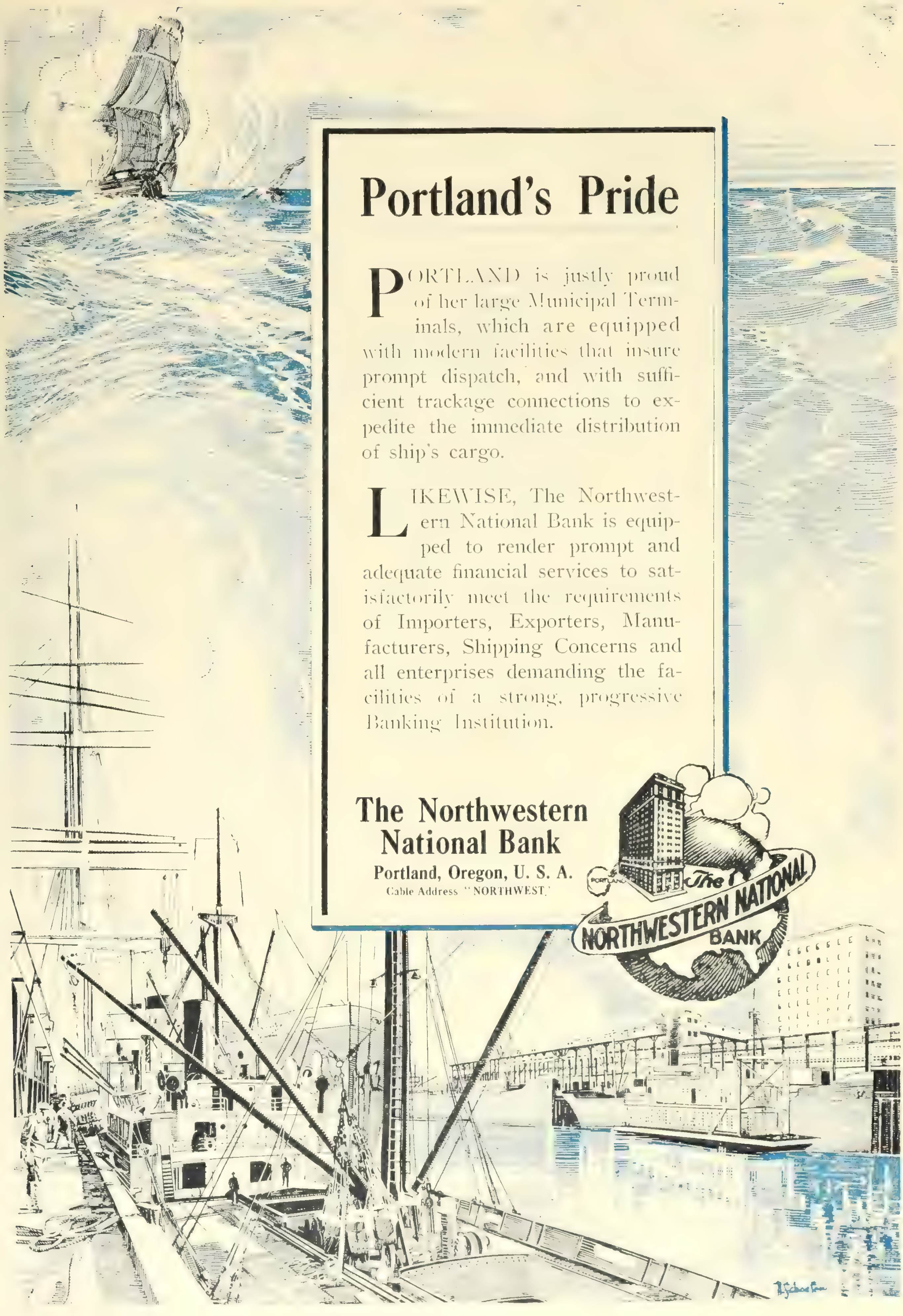
(Seal) L. I. CLARK,

Notary Public in and for the City and County of San Francisco, State of California.

(My commission expires February 15, 1920.)

STERLING'S MARINE CATALOG AND SERVICE

A NEW publication will appear shortly, Sterling's Marine Catalog, that will be a complete directory of the entire American marine trade in all of its branches. This work will contain a directory of all firms manufacturing products for ship yards and ship construction. It will also contain a complete directory of all shipbuilding companies and steamship companies, their personnel and principal data.



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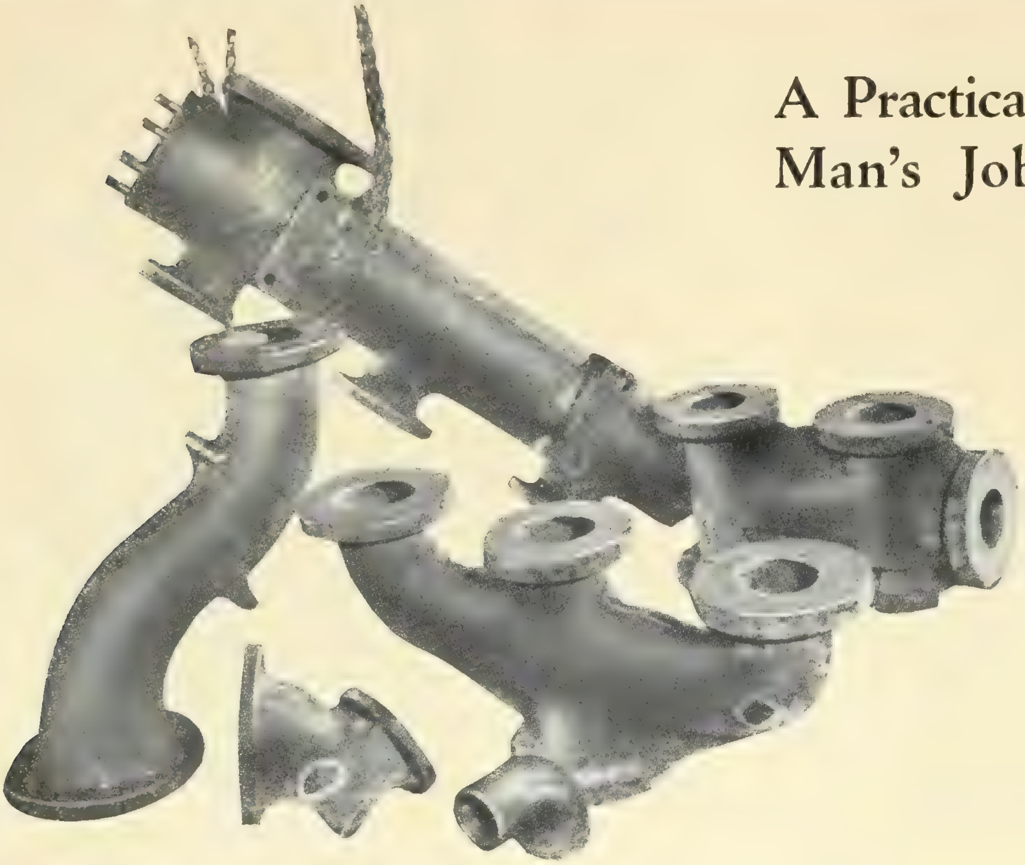

A Practical Man's Job

A most difficult phase of foundry work—pressure steam fittings.

Each pressure steam fitting presents an individual problem in the coring and placing of risers. A good casting is the result of the careful study and solution of these problems by the superintendent. Our superintendent is an intensely practical man with thirty years' experience in the business to his credit. Electric Steel Castings are the fruit of this experience.

Our success in this phase of our work is shown by the fact that we have furnished all the manifold castings used by the following shipyards in the Northwest:

Skinner & Eddy Corporation,
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G. M. Standifer Construction Company.

ELECTRIC STEEL FOUNDRY

24th and York
Portland, Oregon

Rix Compressors

THE Rix Compressed Air & Drill Company, manufacturers of compressed air equipment, are considered experts in handling problems in regard to high pressure air compressors. With the advent of the Diesel type oil engine the Rix Company have made a careful study as to the requirements for air compressors for emergency and auxiliary equipment for filling injection tanks for land engines and injection and maneuvering tanks in Diesel type marine oil engines and have found a great demand for their compressors and this fact in the face of the fact that many engines already being equipped with their own air compressors. The requirements in this particular field of compressor equipment seem to vary from eight cubic feet to three hundred cubic feet free air displacement at pressures from 250 to 350 pounds for the maneuvering tanks and from eight cubic feet to 88 cubic feet free air displacement at pressures from 1000 to 1200 pounds for the injection tanks.

The Rix Company has designed and built quite a varied assortment of these machines, which are in service at home and abroad and they have proven reliable and satisfactory for the purposes intended; some of the smaller sizes for the lower pressures are single stage, but the majority are two-stage and all may be driven by belt, geared to motors or direct connected to gas engines. The aim in these designs has been to conserve space and combine simplicity with effectiveness.

The Rix valve system of steel disc valves weighing but a few ounces, combined with a limited clearance, enables these machines to give a satisfactory volumetric efficiency. For example, the eight cubic feet machine will actually deliver four cubic feet at 1200 pounds pressure, which is a remarkable performance for so small a machine, and the three-stage 3000 pound machines have an official record of 82¼ per cent volumetric efficiency, which is evidence that the system is desirable.

The Rix Company does not limit itself to any particular size, but furnish many other sizes and to any specifications that promises effective results. They are not miracle workers and their machines are not "fool proof." They require proper installation and intelligent care and with these conditions satisfied will give efficient service.

WANTED

Sole representative wanted to handle line of all kinds of nautical instruments, such as, compasses for marine and airships, magnetic instruments, xectanten, sound and log apparatus, fog signal apparatus, manometers, etc. These instruments are manufactured by an old, experienced German firm. Communicate with

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AMERICAN EXPRESS COMPANY
65 Broadway, New York City

Positions Open for Draftsmen in Shipyard

Men experienced on steam and water piping arrangements.

Men experienced in hull construction details.

UNION CONSTRUCTION COMPANY
Engineers and Shipbuilders
Foot of 14th Street
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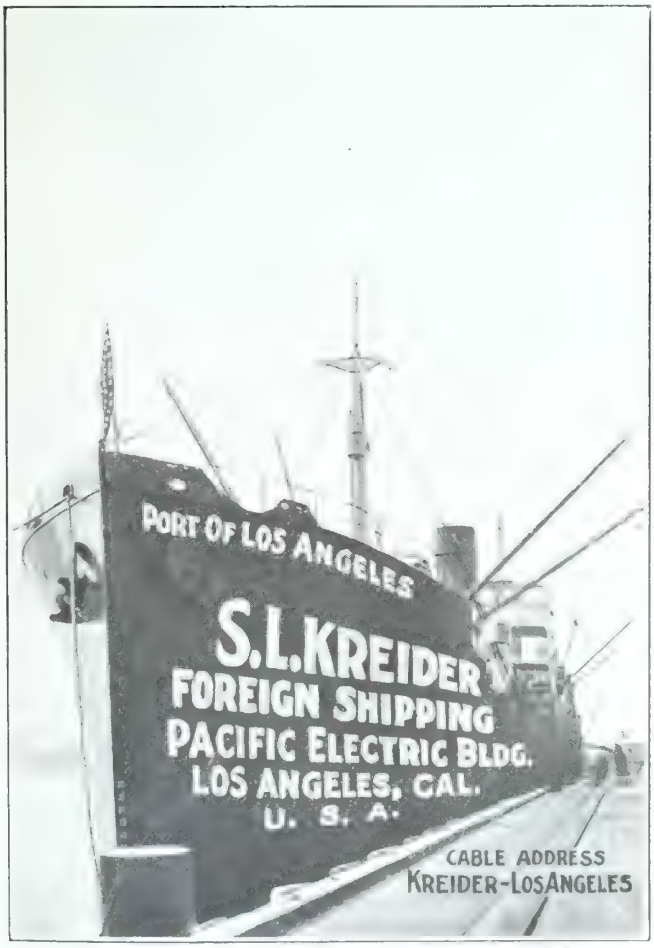

WANTED

Young man as salesman with large Machinery Company. Single man with college and apprentice training preferred. Good opportunity for advancement for right man.

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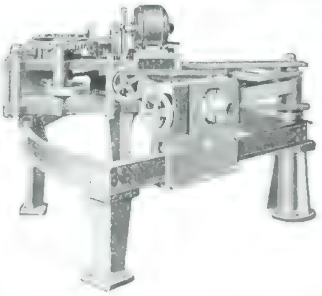

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Standard of the world.
Bends all sizes of Pipe [illegible] to 8", hand or power operated.
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AMERICAN PIPE BENDING MACHINE CO.
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For MARINE

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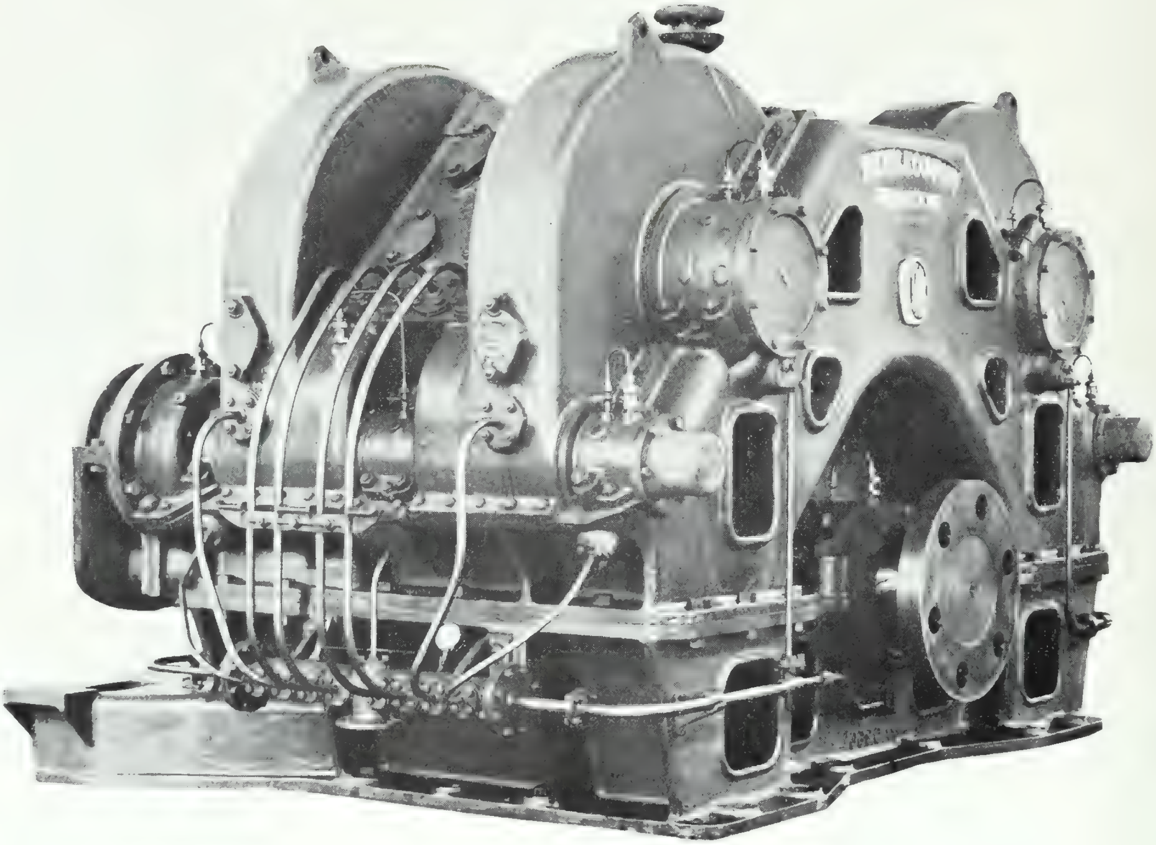

Double Reduction Marine Gear, Compound Turbine Drive, 2800 H.P., 3600 to 90 R.P.M., including Kingsbury Thrust Bearing.

These gear units are built in the Largest and most Completely Equipped Plant in this country which is devoted exclusively to the building of high class reduction gears—for all purposes.

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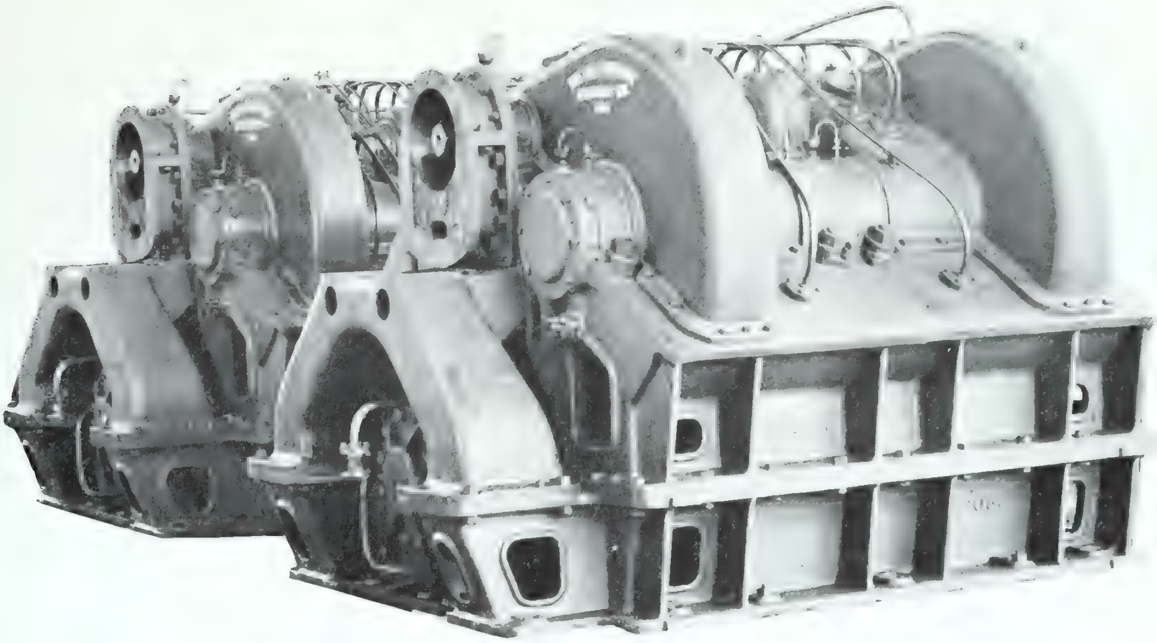

Double Reduction Marine Gear for Single Turbine Twin Screw Drive, each 1500 H.P., 3260 to 90 R.P.M., including Kingsbury Thrust Bearing

Our Engineering Department will—upon request—send full information as to capacities, dimensions and mechanical details.

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50 Church St., New York City

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Monel Metal in the Northwest

Front views of main building, Eagle Brass Foundry Company, Seattle

THE past four or five years have expansion in the Pacific North- witnessed a phenomenal industrial west. Timber, mineral resources, vast quantities of available water power, and unexcelled harbor facilities, could not fail to invite enterprise and stimulate development.

Among many others, the Eagle Brass Foundry Company of Seattle had its inception in faith in the industrial stability of a section blessed with so many advantages of location and environment.

The Eagle Brass Foundry Company was originally located in a small shop at 505 Railroad avenue, South. In the fall of 1917 it was reorganized under its present management.

At that time new and commodious buildings were erected on the present site south of Spokane street between Whatcom avenue and First avenue, South. It is served by both surface and elevated cars, including the Seattle-Tacoma Interurban, while a spur of the steam railway passes along the rear of the buildings. The plant is in a location that is rapidly developing into one of the largest manufacturing centers of the Northwest, being within easy reach of all the leading shipyards and associated industries. The plant occupies ground space of 30,000 square feet with a frontage of 300 feet on Spokane street. The ground floor of the main building covers 11,000 square feet, comprising the main foundry room, furnace room, cleaning and grinding rooms, core ovens, air compressor and blast fan room, offices, stock room, and an up-to-date locker and wash room for the employes. An overhead track connects the furnace room with all branches of the foundry, reducing the manual work of lifting to a minimum. A powerful traveling crane serves the main floor of the foundry room.

The furnace room adjoining the foundry and communicating with same by means of sliding doors is equipped with a battery of modern Hawley-Schwartz and Monarch Simplex furnaces of varying capacities. This room is equipped with large hoods and a ventilating cupola.

The second floor houses a rapidly growing machine shop, a well equipped pattern shop, a pattern loft and additional store rooms.

The plant is equipped for the manufacture of all types of marine brass castings or of bronze from stern bearings to condenser ferrules, including valves, air ports, hinges, and louvres; also the different types of locomotive and engine brasses.

Aside from the ordinary synthetic alloys this plant is featuring the comparatively new "natural" nickel-copper alloy known as Monel Metal. This metal, closely resembling nickel in outward appearance, combines the strength and toughness of steel with the corrosion resistance of nickel.

Mr. Anderson, president of the company, recently spent considerable time at the Bayonne, New Jersey, works of the International Nickel Company in order to familiarize himself with the technical processes involved in the conversion of Monel Metal into manufactured products. In addition, the experimental staff of the Eagle Brass Foundry Company has lately completed an exhaustive series of experiments with alloys formed from Monel Metal and varying proportions of copper, tin, zinc and lead. The resulting alloys were subjected to a series of physical tests to determine their utility for specific manufacturing purposes. These tests showed some surprising results in regard to strength, density, toughness and hardness.

The Eagle Brass Foundry Company accordingly has been able to select a number of these Monel Metal combinations, particularly adapted to specific purposes. These products have been given the name "Bronel," viz., Bronel Bearing Metal, Bronel Valve Metal, etc.

The growth of the Eagle Brass Foundry Company is vindicating the company's slogan, "It will be right there and right when it gets there."

Front view of main building, Eagle Brass Foundry Company's plant

Battery of modern brass furnaces at Eagle Brass Foundry Company

AS FLEXIBLE AS A LINER'S ENGINES

PREST-O-LITE service functions like the giant liner's engines. In harbor these smoothly revolve at a snail's pace, yet at a signal instantly develop their maximum horse power. It matters not what the emergency is these steam wonders respond efficiently, and just when needed.

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Kohl Building, San Francisco
In Canada, The Prest-O-Lite Co., of Canada, Ltd., Toronto

PW-506

Catalogue No. V of the Bantam Ball Bearing Company, Bantam, Connecticut.

A very neatly arranged, loose-leaf catalogue of fifty odd sheets which covers the subject of ball bearings from every possible angle and describes the many different forms of roller and ball bearings manufactured by the Bantam Company with specifications of all sizes carried in stock, and a line drawing showing the arrangement of each type. Tables of safe loads are given for all sizes of balls up to 2⅝ inches in diameter on the grooved and flat type races; and convenient decimal equivalents for both metrical and English measure.

The catalogue closes with a reprint of a very fine article on ball bearings and roller bearings by W. S. Rogers.

The Bantam Ball Bearing Company is represented in San Francisco by the Frank M. Cobbledick Company, 693 Mission street.

American Made Products, by the American Spiral Spring & Manufacturing Company, Pittsburgh, Pennsylvania.

A sixteen-page pocket-width booklet describing the spiral springs made for manufacturing and industrial purposes by the American Spiral Spring Company, together with tables of various standard wire gauges and decimal equivalents, weights and areas of square and round bars, and weights of flat rolled steel.

The American Spiral Spring & Manufacturing Company is thoroughly equipped with automatic wire-forming machines and are prepared for quantity production of a large variety of special shapes to order.

They are represented in San Francisco by the Frank M. Cobbledick Company, 693 Mission street.

Bulletin No. 152 of the Whiting Foundry Equipment Company, Harvey, Illinois.

A twenty-six page booklet giving a list of the names and addresses of the users of the Whiting cupola. This furnace has been on the market about thirty-five years and about 3500 have been installed up to date. While many minor improvements have been developed, the outstanding characteristic features of design are the same today as they were on the first installation.

A special design of this cupola for continuous melting has been put on the market during the last three or four years and the installations of this type are listed separately.

Catalogue No. 151 of the Whiting Foundry Equipment Company, Harvey, Illinois.

A handsome eighty-page booklet illustrating and describing and giving complete specifications for the Whiting cranes, which are manufactured in the following types:

- Electric traveling cranes
- Bucket handling cranes.
- Gantry cranes.
- Transfer cranes.
- Handpower cranes.
- Jib cranes.
- Pillar cranes.
- Bracket cranes.

While not at all confined in their application to foundry service, it will be found that the Whiting cranes are especially adapted for that class of work. Some notable examples of installations of electric traveling cranes are given, among which might be mentioned that of the 78-foot span, 250-ton, seven-motor electric traveling crane for handling locomotives at the shops of the Union Pacific Railroad at Cheyenne, Wyoming.

A Hoist Below the Hook, by the Shepard Electric Crane & Hoist Company, Montour Falls, New York.

This very attractive twenty-page booklet describes the various types of the Shepard monorail overhead floor and cage-controlled hoists and traveling cranes.

Many different varieties of industrial uses are graphically described by pictures and text.

Bulletin No. 100-1 of the Standard Underground Cable Company, Pittsburgh, Pennsylvania.

This twenty-four page booklet describes and gives specifications for copper and brass tubes; copper, brass and bronze rods; and copper, brass and bronze wires manufactured by this well-known firm. Weights and dimensions are given for brass, copper and bronze rods from 1/16 to 5 inches in diameter; for brass and copper wire of all gauges. Also a very useful table of comparative sizes of wire in decimals of one inch for the American and foreign standard wire gauges. In addition there is also a very useful conversion table of metric and English weights and measures.

All of the above catalogues may be obtained free on request by interested parties, except where otherwise noted.

Progress of Boiler Feed Water Purification by Evaporation

YOU have often watched a locomotive take on water from a tank, as it has to do every hundred miles in order to make steam. This replenishing of water is also necessary on ocean going steamers, but there are no friendly fresh water tanks located at intervals in the ocean and at which a ship can call and receive the necessary supply of water. Sea water cannot safely be used in boilers, so every ocean going ship carries apparatus which purifies the salt water and makes it suitable for steaming purposes. This necessity led to the development of evaporators. The type of apparatus at first used was extremely crude, but constant improvement has been made in the art until today we have evaporators as manufactured by the Griscom-Russell Company, 90 West street, New York, known as the Reilly Evaporator, Submerged Type, which not only provides a constant pure supply of boiler feed water, but also furnish water for drinking purposes. The difficulty with the earlier types of evaporators was due to the scaling of the evaporating surfaces, but this submerged type of evaporator is actually self scaling, which is a long step in advance.

The development of feed water purification by evaporation in the marine field has extended over more than fifty years, but it was not to any extent applied in stationary power plant practice until about five years ago. It is noteworthy that the great power plant advances are fostered and first used in marine practice, because operation on board ship demands high-grade equipment, minimum shut downs and greatest ease of repair. A ship at sea is its own repair shop and the repairs must be minimized in order to insure constant operation of the ship's plant. However, from time to time, some of these marine products have been adopted in stationary power plant practice, and the past five years has seen the introduction of Reilly Evaporators for purification of boiler feed make-up in large central station plants, and also in plants of various sizes—even to very small ones. This purification is accomplished in a similar manner to the established shipboard procedure with the exception that the refinements of operation are even greater, and plants are so arranged that practically all of the heat used in the evaporation of the water by the use of steam, is returned to the system. In the actual operation, high pressure steam is supplied to the coils of the evaporator, and in condensing in these coils, evaporates the body of water in the shell surrounding the coils. This purified vapor is in turn condensed in a condenser and is ready for boiler feed. This is descriptive only of the basic feature of the plant, and it is the plan of utilizing the hot well water as the condensing water, and other features, which make the system not only a valuable means of purification, but also permits the apparatus to pay for itself in actual savings in from six months to one year.

The pioneers of the development of evaporators for marine service were the Griscom-Russell Company, who have been manufacturing this type of equipment for more than fifty years, and they are also the pioneers in the development of the "High Heat Level Evaporator Plant" for stationary power houses. This latter development, even though a revolutionary one, has come to stay. The particular features which commend it to the plant owner are that it provides pure water, eliminates scaling in the boiler tubes, eliminates the necessity of blowing down the boilers, and that it actually pays for itself in a short time through the heat saved.

Each Block Stamped With Its Safe Working Load

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UPON REQUEST, WE WILL SUPPLY
TABLES OF SAFE LOADS
COMPILED BY OUR ENGINEERS ON
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Book Reviews

The Gas Turbine. By Hans Halzwarth. Translated by A. P. Chalkley. Published by Charles Griffin & Company, Limited, London.

This book of one hundred and forty pages, with one hundred and forty-two illustrations and many tables, gives a thorough discussion of the theory, construction and records of the results obtained from two gas turbines manufactured in Germany. These turbines were both built to the designs of the author; one for experimental purposes by Messrs. Koerting Brothers of Hanover, the other employed in driving a dynamo and blowing plant constructed by Messrs. Brown, Boveri & Company of Baden-Manheim.

A successful gas turbine would appear to be the ne plus ultra in the design of prime movers, and Halzwarth seems to have solved a good many of the problems which have been stumbling blocks in the path of former designers.

The book is divided into four parts: the first of which in sixteen chapters treats thoroughly the theory of gas turbines; while the second part in eight chapters gives the details of construction; part three in three chapters gives a general comparison between gas turbines and reciprocating engines, both thermodynamically and from the point of construction and operation; part four gives the practical results of the tests both on the experimental turbine and on the first turbine used for practical driving.

TRADE LITERATURE

SAWS AND SAW TOOLS. Catalogue of E. C. Atkins & Company, Indianapolis, Indiana.

A very neat two hundred sixty-four page booklet describing the very complete line of Atkins Silver Steel Saws and accessories for users of saws.

The Atkins family have been making saws for about three hundred years. They have been students and inventors and have always endeavored to maintain their AAA slogan of "Atkins Always Ahead." The product of this family is divided into ten departments: first, is that for Mill Saws, which includes all types of power-driven, woodworking saws; the second department is devoted to Metal Cutting Saws, including circular, band, hack and kwik kut metal cutting saws; the third department handles Cross Cut Saws for the lumber trade; the fourth department handles the hardware line, including all forms of Hand Saws for woodworking, and many forms of knives and scrapers; a special department handles Saw Tools and several special tools, which have no connection with the saw business; another department is devoted to Trowels; Machine Knives occupy the activities of one department; a Manual Training department takes care of the special needs of manual training schools; a Repair Work department handles completely equipped repair shops at Atlanta, Memphis, Minneapolis, New Orleans, Seattle, Portland, Vancouver, B. C., Hamilton, Ontario, and Indianapolis, where prompt and accurate execution of all classes of repair work can be assured to users of Atkins equipment; the tenth department handles all special work outside the regular stock lines and produces many special items of sheet metal work where a high quality of steel and delicate manipulation is essential.

A New National House Organ. The Greenfield Tap & Die Corporation of Greenfield, Massachusetts, is issuing a new national or exterior House Organ entitled "The GTD Helix."

This firm has been publishing an employes' edition for two years, which has met with universal approval on the excellence of its make-up and contents.

For some time the GTD Corporation has felt the need of a publication more national in scope—hence the new "GTD Helix."

The name "Helix," which means "the path of a true screw thread," is a particularly fortunate choice in view of the firm's products, which consist of tools for cutting and gagging screw threads.

The new magazine is a convenient size, 4½ by 5⅞, and the cover is very attractively and strikingly laid out in colors, the principal design representing a screw thread as seen inside a nut or tapped hole—the path of the thread or "helix" bringing the reader's eye down to the feature item for the month.

Besides the editorials there will be a section devoted to dealer's service, which will be appreciated by the trade.

Bulletin No. 98. The Independent Pneumatic Tool Company, 60 West Jackson Boulevard, Chicago, Illinois.

This four-page bulletin describes the Thor Universal Assembling and Repair Vise for Pneumatic Drills. It is claimed that this vise when properly used will save 50 per cent of the time ordinarily used by the repair men in reconditioning pneumatic tools. This vise is applicable to any make of pneumatic drill.

Bulletin No. 48029 of the General Electric Company, Schenectady, New York.

A profusely illustrated booklet describing the motors and control used by the General Electric Company in their reversing drive for planers, slotters and other similar tools. The use of this reversing motor in driving these tools very much simplifies the mechanism, eliminating clutches and belts and giving a much better opportunity for the use of simple safety devices. At the same time the direct connected reversing motor drive saves considerable time in the operation of the machine by adjusting the cutting speed to the maximum and keeping the fast return speed at the same rate, eliminates all slip except that inherent to the meshing of mechanical parts, and thus makes for a machine of much greater all-around efficiency.

Leaflet No. 6 of Griscom-Russell Company, 90 West street, New York.

A very neatly arranged fifteen-page leaflet which is designed to act as a handy index to the various bulletins issued by the Griscom-Russell Company describing individual units of their complete line of water and oil heaters, oil coolers, evaporators, expansion joints, grease extractors and steam, oil and air separators.

The Maydole Hammers, 1919 Catalogue of the David Maydole Hammer Company, Norwich, New York.

A very neat booklet of thirty-two pages describing, pricing and illustrating various styles of hammers made by this company.

For nearly one hundred years the name "D. Maydole" has been stamped on hammers of quality, and the way in which this New York village blacksmith, by what might be called integrity of his craftsmanship, gradually climbed to the world leadership in the manufacture of his specialty, forms one of the most interesting industrial romances that the United States has produced. This story is incorporated in a separate booklet and distributed with the catalogue.

Autogenous Welding for April, 1920. This current number of the house organ of the Davis-Bournonville Company of New Jersey City contains twenty-eight pages of a very interesting copy and illustrations bearing on the use of oxy-acetylene welding and cutting in industrial plants.

The frontispiece illustrates the Davis-Bournonville motor-driven oxy-acetylene tube welding machine which has produced some very remarkable results. The unwelded strip is subjected to very heavy pressure at the time of welding and the temperature is so controlled that the welded metal retains its physical structure practically unchanged. This field of welding under compression by machine is practically unlimited and it is at the present time developed only to a very slight extent.

Railroad and Marine Lighting Appliances and Fixtures. Catalogue No. 500 of F. H. Lovell & Company, Arlington, New Jersey.

For fifty-two years F. H. Lovell & Company have been manufacturing and distributing the class of fixtures described in this catalogue and during that time their products have penetrated into every part of the world.

The progress in the development of the design of railroad and marine lighting appliances and fixtures has been very great and the fact that while many of the original types are still retained, there has been added so many of the more modern type, forces the publishing of a catalogue containing two hundred and thirty-two pages, practically the whole of which is devoted to the description and illustration of these appliances and fixtures for lighting ships, trains and shops.

Shipbuilders will be especially interested in the water-tight and steam-tight lighting and wiring fixtures which are manufactured both to commercial and naval standards. The lighting appliances cover both the electric and oil types.

Pacific Marine Review

June 1920

S.S. "CITY OF ALAMEDA"
BUILT BY BETHLEHEM SHIPBUILDING CORP., LTD.
UNION PLANT

Pacific Marine Review, Vol. 17, No. 6. Published monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.

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The men are of *uniform* strength. Any one of them can finish a job begun by any other.

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Pacific Marine Review

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Pacific Marine Review

The National Magazine of Shipping

June, 1920

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The Seventh National Foreign Trade Convention

IN what economic situation the United States finds itself as a result of the war and the overturning of all trade balances; what the country must do to overcome the adverse effect of present exchange rates; the causes and effects of the great excess of exports over imports; in brief, "The Effect of Being a Creditor Nation": these were the broad themes of discussion of the seventh National Foreign Trade Convention, which was held in San Francisco, May 12 to 15. The principal speakers of the convention recognized the imperative necessity of awakening the foreign traders of the United States, and no less the people of the country, to the palpable fact that American foreign trade cannot continue in its existing state. The degree to which the convention accomplished that aim will be one of the primary criteria of its success.

Primarily a Selling Nation

This was not the first time that authoritative voices have spoken on the meaning and consequences of overwhelming favorable trade balances: the National Foreign Trade Council has invited the public's earnest consideration of them; economists, practical and theoretical, have analyzed the situation; and, more lately, American exporters have found their paths blocked by enormously expensive exchange, so that, despite great need, other nations have not been able to purchase. Even though both precept and experience have been at the country's elbow, yet the United States, on the whole, has remained a selling rather than a buying nation: foreign trade to most of the people and many business houses has been translated as exporting alone, without regard to importing. Now has come the National Foreign Trade Convention, speaking most authoritatively and to the great public, to utter again the fundamental truth that foreign trade must be reciprocal.

Precisely what was the effect of the convention's discussion no one can say. Success or failure in awakening the people of the country may not be evidenced for several months. And, of course, vital as was the necessity of inculcating the truth that the country must be a buyer as well as a seller, there were scores of other subjects of great intrinsic importance, which necessarily distracted attention from the formal theme of the convention. Yet the fact remains that the success of the meeting in San Francisco must rest upon the degree to which it awakens the nation to the gravity of the conditions of today.

By What Steps We Rose

By what steps the United States mounted to its eminence as feeder, manufacturer and banker of the world was outlined by James A. Farrell, president of the United States Steel Corporation, in his address on "The Relation of Our Industrial Capacity to Our Foreign Trade." In addition to being president of the world's largest corporation, Mr. Farrell is chairman of the National Foreign Trade Council, and easily was the commanding figure of the convention.

"Fifty years ago, the total of our exports was only $376,600,000, or less than one-twentieth of their value in 1919. Of that comparatively small amount, raw materials and foodstuffs together contributed more than 81 per cent and manufactures less than 19 per cent. Last year the manufactures, including manufactured foodstuffs, accounted for over 70 per cent and raw materials and foodstuffs in crude condition for only 29½ per cent. . . . . This people . . . has definitely shifted from being a nation whose preponderant products were agricultural to a nation whose production is chiefly industrial. . . . There has been an enormous increase in the industrial plant capacity of the country during the war. It is the effect of that greatly enlarged basis of production with which we are now vitally concerned. . . . It is true that . . . there was a great disparity between the increase in value and the increase in volumne, but the transformation effected in the productive capacity of the United States in order to meet the requirements of war was nevertheless a notable one. . . . This development was super-imposed upon an industrial structure, which, before the war, was capable of producing a substantial surplus of manufactures for export."

Causes and Effects

Of the present situation, to which the country has been brought by the favorable trade balance, it is necessary to say little, because the newspapers for months have been filled with the rapid decline of exchange, especially of the British pound. The cost of American dollars, with which to pay bills in the United States, is, to the foreigner, little short of ruinous; with this, the fact itself may be dismissed; of the causes and effects of this state, however, much was said at the Foreign Trade Convention.

F. L. Lipman, vice-president of the Wells Fargo Nevada National Bank of San Francisco, after enumerating several reasons, expressed the opinion that the decline of European moneys in international exchange was due principally to "the depreciation of an inconvertible paper circulation abroad." There were various points in Mr. Lipman's reasoning where his chain of logic was weak: his attempt to trace the primary and well-nigh sole cause of low exchange to inconvertible paper currencies abroad was not convincing; and most persons probably would agree with George E. Roberts, vice-president of the National City Bank of New York, who, although admitting that "exchange rates with some of the countries of Europe are affected by inflated and depreciated currencies," yet found, in the case of Canada, conclusive evidence that the balance of trade had caused the depreciation in international exchange of the sound Canadian dollar. In that depreciation, at least, as Mr. Roberts departed from his prepared address to emphasize (apparently in controverting Mr. Lipman's argument), there was no question of the value of Canadian money; if there be inflation in Canada, "we cannot say that there is any more than in the United States."

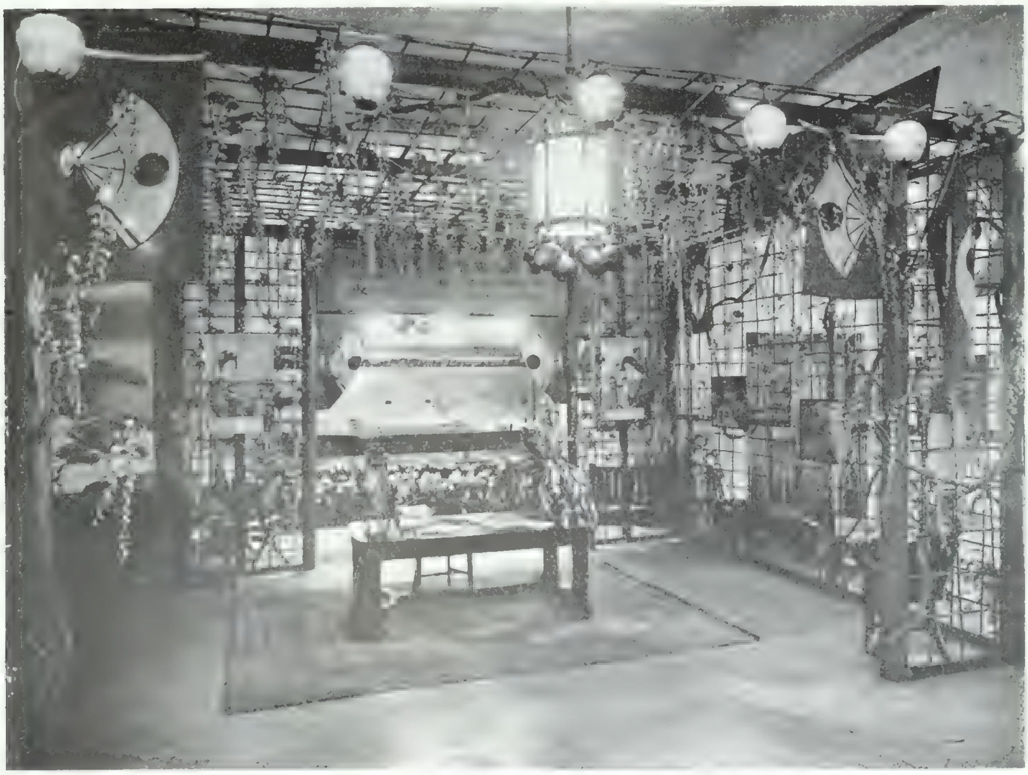
Purchases Being Limited

And so it comes about that those countries in which the American dollar commands an enormously increased price, of necessity are limiting their purchases to the greatest possible degree. What should be done by the people of the United States to maintain their exports?

"Every situation like this brings a lot of people to the front with remedies," said Mr. Roberts, in the keenest, most logical address of the convention. "There are proposals for an international currency, with international gold reserve, an international clearing house, an international bank, and for a government foreign bank on our own account." All these Mr. Roberts dismissed with little consideration; others, however, dwelt at length on some suggestions. Among these was P. S. Steenstrup, of the General Motors Export Company, who, in a paper on "Sales Methods Under Adverse Exchange," recounted the application of direct exchange of goods in order to supply Poland and Czecho-Slovakia with transportation—the release of motor trucks and locomotives upon the accumulation of given amounts of produce for export to the States. The palpable weaknesses of the working-out of this plan did not go untouched by those who heard the paper; cases were cited of American companies that had met heavy losses because of complete ignorance of the commodities they were accepting in exchange; and to these rebuttals might have been added this: that if Poland or any other country has sufficient goods for export to make this plan feasible for American exporters in general, then the direct exchange of goods by individual corporations is unnecessary: the Polish refiner, for example, may sell his sugar directly to America and the credit thus established go to offset purchases of motor trucks in the United States. There were, however, several suggestions that American corporations might find in the accumulation and shipment to the States of products of foreign countries a business not only profitable but of great aid to American exporters, as tending to restore the balance of trade.

Regarding Additional Credits

Additional credits also were considered. Henry S. McKee, vice-president of the Merchants' National Bank, Los Angeles, devoted much of his address to extension of credits, which he regarded as practicable, although merely a stimulant and not a cure. Other speakers discussed acceptance of foreign moneys and the deposit of those funds abroad until the exchanges should improve; and against these suggestions were cited various workings-out of the plan, with dismal results. Investments abroad were urged: the great opportunities for the United States to build up its commerce as did England were dwelt upon, especially by Eugene P. Thomas, president of the United States Steel Products Company, and Paul Page Whitham, United States trade commissioner. Such investments would create "channels of outlet for the products" of American industries; they would be of incalculable, permanent value; through them much of the immediate debt owed to the United States might be left abroad; but these investments would not be a complete solution of our trade balances



An artificial Japanese wistaria arbor gave the booth of the Toyo Kisen Kaisha at the Seventh National Foreign Trade Convention an Oriental setting which was further enhanced by the frequent presence of pleasant Japanese maidens in their national custumes.

Cocoanuts and pineapples, husky native singers and ukuleles combined with the bathing beauties from "the beach at Waikiki" gave a distinctly Hawaiian flavor to the booth of the Matson Navigation Company.

because not all foreign accounts could be settled in this manner, and, finally, payment of interest would become a problem.

One plan remains: this, the only possible solution, to which Messrs. Farrell, Roberts, Lipman, Thomas, McKee and many others arrived, though by different paths.

We Must Import More

This solution is the increase of imports. A composite statement might be drawn up from different addresses: "Foreign trade is necessarily reciprocal. We have long been accustomed to speak of competition for foreign trade in terms of commercial warfare. We have given all our thought to exports, to selling our products in other countries, without considering how the foreign customers we are seeking will be able to make payments for their purchases. Imports pay for exports, and we have a huge balance of exports to be paid for."

In this manner the burden of many addresses was that America must buy if it is to continue to sell. And not only would increased imports make it possible for foreign nations to pay their existing debts and to continue buying, but (as all will admit) a merchant marine demands freights in both directions, imports no less than exports—and the merchant marine and foreign trade are inextricably bound together.

The consensus as to the desirability of increasing imports was summed up by the report of the general committee, the final and authoritative expression of the convention:

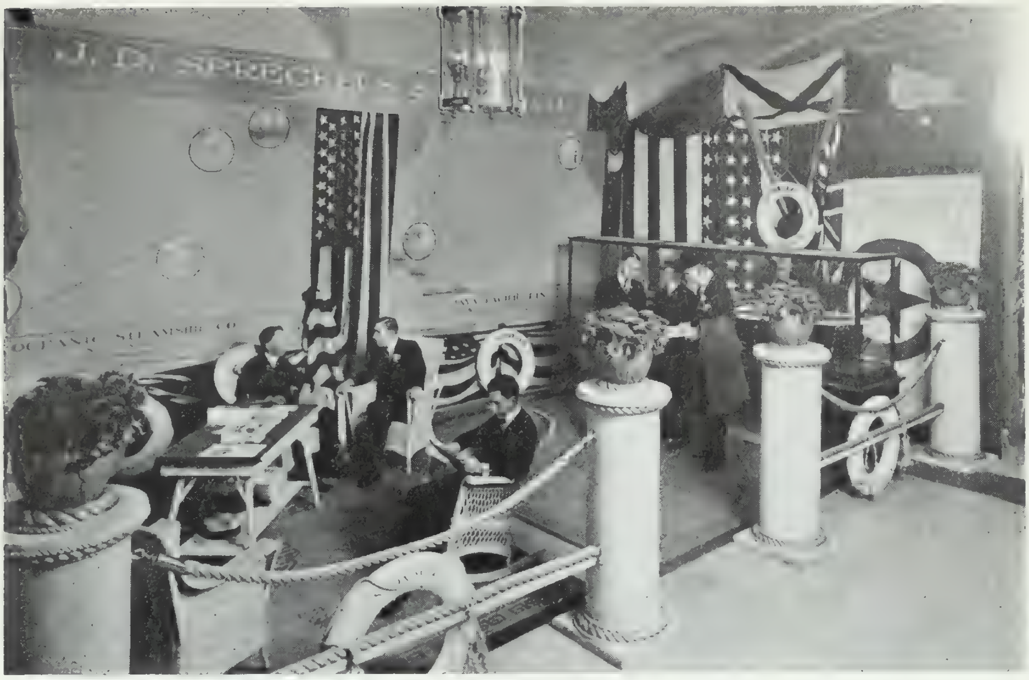
"The United States as a creditor nation should afford to other nations every fair and reasonable opportunity to sell their products to us, especially of raw materials, without detriment to existing industries: (a) to permit of liquidation of the obligations of the debtor nations; (b) to promote exchanges of products in view of the impossibility of their making payments in gold; (c) to provide return cargoes for our merchant marine; and (d) to relieve the demoralization of industry and exchange in Europe."

General agreement as to the advisability; but what of the means? Mr. Thomas answers that question admirably:

"But back of all this is the primary question of how shall we best promote and develop new markets in this country for those products which can be imported to the mutual advantage of ourselves and of those foreign nations to which we desire to sell our products, or which are already our debtors. It may be assumed that there is substantial agreement on the general proposition that there can be no permanent and continual expansion of our exports, particularly of manufactured products, without a substantial increase in our imports. The stimulation, in new quarters, of our commercial exchanges will necessarily require the co-operation of the countries in which we are seeking business, as well as a careful co-ordination of means to ends on our own part. That is to say, countries having a surplus of their native products for export and desiring to exchange them for American raw materials or manufactured goods will be expected to study the possibilities of our market as assiduously and intelligently as we may be expected to study theirs. The mutual benefits derivable from foreign trade can be insured only through co-operation, reciprocal confidence and a close co-ordination of common aims.

Lack of Systematic Campaign

"There has been, so far, a notable absence of any systematic campaign of publicity with regard to foreign products which might be widely used in this country but with which our people are only partially, if at all, familiar. A beginning has been made in the organization of foreign chambers of commerce in New York and elsewhere, the primary object of which is presumed to be the exchange of information as to the capacity of the United States to absorb certain classes of imports, and the ability of foreign countries to find a market for certain classes of exports. The usefulness of such chambers of commerce could be greatly extended were they to concern themselves with the communication to our financiers and merchants of the opportunities for profitable investment presented by their respective countries and for the establishment there



The booth of J. D. Spreckels & Bros. Company was used by many of the visitors to the convention as a convenient spare time lounging and meeting place. Notable in its furnishings was the beautifully built model of the Java - Pacific liner Tjisondari.

of branches of American trading concerns and of American industries. There is a large and unoccupied field for popular education here with regard to the consumption of foreign goods, or rather the creation of a demand among our people for foreign products not now entering into American consumption or not yet utilized for further manufacture in this country."

Moreover, as Mr. Thomas continued, a profitable business in re-exporting foreign products may be built up. The extent of Great Britain's re-export trade he sketched as follows:

"England has a larger transhipment trade than any other country in the world; in 1913 she bought for re-shipment over half a billion dollars' worth of merchandise. In addition to what came from her colonies, she bought from Europe $96,000,000 worth, and re-sold to Europe goods not produced in England to the extent of $296,000,000. In 1913, England sold to the United States goods valued at $288,000,000, of which $147,000,000 came from non-British sources. For example, we bought from England Philippine hemp worth $700,000; East India jute, $4,400,000; wool from Argentina, Australia and South Africa, $10,000,000; rubber from the Congo, Brazil and the Straits Settlements, $40,000,000; and tin from the Straits, Bolivia, the Dutch Indies, South Africa and Australia, $25,000,000.

Free Zones Considered

"For the more rapid expansion of our direct trade in imports for re-shipment, it has been urged that free zones should be established at those American ports which are well equipped with railroad and shipping services and with financial facilities. The number and frequency of sailing of American ships would thereby be increased; there would be forthcoming a better prospect of cargoes on incoming as well as outgoing vessels; a consignment market for all the great staple products of commerce would be created, to the manifest increase of the range, and the reduction in price, of raw materials for the American manufacturer."

This problem is one of many facets, however. Mr. Roberts bluntly suggested tariff reduction as one avenue of escape, as one means of encouraging imports. Such a proposal, coming from a banker of Mr. Roberts' standing and affiliations, may create surprise but it must command respect. Said Mr. Roberts:

"A proposal to adopt a policy of greater liberality toward imports than this country has maintained habitually in the past will run counter to the long-established views of many people, arouse apprehensions and perhaps create some dissension even within the council itself, but the question must be dealt with, one way or the other. An argument can be made for a policy of exclusion and isolation, keeping out all foreign products which are competitive in any degree with our own and restricting our exports correspondingly; and another argument may be made in favor of a more liberal policy which will afford an opportunity for a larger development of trade on mutually advantageous lines; but no well-supported argument can be made in favor of trying to expand our exports without increasing our imports. That is a waste of energy; it simply cannot be done. We must choose a consistent course.

Upon Being Self-Contained

"In my opinion it is inconceivable that the people of the United States will adopt permanently a policy which lays all emphasis upon being self-contained and which would restrict and handicap those industries, which are able to compete in all markets, for the sake of other industries which do not have like possibilities of growth. The largest possibilities for the country lie in the industries which can make their way in world markets. The genius of our people will not be satisfied without a chance in the markets of the world. The facilities for travel and transportation are such that it is inevitable that trade shall reach across national boundaries, and it is favorable to national efficiency and development and in the common interest of industrial progress that this shall be the case. In saying this, however, I am not making a declaration in favor of any radical change from the policy which is embodied in our laws today. Nothing should be done that will change materially the position of the great essential industries of the country in which thousands of people are employed and millions of capital are invested. It is not desirable to unsettle these industries, and to a great extent they are quite secure in their own strength.

"Industry is undergoing constant changes, the volume of trade is rapidly increasing, and if we are guided in the future by recognition of the reciprocal nature of all permanent trade it is not likely that tariff changes materially affecting existing industres will need to be made."

A suggestion of this import runs counter to much of the new nationalism of a few years ago; of that nationalism which insisted that nations for their own safety must be self-contained. But of that new nationalism, of commercial groupings and boycotts, one hears less and less.

Bargaining Tariff Needed

With Mr. Roberts' suggestion of moderate tariff reductions, but running somewhat counter to it, were the demand of the general committee for a bargaining tariff, and an address by Robert H Patchin, of W. R. Grace & Company, on "The Need of a Bargaining Tariff."

"To insure such equality of treatment the American tariff, whatever its underlying principles, should provide for additional duties on imports from nations discriminating, by traffic or administrative practices, against the trade of the United States," said the report of the general committee.

In the reorganization of trade, through the increased consumption in America of foreign products, the States must expect to import more than they export—a prospect somewhat novel and disconcerting to Americans to whom the so-called "favorable trade balance" has been well-nigh the keystone of economics. But Mr. Roberts' logic is complete:

"In the past it was necessary for the United States to have a trade balance of approximately $500,000,000 per year in order to pay the charges accruing against it abroad; but in the future it will be necessary for the United States to receive a balance of perhaps an equal amount in order to collect the interest running in its favor and against other countries.

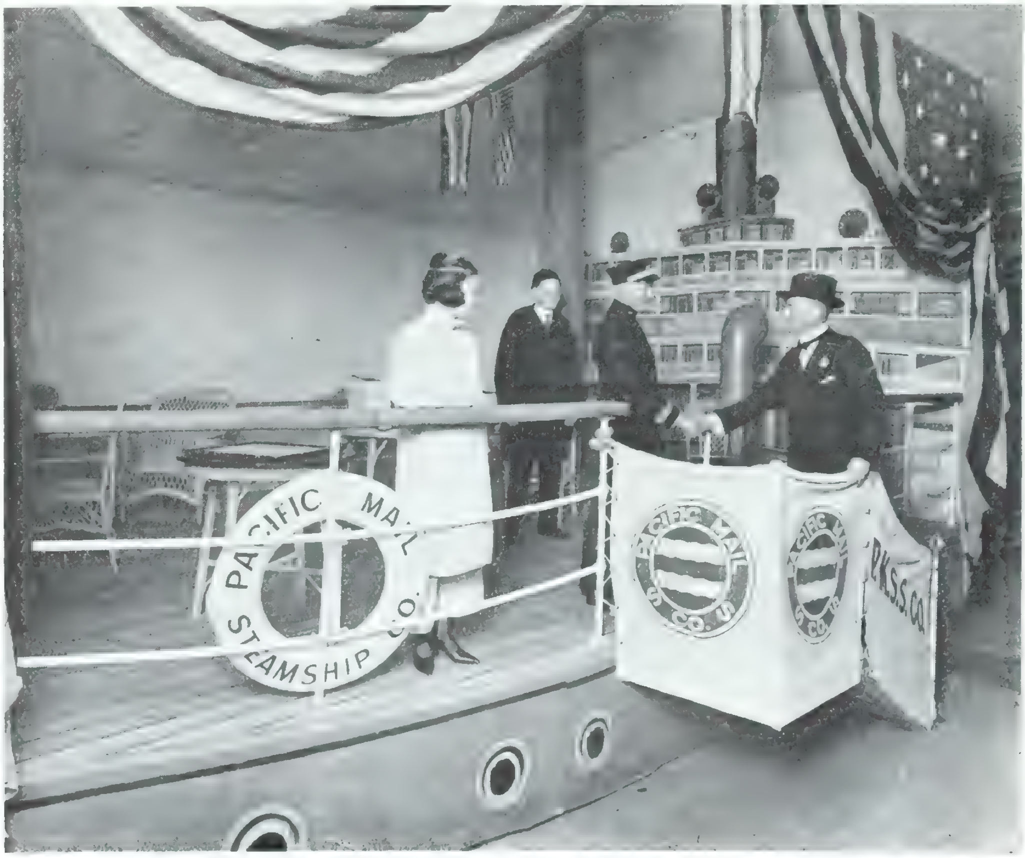
What Favorable Balance Is

"This may sound to some people like a startling and even alarming change. Our own history has accustomed us to thinking that we must have a trade balance in our favor in order to be in a sound and prosperous condition, but that was true because we were in a debtor position. We had to have an excess of exports over imports sufficient to meet the other charges in the account against us, or we had to settle the difference in gold or securities, and if gold was withdrawn from our bank reserves for the purpose it meant a contraction of credit, a check to enterprise and probably a period of falling prices and business depression. Our belief in the necessity for a favorable trade balance has been based upon our own experience that good times came with the trade balance and that bad times came when the balance turned against us; but we must now consider that our position is reversed, that our own requirements are reversed, and that the countries which are now debtor to us need to have the favorable trade balance for the same reason that we formerly required it. It is in the interest of both sides that the debtor country shall have the favorable trade balance, because that is the only condition under which it can meet its obligations."

Mr. Roberts on Competition

Mr. Roberts also had a word to say regarding competition:

"I have had friends express great concern to me about the future competition of different countries; sometimes it has been Great Britain; sometimes it has been Germany; sometimes it has been Japan.


PACIFIC MAIL STEAMSHIP CO.

"All aboard for the Orient." The Pacific Mail exhibit represented the deck of one of their ocean liners and on the end not shown in the photograph a splendidly executed map outlining the routes of the world service of this steamship company. At the rail in the foreground is Miss Emily Lowe, a dainty Chinese maiden of California birth whose presence added much charm to this booth.

The arrangement of the exhibit of the Robert Dollar Company displayed a beautiful model of one of the Dollar steamers and mural paintings depicting the Shanghai terminal and the British Columbia lumber mills owned by this company.

Any of these countries may specialize in certain industries and become formidable competitors in them, but nothing is more certain than that none of these countries in any general sense can crowd other countries out of industry. None of them in the long run will sell any more than it buys, or make in the aggregate any more commodities than it consumes. None of them will make goods for other countries without wanting something in return. Japan is sometimes mentioned as a threatening competitor because of the low wage rates prevailing there; but wages are low in Japan because the machine equipment of the country has been small and the productive capacity of the country has been small. Japan can hardly produce enough to satisfy the growing wants of her own people. Their consumption and their wants will keep pace with any increase in productive capacity that they can accomplish. Their imports grow as fast as their exports; and so it is everywhere."

Too-Much-Work Fallacy

And Mr. Roberts' views on the fallacy that there is only so much work to be done, are to the point:

"One of the grievances alleged against the labor organizations is that they sometimes limit the output, acting upon the theory that there is only a limited amount of work to be done, and that it is to their interest to make it go as far and pay as much in wages as possible. Every such conception of industry and business is fundamentally wrong. There is no limit to the amount of work to be done or the amount of business to be had, because there is no limit to the amount of wealth that may be created from the natural resources or to the consumptive demands of the world's population."

What of the bogey of "over-production"? That may be answered briefly: there is no such thing. In his address, Mr. Farrell devoted some attention to over-production, in such passages as: "We must devise such a plan of campaign, organizing for peaceful contest equipped with finance and transport, or we must be confronted with an over-production unwieldy and beyond assimilation in this country." And again: "Necessarily, a large part of this bill (owed by other nations to the United States) will be met with goods, and those goods will come into a market equipped industrially to produce much more than it can consume."

Does Mr. Farrell therefore believe that over-production can exist?

Always Room for Imports

His next statement shows that he does not: that, in speaking of over-production, he evidently has in mind only production unassimilable in some respects, but by no means in all. He continues: "There is, of course, always room for certain classes of imports; no country is capable of producing all that its people need and desire."

Mr. Roberts, with his usual clarity, effectually disposes of the over-production bugaboo:

"It is a mistake for us to advocate foreign trade, as is sometimes done, on the ground that we have so greatly increased our general productive capacity that we cannot consume the output of our industries. That is not true in a general sense, including all the industries. The people of the United States could easily consume a volume of production equivalent to twice the present industrial capacity of the country, provided production was adjusted and balanced to their wants. Everybody would like to have twice as much house-room, and an automobile and other things to go with it. There is no limit upon our ability to consume; the limit on the whole is upon production. But in some lines of production we have developed our capacity beyond the demands of our people for those products, and we want to exchange such products for other things of which we are in need. We cannot dispose of them, or use that industrial capacity, except on a basis of exchange. This is the real situation as to foreign trade.

Wants Always Increasing

"The people of no country can do more than work all the time; and however efficient they may be in production they will not be able on the whole to do any more than supply their own wants, because their wants will develop as fast as their production, which is the measure of their buying power. It does not follow that they will supply all their own wants directly; they never do that; a country naturally sends abroad a part of its production in exchange for the production of other countries; but the population of every country will gladly consume the equivalent of its own production, and in the long run is bound to do so."

That a Foreign Trade Convention held in San Francisco should devote itself largely to problems of the Pacific was quite to be expected. That the people of the Pacific Coast should see in the convention a great stimulus to American trade with Asia, Australasia and South America was no less natural. And it appears that this belief will be justified. Aside from sectional pride, which easily might persuade the Pacific states that they were the future commercial center of the nation, there was a deeply-seated and freely-expressed belief, voiced by men from all sections of the country, that vast opportunities offered in the Pacific. To one speaker China was the world's potential market; to another, Russia's possibilities were boundless; still others dwelt upon Latin America.

"Vast undeveloped portions of the world with fertile soil and cheap labor are entering upon a period of rapid development," said Mr. Farrell. "They will help supply the rapidly increasing needs for foodstuffs and raw materials, and they will at the same time furnish new markets for finished products."

Mr. Roberts was more specific:

"We are in the debtor position on trade account toward South America and Asia, and in a creditor position toward Europe, Africa and the other countries of North America. Conditions are unfavorable to an expansion of our exports to Europe and Canada, but favorable to such expansion in South America and Asia, providing we continue to receive the products of the latter upon present terms. These products are mainly foodstuffs and raw materials which are required in our industries and they come into competition with our own products only in the sense that the domestic supply is insufficient to meet our wants."

For immediately pressing reasons, therefore, the eyes of the convention were fixed upon South America and Asia. Except for Russia, these lands have not suffered impairment of purchasing ability; the tremendous disorganization of the war has not crushed them; they continue to produce, to have goods that may be exchanged for those of America. In them the convention saw markets of the present no less than of the future.

So much for the purely economic aspect of foreign trade as covered in the general and group sessions by the speakers at the convention. Underlying this and fundamental to it, as emphasized by practically every speaker and in all discussions, were three classes of problems on the solution of which depended the future of American foreign trade and of America's financial stability as a creditor nation. These three classes of problems may be grouped under three words: education, communication, transportation.

Education

Very noticeable in many of the addresses and in much of the discussion was the need for education in the fundamentals of foreign trade, not only in the high schools and universities, in order that there might be built up a body of young men to form the operating personnel in our foreign trade machinery, but also and fundamentally in the daily press and trade journals so that the idea of the necessity for foreign trade might be sold to the population of the United States. While foreign trade is not in any sense of the word a new adventure for American ship operators and American merchants, there is, as we have already pointed out, an entirely new position in foreign trade which brings with it the necessity of a complete reversal in our ideas on that subject and the ultimate consumer in America who has been trained in the belief that his most patriotic idea in economics is wrapped up in the old slogan, "patronize home industry," must now be trained in the idea that along many lines it is necessary for him to patronize foreign industry.

This education of the American public through the press is fundamentally important to the solution of all the problems connected with American foreign trading, because of the fact that our national institutions practically make such education necessary as a prelude to the introduction of any legislation beneficial to our foreign traders. It is therefore highly important that every American citizen vitally interested in foreign trade sees to it that the lessons of this great convention, as was so aptly stated by Alba B. Johnson, "be sold to the people of his community."

We are here placing this matter of education first because we regard it as the foundation upon which must be laid any solution of the problems of communication and transportation.

Communication

From all of the delegates to the convention representing the Pacific Coast states and foreign countries bordering the Pacific, there was a practically unanimous demand for better communication service, both as to wireless, wire and mail.

Many of the delegates from Asiatic countries cited instances of mail communication by slow steamer arriving ahead of telegraph by cable. A particular example was given in which a message transmitted by a Pacific cable to Saigon, Indo-China, took between four and five weeks in transit, the same message transmitted from New York via Atlantic and French cables arriving in Saigon in two and one-half hours.

Prompt and adequate facilities for the communication of thought are absolutely indispensable to the life of foreign trading operations and no American foreign trader can expect to successfully do business against a foreign competitor unless he has equal facilities for prompt communication of information and of business. Many hopeful signs were indicated showing that the United States government is well alive to the situation on the Pacific and that there will probably be a very great deal of relief afforded through the co-operation between Chinese, French, British and American wireless stations, but in addition to this there should be as speedily as possible adequate facilities provided for cable communication and for fast express mail steamers.

Perhaps the mail problem will be solved largely in the coming development of commercial aviation.

Transportation

If we assume that we have educated the people of the United States to a proper appreciation of the benefits of foreign trade and that we have completely solved all of the problems of communication so that we are on an equality with all of our rivals in that important particular, there yet remains the problem of the transportation of passengers and of merchandise. At sea this problem is not now, as formerly, so much a matter of obtaining ships as it is a matter of placing ships on a good competitive basis with those of our rivals. To that end the seventh National Foreign Trade Convention, in the report of its general committee, under the chairmanship of James A. Farrell, declares itself to be unequivocally pledged to the idea of a privately-owned, privately-operated merchant marine. The report states:

"Our merchant marine should revert as soon as practicable entirely to private ownership and operation as contemplated by the act creating the Shipping Board. We urge that legislation be passed promptly providing for the sale of government owned tonnage on terms uniform to all buyers, having regard to the current cost of building vessels of similar type and tonnage in American ship yards. Unsold ships should be chartered at current market rates for world tonnage without restriction as to trade routes.

"Owing to the insufficient number of passenger vessels in the trans-Pacific and South American trade, measures should be taken to relieve the situation by promptly utilizing available passenger vessels in their trades.

"The investigation of the American navigation system which the Shipping Board was directed by its organic act to effect should be completed with the least possible delay and such revision and improvement made as will enable the operation of the American merchant marine on a fair competitive basis."

We have the facilities for building the ships and we are now in a position to successfully compete with foreign shipbuilders on ships for foreign orders.

The great dilemma in the transportation problem as it affects overseas' trade lies in the connection between overseas' commerce and our railroad and inland waterway transportation systems. This is true not only of the United States but of pratcically every nation in the world at the present time. The railroad systems of Europe and to a large extent the railroad system of the United States, found themselves at the close of the war in a very disorganized state with reference to the ordinary transportation of commerce and the great congestion at all of the principal seaports of Europe and America is due partly to this and partly to industrial causes.

The foreign trade of the United States, as shown in the consideration of its purely economic aspects, must look to the expansion of its trade with Asiatic and South American countries in order to offset the effect of being a creditor nation, and therefore American capital must address itself to the task of building up the transportation facilities of the continents of Asia and South America. In several of the addresses, notably in that of Mr. Paul Whitham, the possibilities of financial returns from railroad development in the continent of Asia were shown to be very great. Mr. Whitham drew attention to the fact that the great development of railroads in the United States was through wild wastes of country which, at the time of the laying of the rails, were absolutely undeveloped and that therefore large government assistance was necessary in the financing of these railroad enterprises and large grief has to be endured by the promoters before the roads were on a paying basis. The great majority of the railroads needed on the continent of Asia traverse highly developed areas with teeming populations, where from the very start a highly profitable freight and passenger business might be confidently anticipated. Just as British capital in developing the railroad systems of India, Canada and South Africa has brought to itself a very profitable field of investment and to the country of its origin a wonderful wealth in foreign trade, so the surplus capital of the United States of America thrown into the development of interior transportational facilities in China and Southern Siberia will immediately bring good interest returns on the investment and will clinch the already strong hold that the name of America has upon the minds of the Chinese people.

The problem in South America is more like that which faced the pioneer railroad builders of the United States except that a very much larger volume of through and local freight may be expected immediately than was the case on our trans-continental lines.

R. M. Calkins, in his address on "The Development of Import and Export Transportation," combines the thought of communication and transportation thus: "American merchants must be encouraged to establish warehouse and distribution facilities at important foreign centers and organizations of the companies and individuals operating the various steamship lines should be established in all of the principal foreign ports where information with reference to American shipping can be readily obtained; in other words, we must advertise to the world how the American exporters and importers can be found and what their facilities are for efficient handling of all business offered. To this end three kinds of transportation are necessary: the transportation of thought by wire or wireless; the transportation of communications and statements by letter; and the transportation of passengers and cargoes by railroad and steamship lines; and the best results can only be obtained by the unification of all three into a prompt, regular and dependable service."

Robert Dollar, that grand old veteran of Pacific shipping, states: "An adequate cable service is of vital importance to trade with the Orient, government must supply that service; one billion people live on the opposite shores of the Pacific Ocean; they are our future market."

Included in the consideration of transportation and communication should be the improvement and expansion of our consular and diplomatic service, and the establishment of a firm and consistent policy by the Federal government for backing up legitimate enterprises in every corner of the globe. In order that this may be done with any reasonable chance for success the consular system must be entirely divorced from politics and placed upon an absolutely civil service basis, was the contention of Honorable Philip B. Kennedy of the United States Bureau of Foreign and Domestic Commerce. This point was also emphasized by Dr. Henry Suzallo, president of the University of Washington, in his great speech on the subject, "American Organization for Foreign Trade."

That American chambers of commerce abroad could play a very important part in the extension of American foreign trade, was proved very conclusively in several addresses, notable among which was that of Charles W. Whittemore, ex-president of the American Chamber of Commerce at Buenos Aires, in which he related the work of the arbitration committee of that chamber in adjusting the differences between seller and purchaser on matters of dispute.

An artist's drawing showing the Union Iron Works in 1884 with the Arago, first steel steamer built on the Pacific Coast, on the building slip and the Pacific Mail liner City of Pekin on the hydraulic lift dock

The Union Plant of the Bethlehem Shipbuilding Corporation

AWAY back in the good old "days of 'forty-nine" James and Peter Donahue started a blacksmith shop on First and Mission streets, San Francisco. Noting the demand for iron castings these mechanics after a few years added improvements in the way of cupolas, molding equipment and a rather extensive machine shop plant and became known as the Donahue Foundries.

In these early days the chief demand was for railroad and mining machinery and as Peter Donahue was one of the principal promoters and owners of the California Northwestern and the San Francisco & San Jose railroads this plant built all of the first locomotives used in those pioneer railroad ventures.

Comstock Lode Equipment

The Donahue Foundries were merged into Prescott, Scott & Company and in the late sixties and early seventies of the last century they, together with the Risdon Iron Works, designed and installed the great bulk of the pumps, hoists and other mining machinery for the famous mines of the Comstock lode and for numerous other mines in California and adjacent states and in Mexico and South America. In 1881 Prescott, Scott & Company decided to equip their plant for shipbuilding purposes with the thought in mind of entering upon naval construction for the United States Navy, which had then under contemplation an extensive program for modern naval craft. The plant was moved to the site it at present occupies in the Potrero district and was re-incorporated under the name Union Iron Works with the following official staff: G. W. Prescott, president; Irving M. Scott, general manager; Henry T. Scott, vice-president and treasurer; G. W. Dickie, manager; J. O. B. Gunn, secretary. On November 6, 1884, the keel was laid for a steel ship to be named the Arago. This vessel was of 950 tons gross register and measured 200 feet between perpendiculars, and was the first steel ship built on the Pacific Coast.

She was followed by a number of smaller craft and then came the keel-laying for the cruiser Charleston in 1887, the cruiser San Francisco in 1888, the coast defense vessel Monterey in 1890, the cruiser Olympia and the battleship Oregon, both of whose keels were laid in 1891. All of these vessels gave a good account of themselves in the Spanish-American War, the Olympia having the honor of being Dewey's flagship at the battle of Manila Bay, and the Oregon, after a wonderful dash of 14,000 miles from Puget Sound around the Horn to the West Indies, arriving in time to take an active part in the battle of Santiago Harbor, where she proved more than a match in speed for cruisers credited with a 22-knot mark, although no one ever claimed more than 15 knots for the "Bulldog of the Navy."

Other Naval Vessels

The other United States naval vessels built by the Union Iron Works were the gunboats Marietta and Wheeling, battleships Wisconsin and Ohio, the monitor Wyoming, cruisers California, South Dakota, Milwaukee and Tacoma, torpedo boats Farragut, Paul Jones, Perry and Prebble and submarines Grampus and Pike. In 1899 a cruiser, the

View from the office building of the Potrero works of the Union Plant of the Bethlehem Shipbiulding Corporation showing the plate and angle storage yard, building slips, plate shop and fabricating park

During the last four years the Union Plant of the Bethlehem Shipbuilding Corporation has built and delivered 597,650 deadweight tons of merchant shipping and 40,794 displacement tons of naval vessels, practically all of the latter being in the torpedo-boat destroyer and submarine class, so that launchings have taken place at very frequent regular intervals. On this page four launchings are shown. At the left that of the steamship Pomona, which took the water February 18, 1920, at the Potrero works. On the right the Portola Plumas making her initial dive from the Alameda works. Below at the left is shown the destroyer Kidder and at the right the United States submarine S-34. The launchings of submarines and torpedo boats at the Potrero works have become so frequent that they scarcely cause a ripple of excitement in the life of the plant.

Chitose, was built for the Japanese government and saw active service in the Russo-Japanese War.

In addition to this naval program a large number of coastwise passenger steamers, ocean-going freighters, towboats, ferry boats and other craft were built; and up to the year 1904, when the Bethlehem interests took control of the plant, there had been contracted for and delivered or partially completed more than eighty-six vessels.

The equipment for building and repairing ships at this yard always has kept abreast of the best practice and in many respects in the earlier days of the plant its equipment was ahead of anything in this country and in some respects equal to anything in the world.

Very early in the history of the plant there was installed a hydraulic-lift dock capable of handling a deadweight of 5000 tons. At the time this dock was built there was only one like it in the world. It worked with perfect success until 1906, when it was destroyed by the great earthquake. Vessels raised on this dock were on a level with the floor of the piers alongside, which greatly facilitated all work undertaken on the bottom of the ship.

When in 1904 the Bethlehem Shipbuilding Corporation acquired the plant of the Union Iron Works a number of freighters and naval vessels then on the building slips were finished and during the years from 1904 to 1910 a large number of other freight and passenger vessels were constructed and delivered.

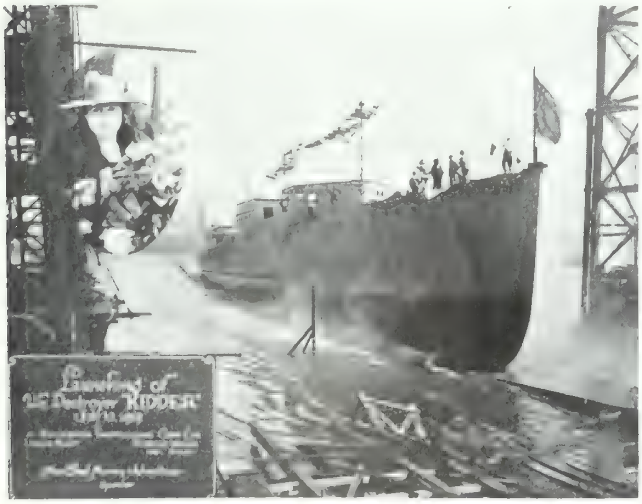
Tonnage Built

Period	Merchant Deadweight	Naval Displacement
1884 to 1900	26,947	46,020
1901 to 1910	73,268	56,902
1911 to 1915	58,793	3,213
1916 to 1920	597,650	40,794
	756,658	146,929
		756,658
	Total	903,587

Alameda Plant Purchased

When in 1915 the beginning of the war created a great demand for shipping the Bethlehem Shipbuilding Corporation made its first move toward the expansion of the Union plant by the purchase of the United Engineering Company's site in Alameda. Here was constructed a modern shipyard especially adapted for the building of steel freighters and equipped with one of the finest machine shops in the United States. The original site comprising only ten acres of ground was enlarged until the Alameda works of the Union plant now contains about seventy-five acres.

At the Potrero plant building slips were remodeled, new wharves built, new machines installed and shops and all machinery altered and many new buildings erected. In 1916 a new floating drydock capable of lifting 12,000 deadweight ton ships was designed and built by the corporation. This is said to be the largest one-piece wooden floating dock in existence. It measures 426 feet long over the



Panorama of the outfitting wharves and floating drydocks at the Potrero works of the Union Plant of the Bethlehem Shipbuilding Corporation

Few plants in the United States are on an equality with the Union Plant of the Bethlehem Shipbuilding Corporation in docking equipment. At Hunters Point they have two graving docks, one of which is shown at the left with the United States Army transport Mt. Vernon, largest passenger vessel on the Pacific Ocean, docked with room for another good sized steamer. At the right is shown the largest wooden one-piece floating dock in the world, with the steamer Imlay up. At the Potrero works there are three floating docks of capacity up to 12,000 tons. And at the Alameda works there are two large marine railways and one floating dock.

apron and is 93 feet 3 inches wide inside the wings. A new graving dock was excavated at the Hunters Point site and was made large enough to handle the longest ships afloat. This dock has been frequently illustrated in the columns of Pacific Marine Review and is shown in one of the illustrations accompanying this article. In 1917, when the plant started work on sixty-six destroyers, it took over and has since operated for the government the plant of the old Risdon Iron Works alongside the Potrero site and there built a complete yard especially adapted for destroyers and shops equipped for the efficient construction of watertube boilers.

The location of this tremendous shipbuilding plant in San Francisco is a wonderful asset to the industrial and economical life of the city. In the palmy days of the old Union Iron Works for a number of years 5500 to 6000 men were kept steadily employed. During the peak of the emergency war construction program the Union Plant of the Bethlehem Shipbuilding Corporation employed as high as 30,000 men. There are now on the pay roll of the Union Plant approximately 12,000 men, which means that the pay roll of this plant is supporting a population directly of 50,000 people and indirectly, if we include all of the work being done in outside shops and by the subcontractors, the population dependent for a living on the construction program at the Union Plant would be well in excess of 100,000.

Fast freighters and passenger liners built at the Union Plant are carrying the goods and the men of American commerce safely over the ocean lanes, under the protection of naval craft built in the same yards. These ships carry the fame of San Francisco's harbor and its great shipbuilding emporium to the four corners of the earth while the yard of their birth remains at home the very backbone of San Francisco's industrial prosperity.

Just as in former years the Union Iron Works stood alone a pioneer steel shipbuilding enterprise on the Pacific Coast of America, so today the Union Plant of the Bethlehem Shipbuilding Corporation stands as the premier steel shipbuilding plant on the shores of the Pacific Ocean.

Exterior view of machine shop at the Alameda works of the Union Plant of the Bethlehem Shipbuilding Corporation. The finest machine shop building on the west coast of America

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G. N. SOMERVILLE.	Associate Editor
J. G. BRAY	Pacific Coast Adv. Mgr.

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THE FUEL SITUATION

SHORTAGE of oil fuel at practically all marine supply stations in the United States and in American controlled points abroad has led to a very great deal of discussion in the press and many suggestions have been brought forward for the conservation of the fuel supply and for finding new sources of production.

A. C. Bedford, chairman of the Standard Oil Company of New Jersey, in an address before the Seventh National Foreign Trade Convention at San Francisco, took rather an optimistic view of the situation and maintained that there would be many new fields discovered in America for the production of crude oil to meet this crisis, just as all crises of a similar nature had been met by the opening up of new fields in the past.

Geologists in the employ of the United States government indicate that oil-bearing shales of certain regions of the United States represent an almost inexhaustible supply. Congress, alarmed at the situation, is hastily devising laws reserving for American control all sources of fuel oil in the United States and its colonial possessions, following much the same line of action as the farmer who incontinently locks his barn after the horse has been stolen. Certain marine engineers have suggested legislation making compulsory in all oil-burning plants the use of Diesel engines instead of boilers and steam engines.

All of this agitation is helpful, for there can be no doubt that the American people have been extremely wasteful in their use of fuel oil. For example, large quantities of crude petroleum are daily consumed in lubricating oils and greases which might in a great many instances be conserved for future use by the installation of proper filtering systems in industrial plants and in garages. Undoubtedly immense quantities of gasoline could be saved by a more scientific method of carburetion in automobile and truck engines. In many other ways that will suggest themselves to users of crude oil products, savings can be effected which in the aggregate would tend to greatly conserve the total supply of petroleum.

In the development of the Diesel cycle for internal combustion engines, considerable attention was directed toward the burning in these engines of coal tar oils and other heavy fuels, and before the war in Germany progress was made in this direction, particularly in the two-cycle type of Diesel engine developed by Professor Junkers.

Crude oil, like any other commercial product, will naturally gravitate toward that demand which offers the highest price and undoubtedly in the petroleum industry that demand is furnished by the refineries. If in the refining processes and the economic situation there should come a point where it is no longer commercially profitable for a refinery to furnish fuel oil, then the industries and the merchant marine will have to look elsewhere for a source of energy. This may be taken to be fundamentally true, no matter what nationals control the world's sources of supply for crude petroleum or any other product.

Before the war Great Britain built up her marine supremacy very largely on cheap steam coal. Her steam coal is no longer a factor in her export trade because it has lost its cheapness and cannot in any wise compete with American coal at present prices on the Atlantic seaboard. Should fuel oil continue to advance in price, it is well within the realm of possibility that the merchant marine will turn to coal both for bunkers and for bulk cargo and some mechanical stoking arrangements be devised and refinements of boiler and furnace construction installed so as to allow the coal-burning steamer to have an over-all earning power, considering the possibility of coal as a bulk cargo that will enable her to compete with the motorship.

With the fuel oil situation as it at present develops, an oil-burning steamer would seem to be an engineering anachronism. Scarcity of fuel oil points the way either backward to coal or forward to the Diesel engine or some higher development of internal combustion motor for heavy petroleums.

AMERICAN CORPORATIONS ABROAD

RECENT developments in China have drawn the attention of American foreign traders to a weakness in the commercial law of the United States as it affects the standing of American corporations maintaining branches in treaty ports in China. On account of the extraterritoriality of treaty ports in China, American corporations doing business there come under American law and pay excess profit taxes and other corporation taxes on their Chinese branch returns the same way as they do on their American business. The corporations of British companies and of other European nationals are allowed by their governments to exempt this China branch business from tax returns in the mother country, thereby giving them a decided advantage over American corporations.

Until recently the majority of American corporations doing business in China treaty ports incorporated that branch of their business under the British Hongkong ordinances. A new ruling by the British government in this matter demands that all companies incorporated under these ordinances shall have British management and more than 50 per cent British ownership, so that American companies are now thrown back against an unequal competition.

In order to remedy this condition a bill, known as H. R. 7204, has been introduced into Congress which will enable the separate incorporation under certain of these Chinese trading companies and their exemption from all federal taxation. The passage of this bill not only will put these companies on an even basis with their foreign competitors as regards taxation, but will also place them where they belong as American companies under American protection and with American backing.

The Pacific American Steamship Association on May 20 endorsed the principle underlying this measure in the following words:

> RESOLVED, That the principle underlying H. R. 7204, and particularly Section 68, is hereby unanimously endorsed by the Pacific American Steamship Association, which strongly recommends that some such measure be enacted into law, thereby placing American corporations affected on the same basis regarding taxation as their foreign competitors.

"WHY DOES THE BIG SHIP LAST A HUNDRED YEARS?"

"WHY Does the Big Ship Last a Hundred Years?" This was the heading of an advertisement recently published in periodicals of national circulation by a Middle Western manufacturing Company. Equally as conspicuous as the caption was a drawing of a large ocean-going steamship, from the taffrail of which floated the American flag.

The corporation whose advertisement this was is well known in its field; it makes a standard product; presumably, its advertising is in charge of a competent agency; the copy of this advertisement must have passed the scrutiny of many men before it finally was approved and published. In this, there is cause for grave concern. Doubtless, many shipowners and shipbuilders of the United States would be most pleased to learn just why the big ship does last a hundred years; rather, they would pay millions to be taught how to make the ship endure for a century—a steel, ocean-going vessel such as was depicted in the drawing in question. But, irony aside, in all this there is cause for grave concern.

What prospects are there of the United States giving adequate support and proper laws to the American merchant marine when the people of the inland country (or even a considerable number of them) believe that in reality the ocean vessel does continue in service for a century? What prospects are there of shipowners being permitted to write off values for replacements, values sufficiently large to allow for depreciation and the great difference between war and post-war values?

These questions merely point to one phase of the problem. There are scores of angles no less important. The plain truth of the matter is that the people of the United States are not ship-minded; and the immediate necessity of education to make them ship-minded is vital.

There has been much discussion of educating the people in regard to the merchant marine: almost uniformly, however, plans for such a program have been based on a wider and more accurate knowledge of things maritime than the people actually possess. The great majority of the present population of the United States have practically no mental connection with maritime affairs. A large proportion have never even seen the ocean, and it will be necessary to impress upon the minds of the vast majority a great deal of ocean wisdom before we can expect any appreciation of the most elementary problems of the merchant marine.

What is needed, far more than propaganda directed toward the accomplishment of any specific policy, is education in the fundamentals of things maritime. Before our shipbuilders and shipowners can succeed in interesting the public in the formation of a merchant marine policy they first must begin with the elementary facts: the history of the American merchant marine; by what means it grew and why it declined; what ships are; their types and classes, sailers, steamers, motorships; for what uses each type is suited; why one vessel uses fuel oil and another coal; what is a liner and what a tramp; where are the great trade routes—a variety of subjects well-nigh boundless.

Primarily, the places for such education are the schools. Let us have properly-planned, properly-taught courses, which shall enable the youngsters to visualize the rubber forests of Sumatra, the cane fields of Hawaii, the cocoanut groves of Fiji, the rice paddies of China; and, more, to appreciate the problems of the deep-sea vessels which distribute these products among the nations of the earth.

THE MERCHANT MARINE BILL

By Americus

THEY'RE OFF! In the vernacular of the race track, this, of course, would refer to horses, but in this particular instance it refers to United States senators, who have begun the consideration of the long-talked-of and hoped-for Jones bill to keep the American merchant marine on the seas. Modified and changed from day to day, it finally reached the stage where it was ready for launching on the troublous legislative seas, and it must be said that it got a mighty good start, when so august and deliberative a body as the upper house practically disposed of more than half its contents in one legislative day.

Skeleton of the Greene Bill

As many interested persons are not familiar with legislative proceedings, it might be well to point out that this so-called Jones bill is really the skeleton of H. R. 10378, the so-called Greene bill decorated with a lot of Senate amendments. When it passes the Senate, it will be in the status of a bill that has passed both houses, but differing in many particulars. To prepare it for final enactment of Congress, it will have to go to a conference committee, composed probably of six members, three from the Senate Committee on Commerce and three from the House Committee on Merchant Marine and Fisheries. If it follows precedent, as such matters usually do, these conferees will be Senators Jones, Nelson and Fletcher, and Representatives Greene, Edmonds and Hardy. Possibly, owing to the great importance of this bill, there may be five members from each body. It is in this conference that the final form of the bill virtually will be decided. The House members will assume an attitude of "How dare you monkey with our bill?" and the Senate members, figuratively speaking, will say, "Your bill was entirely incomplete and we had to fix it up to meet the requirements of the merchant marine." Then will follow long discussions, ending in disposing of the easy problems first, after which will follow the more serious points of difference, for of such there are bound to be several. Probably one or two points of difference will be so serious that resort will have to be taken to separate votes in the House and Senate to relieve the conferees from the entire responsibility of making decisions. While a casual reading of the bill might indicate that the Senate version of the Greene bill consists of about 90 per cent of amendments, it will be found on scrutiny to embody a number of measures, such as the carrying of passengers on cargo vessels, the provision regarding classification bythe American Bureau of Shipping, the Rowe bill in amended form, and the Campbell ship-mortgage measure, which have already received the approval of the House. It is anticipated that aside from the vital question of the disposition of the ships, the principal bones of contention will be the appropriating of $50,000,000 annually for a period of five years for new construction by the Shipping Board, the excess profits tax exemption and the clause relating to discriminatory duties.

Politics Not Considered

It will be noted in the new bill that the qualifications for the seven members of the newly-formed Shipping Board take no note of the political affiliations of the proposed members. In all boards heretofore formed by the government it has been usual to specify that not more than a bare majority shall be accredited to any one of the great political parties. If the bill is enacted as it now stands, there is nothing to prevent the President from naming seven Democrats to comprise the new board. Possibly the framers of the bill had in mind that, as the terms of five of the members will terminate within the four years of the next administration, it will make but little difference whether the Republicans or Democrats are appointed originally. Theoretically, at least, if men are qualified for positions on the board, their political leanings should be disregarded, but in all governmental activities, politics are bound to play an important part, so this shortcoming of the bill is received with apprehension in some quarters.

As a whole, the bill is accepted generally as very satisfactory. Certain prospective purchasers of Shipping Board vessels do not like it, as they assert that it was framed entirely in the interest of the shipbuilders. It must be admitted the provision that "no sale shall be made at a less price than the cost at the time of making such sale, of constructing vessels of similar types in private yards in the United States, after deducing the depreciation charge generally allowed in shipping operations," will not be conducive to hastening the sale of the ships to private shipowners. It is quite probable that this provision may be modified by the conferees. Even though the shipbuilders should receive some favors from the bill, is it not high time that they should? For years they have struggled along against great odds; such legislation as has been passed by Congress invariably has been against their interests. It is true that little or nothing has been done heretofore to benefit the shipowners and operators, but anything that will tend to reduce the initial cost of ships (which encouraging the shipbuilders will undoubtedly help to accomplish) later on will be reflected in reduced operating costs to owners.

Of Benefit to Builders

The attitude of the shipbuilders' association in carrying on a vigorous publicity campaign to encourage the passage of remedial shipping legislation at this time is one entirely to be commended. The theory is that if Congress by legislation will make the operation of ships under the American flag attractive to American investors, the ready sale of existing ships and the building of additional ships naturally will follow. The Jones bill, if passed substantially as now written, will accomplish this very object, so that every true friend of our merchant marine should use every effort possible to have it enacted as soon as possible. Every phase of shipping activity is given encouragement under the terms of the bill. The bill fairly exudes Americanism, and our national legislators deserve the unstinted praise of all patriotic Americans for accomplishing as much as they have.

Means Motorships

The authority to expend $50,000,000 annually in the construction by the Shipping Board of new vessels, or in financing their construction by private owners, means, if it means anything, a determination on the part of Congress to have a number of efficient motorships built in order to "balance the fleet"; in reality to make up a shortage of these most economical ships which the short-sighted policy of the Shipping Board has failed to provide in its wholesale ship production program heretofore. It is known that the most prominent members of both the House and Senate committees are strongly in favor of motorships, and repeatedly have urged their construction to the Shipping Board, although individual members of the board, notably Commissioner Donald, have recognized the desirability of such construction, and urged it at meetings of the board, nothing has as yet been accomplished, other than ordering a number of small Diesel engines without constructing any hulls in which to install them. Now that Admiral Benson has come out flatfootedly in favor of motorships, and Congress undoubtedly will give the necessary legislative authority for the expenditure of funds, there most probably will be great things doing in motorship construction at an early date. In the meantime, European countries have made great strides in the building of Diesel engined ships, but it is not too late for us to make a vigorous attempt to catch up with the procession. There are a number of leading shipping firms around New York looking into the matter very closely, so it would not surprise me to see numerous private contracts given out coincidentally with the government's construction.

AMERICAN BOYS FOR AMERICAN SHIPS

By Captain Irving L. Evans*

Director, Recruiting Service, United States Shipping Board

ONCE during my apprenticeship days many years ago, while on a square rigger, the fine American three-skysail-yarder F. F. Oakes, we were bound from China to New York, and had not seen a vessel of any nationality for nearly thirty days. One blustery morning in the first watch, just as I was about to be relieved from my trick at the wheel, the lookout reported a sail about two points off the weather bow. Soon the news spread throughout the ship and there was much speculation as to the nationality of our new-found friend. When the two ships had come quite close together, every man was on deck watching the other ship with as much interest as anyone of you would watch a theatrical performance. When we were nearly abreast, the flag of each ship was hoisted in a roll to the monkey gaff, the halyards were pulled, and the Stars and Stripes broke out to the wind.

This Spirit Is Needed

Not a word was spoken, but simultaneously, just as though an order had been given, every man there, from the captain down to the apprentice boy, took off his hat to the American flag.

These were Americans at sea. It is this spirit which must again prevail on American ships.

When this country entered the war, one of the greatest problems of the world was to produce ships. American tonnage then available was almost negligible in comparison with our needs, but before hostilities had ended, American yards outstripped the world in building capacity.

The need of officers and men for these ships called into being a service for recruiting and training which is just now coming to its full results. With a view to meeting the urgent requirements for officers and men, the Shipping Board established this recruiting service in June, 1917, consisting of navigation and engineering schools, for the training of officers; the sea training bureau, for training men below the grade of officers; and the sea service bureau, for placing on ships officers and men trained by this service, as well as those from other sources.

There are at present twenty-eight navigation and engineering schools, located on the Atlantic, Gulf and Pacific Coasts and the Great Lakes. The average attendance in these schools is more than 700 men, and they have turned out 12,190 graduates, of whom 4920 deck officers and 3171 engineers have been licensed. The sea training bureau maintains and operates from its stations at Camp Stuart, Virginia, San Francisco, California, and Seattle, Washington, six training ships with an aggregate capacity of 1500 men. To date, nearly 30,000 men have been trained. In addition to the apprentices, five of these ships are fitted to carry about 1200 tons of cargo each.

Two or Three Weeks Ashore

The recruits spend two or three weeks at the shore stations before they are sent to sea on the training ships. During this period they are given instruction in seamanship, boat drill and other preliminary work. After this, they are sent out on the training vessels for a trip to the West Indies on the Atlantic, and Honolulu on the Pacific. These voyages give each recruit from four to five weeks' additional training, under conditions as near as possible to what he will find when he goes into the regular commercial service. These combination training ships and cargo carriers have the advantage of paying a part of the operating expense, and at the same time the boys are made to feel that they are doing something worth while.

The sea service bureau, with agencies at all the principal American ports, is now placing on ships an average of nearly 14,000 men a month. This, of course, includes men trained by the service as well as experienced men available from other sources.

The action of the Shipping Board in establishing the recruiting service has been justified, if by no other act than the raising of the number of Americans on our ships. To give you a clear example of what has been done, and is now being done, I will give you some figures from the records of our New York office. In 1917, only 10 per cent of the men below the grade of officers placed on ships by this service were Americans; while during the last six months the average has been 55.7 per cent Americans. Of all the men placed on ships by the recruiting service during the last six months, 6 per cent have been Americans; and we must continue our efforts to increase the percentage, in order that there may be no question about the loyalty to our flag of the officers and men in our merchant service. The recruits to be trained are being drawn from every section of the country; and special efforts are being made to obtain men from the interior, with a view to interesting in our water-borne commerce the people from that section as well as those in the sea-coast states.

What the Opportunities Are

We are finding very little difficulty in securing the number of men needed for training, where the opportunities offered are brought to their attention. A few of these opportunities may be referred to briefly:

First: There is no other trade, occupation or profession that offers so many opportunities for rapid advancement to positions of responsibility and good pay. When we consider the wages now being paid on our merchant vessels, together with room and meals furnished by the ship, the income is above the average which young men may obtain in almost any other profession, within the same length of time.

Second: There is an average of one officer for every five men on each ship.

Third: The man with a high school education or better may become a third officer after one year at sea; the man who is less fortunate in educational advantages may become a third officer after two years at sea.

Fourth: It is possible under present conditions for a man to be in command at the end of five years after he first steps upon the deck of a ship. I do not wish to be understood, however, as stating that this is the average opportunity. The man's progress depends upon his own initiative, ability and aptitude for the work.

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* Address at the annual dinner, National Marine League, New York.

Men Needed for Managers

Fifth: Opportunities in the merchant service do not end when a man becomes a master or chief engineer, but there is a much broader field of activity in the management and operation of vessels, and in that field experienced men are needed today as much as they are on the ships. Nothing gives a man a better foundation for service in the office of a large steamship company than the experience and knowledge obtained at sea.

Sixth: Thousands of commercial representatives are needed by shipping companies for foreign service. These should be Americans, and you may be assured that Americans will receive preference wherever and whenever they are found to be qualified.

Seventh: Last, but not least, opportunities are offered to see every part of the world while receiving high pay.

Although the acute demand for officers and men has been relieved to a great extent, there is still much to be done with a view to raising the standard of the men we now have and will have in the future. There are many ways in which this may be accomplished, and we may not all agree as to the methods to be used, but all interests, including the government, the private operators, the state nautical schoolships, licensed officers' associations and others, should get together and strive for the same end. This should be done at once.

Sailers Needed for Training

No progress will be made without some concerted effort, and no matter what methods are followed, the quickest possible way to obtain the desired results will be through stimulating in the officers and men a livelier interest in their work and a desire to qualify themselves for advancement. In order that the new recruits coming into the service may get a better foundation for the work they are entering upon, with a view to becoming deck officers, sailing vessels should be operated in conjunction with the present steam training ships. In this way there could be selected each trip from the steam vessels a certain number of the most apt and promising young men for officer material, and these sent for a trip on one of the sailing vessels. This would offer an incentive to the recruits to work for promotion to the sailing ships and opportunity to become officers.

U. S. Shipping Board Cadets Listening to Advice by Senator Phelan

Quartermasters should, in my opinion, be carried on all American vessels of more than 5000 tons. Men who have completed their preliminary training as already outlined could complete in that capacity the service required for a license, and other promising young Americans could be promoted from the forecastle. This will give every American something to work for in the way of promotion, even before he obtained his license.

It is believed that we can help raise the standard of the engineers by establishing a school at or near New York in which we will have a model of a modern reciprocating engine, showing a cross-section, together with all auxiliaries used on a modern steam vessel. In this school we should also have lecture rooms, in which blue prints and other descriptions of the various types of engines, boilers and auxiliaries should be displayed. Lectures would be given by thoroughly qualified men, covering every phase of the problems and difficulties experienced today by the marine engineer. These lectures should be so graduated and arranged as to be a benefit to the men beginning the elementary work and extending into the subject to such an extent that the most experienced and best qualified chief engineers would obtain from them valuable information and knowledge.

In addition to the foregoing, we now have under consideration a plan under which pamphlets will be printed and distributed among the men aboard ship. These pamphlets will cover subjects of interest and importance to all officers and will contain information and problems which should prove of some value to the individual, as well as to the service as a whole.

Must Resume Diesel Instruction

We are now training men experienced in reciprocating engines in the operation and repair of marine turbines, including the electric drive. We have trained a few on Diesel engines, but stopped on account of the lack of demand for men so trained. However, it is my opinion that we will have to resume this training again, because the internal combustion engine is undoubtedly destined to play an important part in the future success of our merchant marine.

The experience gained through giving this "post graduate" work on turbines has demonstrated conclusively that great enthusiasm and a desire for broader knowledge can be very easily stimulated in the engineers.

We now have an American mercantile marine. I am confident that it will succeed because it is going to be manned by Americans and backed by the citizens of this country. The time has come when the American people must realize that if the wonderful growth and prosperity of this country is to continue and endure, American ships, manned by Americans, must carry our commerce to the ports of every nation whose shores are washed by the salt seas.

On the Yards of the Moshulu

On the Bark Moshulu

By Captain F. O. Parker
Master, Bark Moshulu

I SHOULD like to write a few of my experiences as a master for the past twenty years, both in steam and sailing vessels. I happen to be one of the few Americans that took to the sea for a living, and I have made trip after trip off shore, when it was a rare event to have an American among my crew—officer or seaman.

One instance: I was master of the Marie, bound to Japan. Three days out the mate told me we had an American sailor on board. This being such an unusual occurrence I kept an eye on him, and he was certainly a fine specimen of the young American, bright, active and first everywhere in handling sails. He seemed to be lost among the foreigners, of whom the crew was comprised. One day I spied him with a sextant taking the sun. I called him below and questioned him as to where he had learned navigation and become so smart a seaman. He said that McMillan of the hydrographic office, San Francisco, had taught him navigation; also that he could never get a job on an American vessel. He had tried one and the foreign crew had made it so disagreeable that he was obliged to leave and ship on a British ship to serve his time and learn seamanship. I made him second mate at Manila, and I hope that by now he is a commander of an American vessel.

Not Like the Foreigners

Not until the shipowners understand that an American seaman with a high school education is a man that you can reason with, and is not coming on board of his own country's ship, under that country's flag, to kick and growl about the food and overtime, and to destroy all the property he can, as the foreigners have been doing for the past twenty-five years, and realize that American ships should be manned by American men—not until then will our merchant marine be fully successful. Put me in a foreign vessel under a foreign flag. Do you think that I would take the same interest in the ship as I would in an American vessel? By no means.

On my last trip to Manila I had thirty boys, mostly Californians, and inside of two months I would back them against any foreigners for seamanship, steering or handling sails. In bad weather I would always depend upon them to get in the canvas, thus saving a sailmaker's bill. I have heard foreign crews say, "To hell with the sails; let them blow. More days, more dollars."

I have heard often that San Francisco boys were no good as mariners, but let me repeat this as a fair example of just how good I have found the majority of them to be: A boy born in San Francisco, south of Market street, 18 years old, shipped on board the Moshulu as deck boy in 1919. In two weeks he was aloft overhauling bunt lines and taking a great interest in his work. In two months he became so efficient that I raised him to the grade of ordinary seaman at $55 a month, and upon leaving Manila he was made an able seaman paying $90 a month.

Seaman After One Year

One year for an American to become a seaman! I have read in some nautical magazine that it takes three years for this. Although this may be true in some cases, it is not of the average, bright American boy, educated with the Stars and Stripes flying over his head from 9 a. m. to 3 p. m. All glory to our school teachers, for they are instilling patriotism in the hearts of their scholars, and doing more good to fight the Bolsheviki and I. W. W. than all the armies of Europe. Of course, you cannot abuse the American boy. Treat him kindly, reason with him, give him plenty to eat and you hace a willing and ambitious seaman; one whom you can depend on to be there when you want him.

The American Navy is beginning to realize these facts also. Thirty years ago most of the seamen in the navy were foreigners, but look at the last war: 90 per cent of the personnel of the navy was American. Could you beat them? No, because it was the finest navy in the world. I know, as I was sailing between New York and France, master of a freighter during that trying period.

A Grand Old Lady of the Sea

By Ralph E. Cropley

ON January 9, 1920, while she was being reconditioned after service in her second war, some German sympathizer set the famous American liner St. Louis on fire, resulting in a catastrophe which has ended her career as a passenger liner. Like all heroes of the great war, this grand old lady of the seas has for her Valhalla but a newspaper paragraph, which to those who know her seems hardly a fitting end to a worthy career. To read about the demise of the St. Louis makes many of us realize we are getting on in years, though it hardly seems a quarter of a century since she began her career as a queen of the seas. Now after buffeting the winds and waves of the Atlantic for twenty-five years, as well as dodging Spanish shells and German submarines, she has been turned over to the underwriters to be scrapped or to do a few years as a banana boat, as the fire which gutted her warped her plates and decks so that because of her age and the cost of labor at the present time, it would not pay to refit her as a passenger liner.

A Grand Old Lady

Learning of the St. Louis's death knell, I went to pay my last respects to the grand old lady. Down near the end of an old dock, quite removed from the active work of a shipyard, she lay moored midst a snarl of vessels, all of which were old and battered and weatherbeaten and showed the brunts of years. Once, no doubt, white bones had gleamed in their teeth as they proudly made their way to sea intent upon conquest. Vanquished by time, fortune and Huns, they had come to a place like that of their birth, some but shapeless hulks, huddled together amid a jam of riffraff as they awaited their turn within the basin of the drydock. There were hulls with black holes yawning in their sides; stackless liners with broken engines, dilapidated boilers and cracked propeller shafts; tank ships with loosened plates, careening heavily, their holds half full of water; steamers of every sort with cabins torn away, shreds of rigging dangling like devastated cobwebs from their masts, rudderless, paintless, streaked with rust, stained with salt and seaweed. Broken and beaten as badly as any, the St. Louis, though but a ghost of her old self, with her graceful yacht-like lines, somehow still seemed to be a reigning queen. Certainly those born to the purple never can hide their light under a bushel.

And as I gazed at her, once again I was a little shaver, standing on the deck as she poked her nose out of Southampton water and straightened out on her course towards home across the big sea. There had been a heavy blow the night before and the moaning of the sea upon the shores of the Isle of Wight could be heard distinctly through every lull in the storm. At the foot of the lighthouse the surf rolled in until the leaping spray fell in a glittering shower upon the cliffs. Here and there a tall funnel belching forth heavy dark smoke or a tapering mast, grimly pierced its way through the shining mist. The shore dropped lower and lower upon the horizon. The passengers congratulated themselves upon being upon such a gigantic liner as the St. Louis was back in 1895. To me, just tall enough to peer over the top of the promenade deck rail, 'twas the joy of being at sea and at that on an American liner. The exultation of that I have never forgotten, intensified as it has been by the fact that for more than twenty-two years succeeding we could boast of only four trans-Atlantic passenger ships.

The American Liner St. Louis

In all American maritime history there is no more significant page than that which belongs to the St. Louis. With her sister ship, the St. Paul, she was built at Philadelphia by the William Cramp & Sons' Ship & Engine Building Company in compliance with an agreement entered into between the American Line and the United States government. Both vessels were constructed under the supervision of the Navy Department; had a length of 554 feet overall, beam of 63 feet, and depth of 42 feet. They measured 11,629 gross tonnage and their indicated horsepower of 22,000 drove their twin quadruple-expansion engines at twenty knots' speed. Being mail liners, their cargo capacity was limited to about 1700 tons. In their cabins they could accommodate 350 first-class, 220 second-class and 800 steerage. Small, you say—yes, doubtless in these days with eyes gauged to Leviathans and Olympics, but do not forget that even today there are only about thirty vessels larger than the St. Louis and in 1895 only the Lucania and Campania surpassed her.

First Auxiliary Cruiser

'Twas Mrs. Grover Cleveland who broke the christening bottle over the bow of the St. Louis as the vessel glided down the ways. Three years later it fell to the lot of the American navy to be the first to put into practice the principle of using fast mail and merchant steamers as auxiliary cruisers for naval warfare, and the first of the auxiliary fleet ready for service was the St. Louis.

It must not be forgotten that the Spanish war happened in days when Marconi had not as yet discovered wireless telegraphy. Consequently, like a reconnoitering vanguard of light cavalry thrown out in advance of a marching army, it was necessary for the fighting units of the navy to have scouts like the St. Louis to get in touch with the enemy and because of their great speed to be able to get away from him and report his position either by cable or in person to the battle squadron. Wireless has altered things considerably since the Spanish war, yet the principle of naval warfare still remains the same. In view of the heavy armament of six-inch guns the St. Louis carried in her service as the transport Louisville in the past great war, her Spanish war armament of rapid-fire six-pounders mounted behind steel protective shields fore and aft and either side, seems ridiculously inadequate.

Her Guns in Place

Arriving in New York on Saturday, April 23, 1898, full of passengers, by 8:15 on the following Tuesday morning the St. Louis had taken on 4000 tons of coal, her armament was in place; and, commissioned as an auxiliary cruiser of the American navy, she pulled out from her passenger pier and dropped down to the naval anchorage off Staten Island, where she was joined by her companion liner New York, bearing the name of Harvard. Captain Goodrich, U. S. N., assumed command of the St. Louis, with Captain Randle, her peace-time commander, as navigating officer. All the twenty-six peace-time officers went with the ship and with them were 350 deck and engine-room men, likewise recruited from the old crew.

On April 30, just seven days after they had been peaceful passenger liners and four days after they had been made ready as auxiliary cruisers, the St. Louis and Harvard put to sea to discover the whereabouts of the Spanish armada under Admiral Cervera, which had sailed from the Cape Verde Islands, destination unknown. On May 4 the St. Louis spoke her first ship. Overhauling her, and stopping her with a shot across the bows, a crew was sent away in a boat to inspect the craft. Thus did the St. Louis begin to demonstrate her value as a commerce destroyer. And while his scouts worked, Admiral Sampson was spending anxious days with his battle squadron off Cape Haytien, whither he had proceeded to head off the Spanish fleet in case Cervera should try to reach Cuba via the Windward Passage. Without wireless, the uncertainty of an unexpected sally of the enemy or his escaping our fleet and reaching Cuba, as he eventually did, kept the scouts scurrying over the seas like fox-terriers.

On May 12 the St. Louis stopped off Basse Terre, Guadaloupe, for orders; proceeded to St. Thomas, Virgin Islands, and then was dispatched to cut the telpegraphic cables between Porto Rico and the outside world. This took but a part of a day and the St. Louis joined Admiral Sampson's squadron.

It was then already Sampson's belief that the Spaniards were heading for the south coast of Cuba and in case this should be so he sent the St. Louis to cut the cables at Santiago and Guantanamo. Accompanied by the little tug Wompatuck, which eventually had to be taken in tow, the St. Louis set her course accordingly. On the night of May 16 both vessels arrived off Santiago and began dragging for the cables. For two hours they grappled in the darkness and had just caught the cable strand in fifty-five fathoms of water, when, about midnight, a Spanish patrol boat hove in sight and bore down so swiftly upon them that the cable had to be dropped, while the little Wompatuck was hurriedly taken in tow by the St. Louis and drawn beyond the reach of the enemy's guns.

In Sight of the Enemy

On May 18 the two vessels boldly returned to resume operations in plain sight of the Spaniards. Steaming straight for the harbor entrance, the St. Louis opened fire upon Morro Castle, so as to draw the fire of the shore batteries upon herself, while the Wompatuck was grappling for the cable. The maneuver was successful, for the forts returned the fire almost immediately and it was fortunate for the St. Louis that the Spaniards were such poor marksmen.

The engagement that followed is thus described by one of the officers who took part in it:

"The St. Louis steamed backwards and forwards across the harbor, gradually getting closer to the forts. Shortly after the first exchange of shots the grappling hook was lowered over the port bow and 650 fathoms of line run out. About noon, when the St. Louis had reached a position a mile and a tenth from Morro Castle, our grapnel caught the cable. The Spaniards discovered our object and the battery to the east of Morro opened fire with a 6-inch gun, the first shot falling about 200 yards short of the steamer. Captain Goodrich thereupon ordered the fire to be returned by the two 6-pounders mounted on the starboard side, our only guns that could be brought to bear on the shore battery. Another shell came from the 6-inch gun in the shore battery, and whistling over the stern of the St. Louis it struck the water only a few yards beyond us. That was the last shot fired from that gun—the next moment it was destroyed by one of the 6-pound shells from the St. Louis. A mortar battery next opened fire from the brow of a hill on Caspar Point, some distance back in the bay, and the shells began to descend dangerously near the St. Louis. Some of them passed close overhead with a deafening screech, while the others fell a little short of the vessel. The fusillade was the more irritating by reason of the fact that the mortar battery was far beyond range of the small guns with which the St. Louis was armed. The Wompatuck, commanded by Lieutenant Junger, went a little ahead of the St. Louis and bravely opened fire with her single 3-pounder, Quartermaster Reynolds, who took part in the Jamieson raid, firing the gun and making excellent practice. Another Spanish battery west of the entrance to the harbor then opened fire, but after discharging a few shots it was disabled by the fire of the St. Louis and the gunners were seen to beat a speedy retreat from the battery.

The Signalmen Depart

"The guns of the American liner were next turned upon the signal station to the east of Morro Castle, where the Spanish forces had been signaling since the beginning of the engagement. A few shots sufficed to tear away the roof of the signal house and the men stationed therein bolted without waiting to haul down their last signal. Seeing that the mortar battery could not be reached with the guns at his disposal, and that the other shore batteries had been silenced, Captain Goodrich took the ship out of range of the mortars and then stopped to finish heaving up the grapnel. As it appeared on the surface of the water, the cable could be seen hanging from its two prongs. A mighty cheer burst from the officers and crew assembled on the forecastle. About 200 fathoms of cable were hauled on deck. The ax of Chief Officer Seagrave fell, and even if Cervera did reach Santiago he couldn't communicate with the outside world.

"The engagement lasted fifty-two minutes, the St. Louis meantime lying motionless in the water, broadside to the forts, a mile and a tenth away from either shore. Captain Goodrich knew that the grapnel had secured the cable and, rather than cut the line and allow the cable to go, he faced the fire of the enemy, more than succeeded in his object and came out of the fight scot free.

"In all, sixty-six shots were fired from the steamer's forward starboard gun and 106 from the gun mounted on the starboard side aft, while the little Wompatuck discharged seventy-three shells from her 3-pounder. One of the shells from the Santiago forts passed so close overhead as to cut away some of the stays of the St. Louis. Throughout the engagement the conduct of the officers and crew of the St. Louis and the Wompatuck was, in the opinion of Captain Goodrich, worthy of the highest praise. Chief Officer Seagrave and his men, who were working with the line on the open forecastle, pluckily remained at their stations while the enemy's shots were falling fast around them. The men of the engineer force not actually on watch refused to remain idle and volunteered their services in passing ammunition. The officers and marines of the guns worked with great determination, acting upon the well-known naval maxim: 'The best protection against the enemy's fire is rapidity of fire against the enemy's guns.'"

A little old-fashioned in expression, maybe, but for a passenger liner that is as vulnerable as a teakettle, it was some fight! Having performed the cutting of the Santiago cable, the St. Louis proceeded to Guantanamo. Three hours after her departure the Spanish armada appeared off Santiago and Cervera sailed into the harbor with his warships, only to find himself cut off from direct cable communication with Madrid.

Grapples for French Cable

Still accompanied by the Wompatuck off Guantanamo, the St. Louis began grappling for the French cable running to Hayti. A Spanish gunboat, armed with 4-inch guns, made matters lively for nearly an hour. On account of shoal water the St. Louis couldn't go in after the gunboat, neither could she reach her with her 6-pounders. At last Captain Goodrich, finding that he could not get the gunboat within range, while the Spaniard could with her heavier battery easily reach both the St. Louis and the Wompatuck, he withdrew and next morning returned before daybreak and cut the cable. Then on to Cienfuegos, another cable was cut, and Cuba was isolated except for the one cable running to Key West.

After parting company with the plucky little Wompatuck, the St. Louis proceeded to Ponce to assist in enforcing the newly-established blockade of Porto Rico. On May 23 she reported at St. Thomas for orders and was promptly recalled to New York to mount supplementary batteries of long-range guns. It was just one month since she had steamed from New York that the transformed liner, her decks and rigging begrimed with smoke of battle, tied up at her old American Line pier. And twenty-four hours later she put to sea once more, after having taken on her new armament and 3500 tons of coal as well. In face of such a record, these days, one wishes the old days of efficient labor were back again.

Four days later the St. Louis was again in Cuban waters and, together with the Texas, Marblehead, Yankee and two gunboats, took part in the bombardment of the fortifications of Caimanera. While the warships were engaging the enemy's batteries, the St. Louis once more grappled and cut the enemy's submarine lines that connected the shores of Guantanamo Bay, keeping up meanwhile a constant fire from her eight 6-pounders and an incessant rifle fire from the Black Watch which was guarding the grapplers. Following this bombardment the St. Louis was dispatched to Morant Point to prevent blockade-running between Jamaica and Cuban ports, and succeeded in capturing the Twickenham, carrying coal for the Spanish fleet. Then the St. Louis rejoined Admiral Sampson's fleet just in time to see Hobson make his dash into Santiago harbor on the Merrimac. Next she escorted the thirty transports bearing General Shafter's army, and was present at the famous battle of Santiago when the Spanish fleet came out. It fell to the St. Louis to convey Admiral Cervera and the other survivors of this sea battle to the naval prison at Portsmouth, New Hampshire.

Four Months of Driving

Though the battle of Santiago practically ended the war, the St. Louis still proved highly valuable as a fast transport, being used repeatedly to carry troops and reinforcements to Porto Rico, until the conquest of the island was accomplished. On August 15 she returned north with her last consignment of troops and landed them at Camp Wikoff, Montauk Point, Long Island. On August 24 she re-entered Cramp's shipyard in Philadelphia to be stripped of her battle gear, and on September 3 was discharged from naval service, after having had as strenuous a four months as any ship could possibly experience.

It is doubtful whether ever before 1898, in the history of nations, there had been presented such a spectacle of patriotic loyalty as that which characterized the sudden change of the St. Louis and her three companion American liners from peaceful trans-Atlantic mail steamers to auxiliary cruisers of the United States Navy, going forth to battle for the flag under which it was their privilege to sail. The men who sailed them were not men-of-warsmen and were employed but for peace. The fact that they elected to "stick by their ships," to go with them, if need be, to suffer the fate of those on the Maine, ever must be regarded as by far the most characteristically important feature of the story of the merchant marine in the Spanish War. A captain's love for his ship is proverbial, but the American Line stokers gave evidence of as great a loyalty as the captains. One and all throughout the rank and file of officers and crew continued with the St. Louis in war as in peace.

In my possession is a booklet issued over twenty years ago by the American Line for advertising purposes. Called "In Peace and in War," it records the valor of the St. Louis and her three companion ships during those exciting spring and summer days of 1898. The booklet is much bethumbed, for the late Bernard N. Baker, father of the International Mercantile Marine (of which the American Line is a subsidiary) and also of the Shipping Board bill of 1916, used to seek inspiration from it, when, thanks to the lethargy of the public, our endeavors to increase American trans-Atlantic liners above the number of four, were given the cold shoulder. I acknowledge inspiration and facts to that little booklet for much of what I have written and was able to do in the seven years I was associated with Mr. Baker in fighting foreign shipping pools which by newspaper and magazine articles and lobbying at Washington, kept the United States from having other overseas liners than the St. Louis, St. Paul, New York and Philadelphia. Who wrote the booklet I do not know. The author certainly kept up our spunk, or rather the plain tale of the St. Louis and her merchantman crew under Captain Randle did. It is good to know that under Captain Jamison, prior to our entrance into the great war, and Captain Hartley during it, though she had not as spectacular an opportunity, the St. Louis still lived up to her reputation, though broken by age.

A Queen of the Seas

Five years after the Spanish War the St. Louis was badly eclipsed in speed and size by foreign express liners brought into existence by American money. Yet, like the queen of the seas she was, she kept plugging away, no matter how severely the elements or mankind treated her. In 1903 she received a new set of boilers and when she was twelve years old made a total of eighteen round trips between New York and England in one year, twelve usually being considered more than is good for a ship. In all she made 281 round trips on the Atlantic, eleven of which were as the naval transport Louisville. In 1897 she rescued the passengers and crew of the Holland-American liner Veedam (first Baltic of the White Star Line), thereby furnishing the late F. Hopkinson Smith with material for his famous story, "A List to Starboard."

We took pride in the grand old lady of the seas, especially when, though eighteen years old, she still ran as regularly as clock work. But it was with shame that we realized how she was outclassed by foreigners because America would not wake up and remember the lesson of the Spanish war: that, if for no other reason, a merchant marine is justified by army and navy expediency.

The great war gave the St. Louis a new lease of life in 1914, because she was a neutral. Many of the people who scorned her because she wasn't a Leviathan or an Olympic were only too pleased to patronize her once more. And as in 1898 it was the St. Louis which first was ready to battle with the enemy. On March 17, 1917, as the first American armed passenger liner, she set forth on her regular voyage overseas, ready to defy a ruthless enemy who was breaking the laws of God and common decency. First in two wars is a record not to be scoffed at. And until April 27, 1918 (twenty years almost to the day when she had entered the Spanish war), the St. Louis continued as a passenger liner. She sighted submarines; fought then as German shells, like Spanish shells of yore, fell about her, and in one case rammed a U-boat. On April 27, 1918, she was commandeered by the Navy and became the U. S. S. Louisville. Till mustered out of service at Norfolk, Virginia, September 11, 1919, she made four trips carrying troops to France and seven bringing them home. Though her antiquated engines and boilers had hard sledding, her steering gear broke down time and time again, she was a thoroughbred and gave of her best, thanks to Captain Hartley and his officers, many of whom were little past swaddling clothes when the St. Louis made her reputation under Captain Randle in the Spanish war. Even greater credit, perhaps, may be given to Captain Hartley, for he had to nurse a worn-out ship.

Unique in Our Regard

The St. Louis as a passenger liner is no more, yet she must ever remain unique in the regard of all patriotic citizens as the first ship to demonstrate the advantage to the United States in possessing a reserve of merchant ships as auxiliary cruisers and transports. As a veteran of the Spanish-American war, the St. Louis always possessed great interest for those who had sailed on her as passengers. As a veteran of the great war under the name of Louisville, she will ever be cherished by the thousands she took to France and brought home again. Her name and fame will never cease to be an object lesson to all thoughtful persons as an example of American adaptability. Let us hope that twice proving her worth, the naval reserve for which the St. Louis stood, will not go into decay as it did after 1898, resulting in that for twenty years the American flag flew from the taffrail of only four trans-Atlantic liners.

National Marine Week

THE National Marine League of the United States of America deserves hearty thanks from every individual and manufacturer identified with shipping, shipbuilding or associated industries because of the success of National Marine Week, which was held at New York April 12 to 17. The exhibition was a great success, and won the unqualified approval of the exhibitors. Primarily, the object of the exposition was to attract the attention of the general public and to get the people as a whole interested in fostering an American merchant marine. So great was the success of the exposition that many suggestions were made that similar displays be held in the cities of the Middle West and of the Pacific Coast.

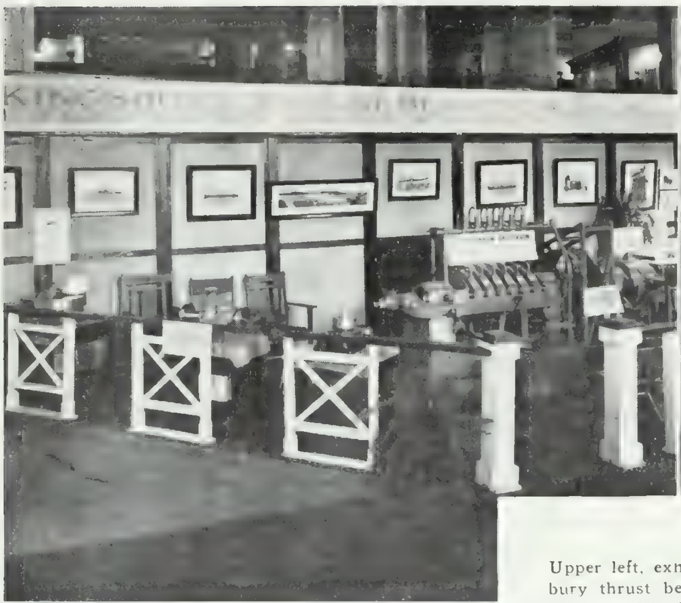
Three floors of the Grand Central Palace were used for the exposition. The Shipping Board took an active interest: the division of operations displayed a large bas-relief map of the world with legends to show the scope of the board's activity; there was a 50-foot model of a combination passenger and cargo vessel; and the division of construction and repairs had interesting and unique models of old ships, both sail and steam.

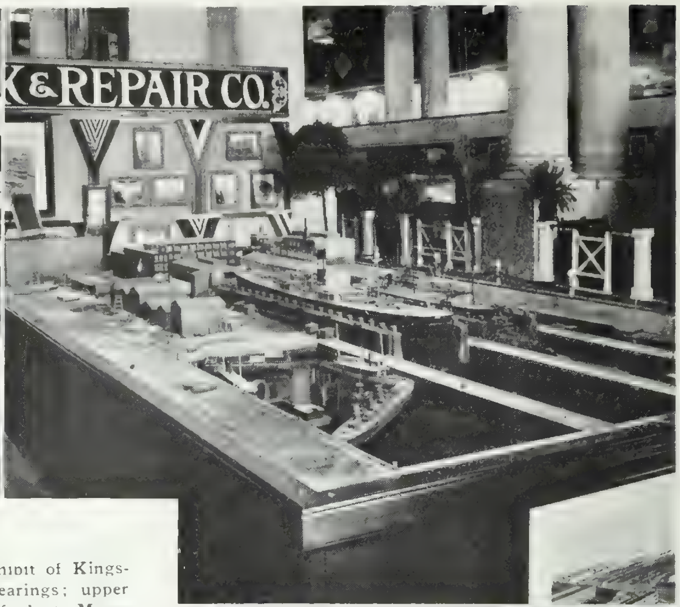
Model of the Kroonland

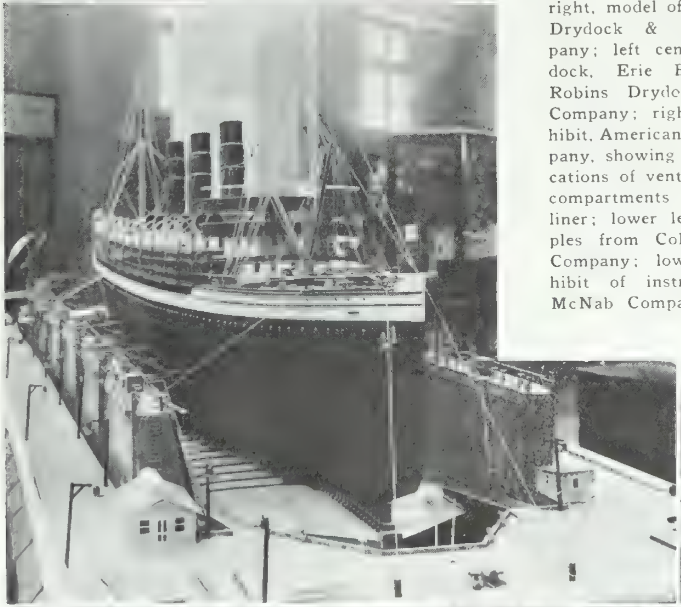
In the International Mercantile Marine booth were models of the steamships St. Paul and Kroonland, the latter of which is well known to San Francisco through being in the harbor when the I. M. M. maintained a line between New York and San Francisco via Panama.

There always was a crowd in the booth of the Todd Shipyards Corporation. Craftsmen of the Erie Basin plant of the Robins Drydock & Repair Company had made models of a modern ocean liner and the six-section floating drydock, known as No. 4. The dock model was set on a tank, under which was reduction gearing that raised and lowered the dock, in which was the ship. The dock model was 11 feet 6 inches overall; was built in six sections; all equipment was reproduced in miniature; and about the dock were piers, platforms, control station and pump house. The ves-

Snaps of Some Exhibits—

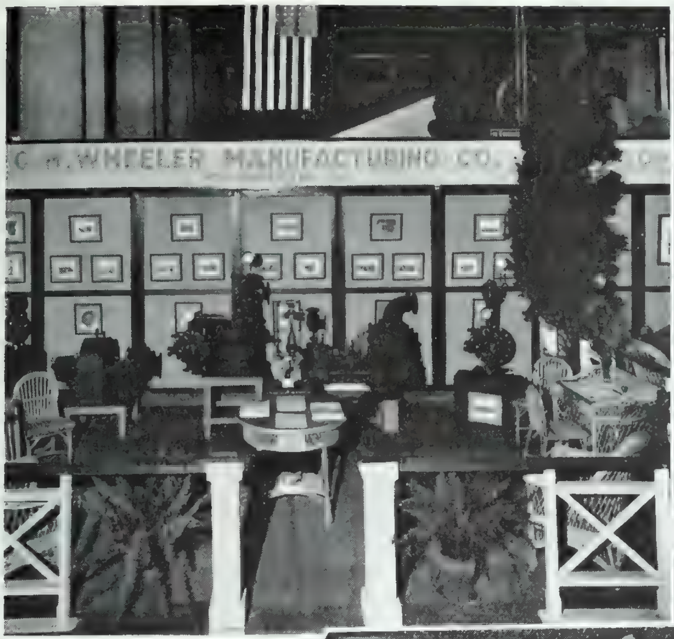


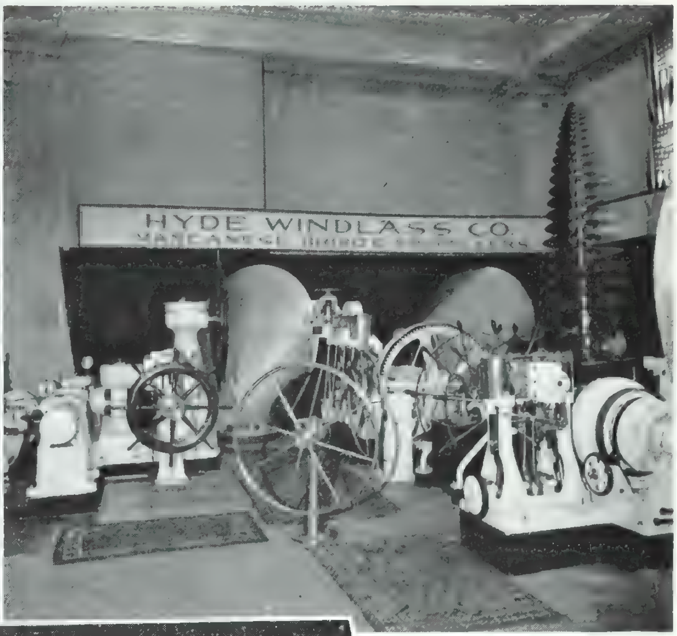




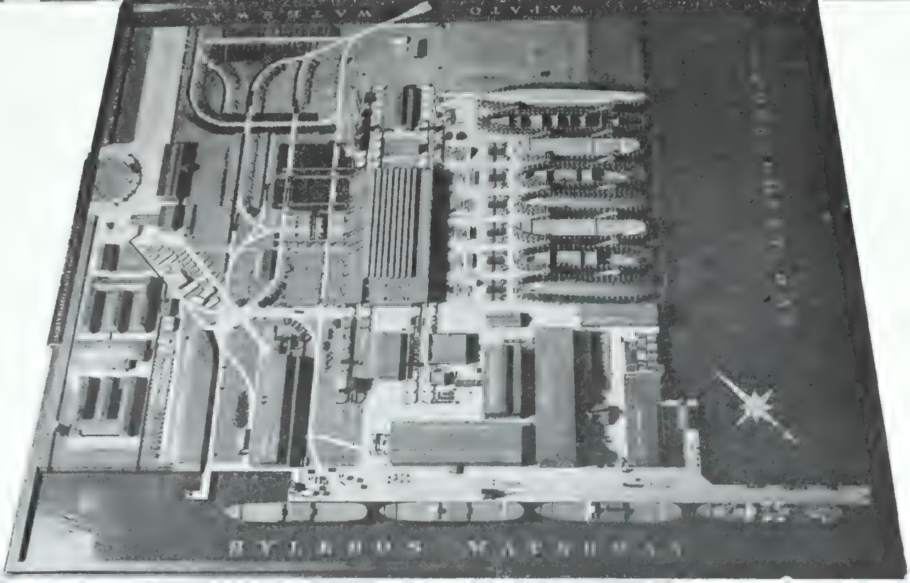
Upper left, exhibit of Kingsbury thrust bearings; upper right, model of plant, Morse Drydock & Repair Company; left center, model of dock, Erie Basin plant, Robins Drydock & Repair Company; right center, exhibit, American Blower Company, showing various applications of ventilation to hull compartments of passenger liner; lower left, rope samples from Columbian Rope Company; lower right, exhibit of instruments from McNab Company.

——National Marine Week

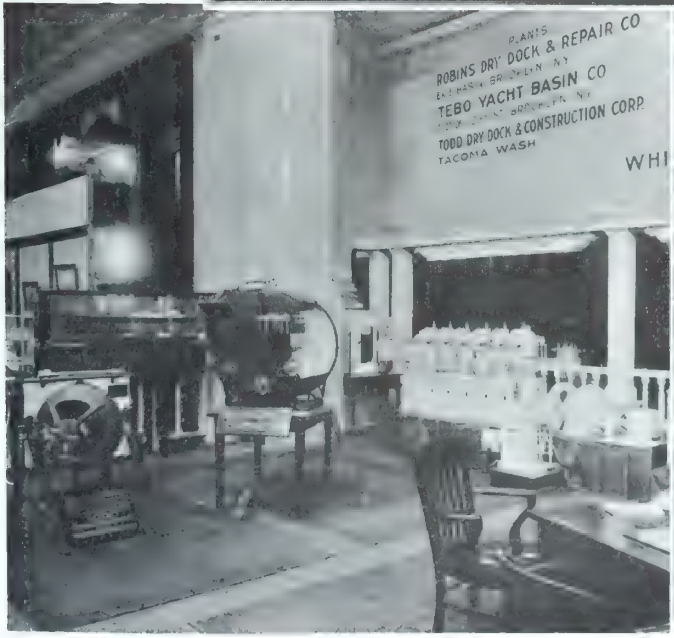


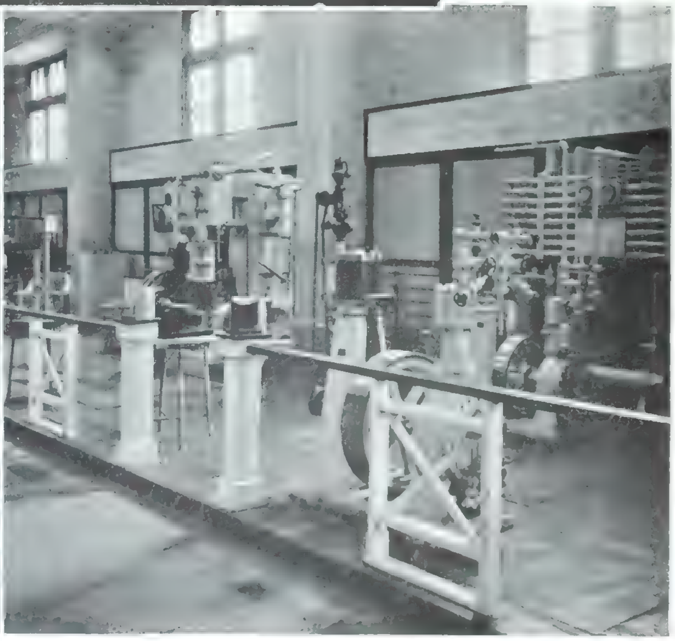


Above, exhibit of marine auxiliary pumps from C. H. Wheeler Manufacturing Company; below, corner of exhibit of Todd Shipyards Corporation, showing models of Diesel engine, Scotch marine boiler and White fuel-oil furnace-front.



Above, steering engines, windlasses and propeller blades at exhibit of Hyde Windlass Company; below, Brunswick Refrigerating Company's exhibit of marine ice-making and refrigerating machinery; center, beautiful model to scale of plant of Todd Drydock & Construction Corporation, Tacoma





sel was 12 feet 3 inches overall; she was a three-funnel, twin-screw, two-masted liner, complete as to details.

The exhibit of the Tietjen & Lang Drydock Company, of the Todd group, included scale models of a 750-horsepower marine engine with electric drive, 13 feet long; and a turbine with gearing in position. The Tietjen & Lang yard specializes in internal-combustion engines, turbines and electric-drive mechanism. An oil-burning fruit and passenger liner was exhibited in miniature by the Tebo Yacht Basin Company, the largest shipbuilding yard in Brooklyn. Two of these vessels are under construction by the Tebo yard. The model was 12 feet overall. From Tacoma was received a complete model of the yard of the Todd Drydock & Construction Corporation, which showed eight building ways with United States destroyers and freighters in course of construction, besides the assembly yard, important shops and four vessels at the outfitting piers. Another exhibit by the Tacoma plant was a model of the Todd standard 7500-ton freighter, eighteen of which have been built.

New Todd Burner Shown

For the first time, the new Todd burner, manufactured by the White Fuel Oil Engineering Corporation, was shown to the public at National Marine Week. The White company also had on display a section of an oil-fired Scotch boiler, and other late improvements. In all, the company has supplied nearly 700 oil-burning sets for ocean-going steamships.

M. P. Whelan painted three mural panels for the Todd exhibit. Motion pictures of the reconstruction and lengthening of steamships were shown by the Todd corporations.

The United States Navy Department occupied a large part of the third floor; the exhibition was complete in every detail. There were models of battleships and destroyers, etc., and one of the unusual displays was of the lighthouse system of New York harbor.

In the Skinner & Eddy booth were four models of ships built in the Skinner & Eddy yards, as well as two models of the Skinner & Eddy scarphing machine.

A daily newspaper was published by the Morse Drydock & Repair Company, of Brooklyn, which covered each day's program in detail. The Morse exhibit attracted much attention. In this display were models of the Morse plant, Fifty-fourth and Fifty-seventh streets, Brooklyn, and of the steamship Mauretania, which was lent by the Cunard Line. A model of the 30,000-ton floating drydock was shown in operation lifting a model of the steamship Satsuma of the Barber Line, 5 feet 6 inches long. The drydock recently lifted the steamship Minnesota, the largest cargo carrier in the world. On the model of the old floating dock of the Morse company was a model of the Standard Oil steamship John D. Archbold. Although this dock has only half the capacity of the new dock, it has been one of the most successful of the world, in one year having lifted three times the tonnage of any other dock.

Faithful Model of Morse Yard

In general, the model of the Morse yard was most faithful, and showed, in addition to the docks and piers, all of the departments, including a heavy marine forge shop and a large carpenter and joiner shop.

Practically every steamship company that had a booth displayed a model of its steamships. One striking model was a cross section of a Luckenbach freighter; to the landlubber the manner of the stowing of different cargoes was a revelation. Also interesting to landlubbers was a booth maintained jointly by the Charles Hartman Company and the American Blower Company, in which was a cross-section model of a ship, demonstrating how vessels are ventilated by blower systems.

The background of the Whitlock Cordage Company's booth was a naval scene, consisting of a proscenium arch from which the spectator looked upon a cycloramic view of the Atlantic fleet on parade. On the sides of the arch were panels that told of the use of Whitlock rope by the navy.

Another cordage exhibit was that of the American Manufacturing Company, which manufactures a complete line of marine cordage in addition to commercial twines. A large picture of the company's plant on the Brooklyn waterfront was flanked by pyramids of rope; and beneath the picture were cuts of the different Manila ropes, ranging from 3/16 inch in diameter to 15 inches in circumference. Ropes also were displayed in other ways, among which was a board showing the processes through which fiber passes.

A display of unusual interest was that of the Ramsay patent anticipating marine governor, which was shown in America for the first time. This governor closes the throttle automatically at the moment before the ship rises above the water in pitching, and opens it when the propeller returns to the water.

Dinner Held April 13

The dinner of the league was held at the Hotel Commodore at 7 o'clock in the evening of April 13. P. H. W. Ross, president, presided in the absence of August Belmont, chairman of the board of trustees. He spoke on "The Mission of the National Marine League." Rear Admiral W. S. Benson, U. S. N., retired, chairman of the Shipping Board, who had forty-seven years of active service in the navy, spoke on "The American Merchant Marine." Other speakers were Henry R. Sutphen, vice-president of the Submarine Boat Corporation, and Captain Irving L. Evans, director of the recruiting service, Shipping Board. Several hundred guests were present. An unusual feature was the singing of deep-sea chanties by old-time seamen from the Sailors' Snug Harbor, whose ages ranged from 62 to 87. The chanties were: "Blow the Man Down," "Reuben Ranzo," "Whisky for My Johnnie," "Leave Her, Johnnie, Leave Her," "Sally Brown," and "Rio Grande." Surrounding the banquet tables was a cyclorama of the sea, with old-fashioned sailing vessels and newer steel steamers in the distance; and near the speakers' table was the bow of a ship, 20 feet wide.

Thomas Boyle, an old-time American seaman, was introduced by Mr. Ross, who said:

"May I present to you Thomas Boyle, American seaman? For more than fifty years he has been mate and seaman on American deep-water sailing ships. He is now over 90 years of age. When Boyle was a lad American ships carried 90 per cent of American trade. In 1914 foreign ships carried 90 per cent of American trade. The flame has burned low, but, thank God! was not utterly extinguished. Boyle still lives, and others like him, to pass on the torch of American maritime independence to younger hands."

The Second Mate of the Dreadnought

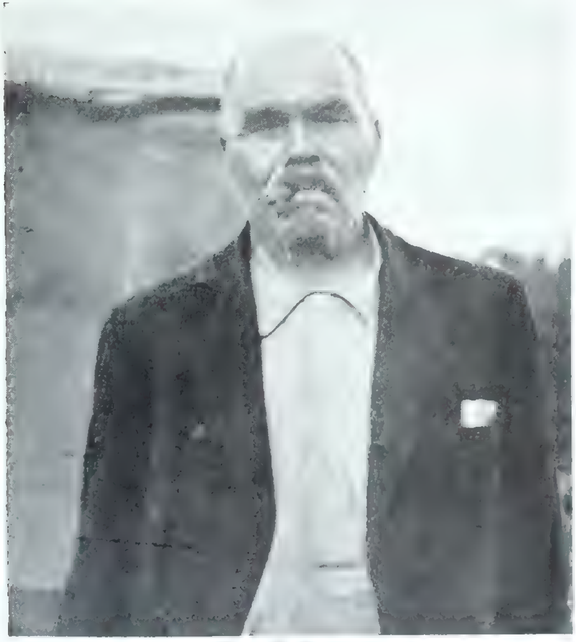
By Andrew Farrell

OCEAN is the mother of queer characters and strange experiences. One need only idle about the wharves of any port, or on board a few weather-stained tramps and windjammers, to encounter both in abundance. For example, it has been my fortune to meet the captain who was persuaded that the floating lump was ambergris. He prepared cheerfully to sail in a boat of thirty feet (or some other impossible length) in quest of the fortune then tossing somewhere between the Arctic Circle and the Line. There also was the Australian skipper who confessed, with sighs and almost with tears, that he had been compelled to burn plumes of the bird of paradise, smuggled out of New Guinea, in order to prevent their falling into the hands of the Sydney customs inspectors. And the master of a certain small schooner—he failed his rendezvous with a steamship, and thereby had a not inconsiderable part in the final success of the allied arms.

In the Old Red Jacket

But on the whole I believe that John Prussia and Peter F. Dubois have first place in the flotsam of memory. Prussia was that white-haired old sea-dog who admitted, when pressed, that he was "the sole survivor of the converted steam brig Alabama," a vessel of some note sixty years ago. A sailor in the Red Jacket had Prussia been, and in the Hobart Town, on which he stowed away for sundry youthful wanderings about Tonga and Samoa.

And Dubois: He was born in New York, August 12, 1840; he is employed at the United States naval station at Pearl Harbor, Hawaii, and resides at 1156 Richards Lane, Honolulu. Except for the bewhiskered pirates of Treasure Island, he wellnigh is the only seaman alive who wears ear-rings, though they be small and somewhat inconspicuous. So he remains a sailor still, if he has been ashore for twenty years. He has the tan of a man who has remained long in the tropics—a brown burned in by sun and wind, an acquired pigmentation that will leave him never, deluding the inexperienced into the belief that the possessor is a half-caste. In addition to these characteristics, he possesses a most picturesque and vigorous vocabulary; a body full and deep-chested; and for a man eighty years old, an amazing memory. In short, Dubois is one of the few sea-dogs left in a world of twenty-five-knot liners.



Peter F. Dubois

A Ship Renamed Virginia

In his forty years at sea, Dubois set up two claims to fame. He was on the United States ship Cumberland at the time of a certain encounter in Hampton Roads, when a vessel christened Merrimac, renamed Virginia, created a stir for a few hours, only to discover that another ship, the Monitor, had even greater potentialities as a maker of history. And Dubois was second mate of the Dreadnought (The Dreadnought, it should read, for nowadays the name has been given to a sort of floating fort). This Dreadnought of Dubois was the vessel that, if she did not "beat the Cunarder a week and a day," came perilously near it. Yes: the same; and in those days Captain Samuel Samuels was the master.

Dubois first went to sea before the mast in the schooner W. A. Griffin of Fall River, which traded in fruit among the West Indies. After being on the Griffin a year, he went to the brig Conflict of New York, owned by J. W. Hubbard, on which he remained for two years. On the outbreak of the Civil War, he enlisted in the navy, first going to the "guard ship" North Carolina, in New York, from which he was drafted to the Cumberland. He was aboard her the morning of March 8, 1862.

"Sink and Be Damned!"

"The ram came down that day in Hampton Roads. Her commander was on the bridge; and he sung out to our captain: 'Will you surrender that ship?' 'See you damned first!' our captain sung back. 'Well, sir, I'll sink you.' 'Sink and be damned!'

Up came the Virginia, intent on performing the first action if not on submitting to the second, and struck the Cumberland on the quarter, "right at the mizzen rigging," while the wooden frigate blazed away at the iron-sheathed Confederate. "The shells hit those rails and bounced a mile in the air before they exploded," said Dubois. As the Cumberland sank stern first, the crew was driven forward, but the guns were silenced only when the water rose above them deck by deck. And then "those that could swim, swum, and the rest went down with the ship." Dubois was picked up by the Minnesota. At dawn came the Monitor, around the point with the sun, and the brief day of the Merrimac was ended.

Dubois returned to New York and was assigned to the first-class frigate Hartford. After a time the war ended, and he was discharged.

A civilian again, Dubois strolled on the New York waterfront. He saw a handsome vessel lying at berth.

"I think I'll ship on her," he said to a friend.

"She's a workhouse and a floating hell!" retorted the companion oracularly.

"Oh, I suppose all of them are," returned Dubois; but he went aboard. Yes, said the mate, they were sailing in two weeks; the captain would be down one of these days—and at length Dubois did see the captain.

"Well, my man," said Samuel Samuels, "what can I do for you?"

"Sir, I'd like to ship with you."

Had Dubois been to sea?

He had—in the navy.

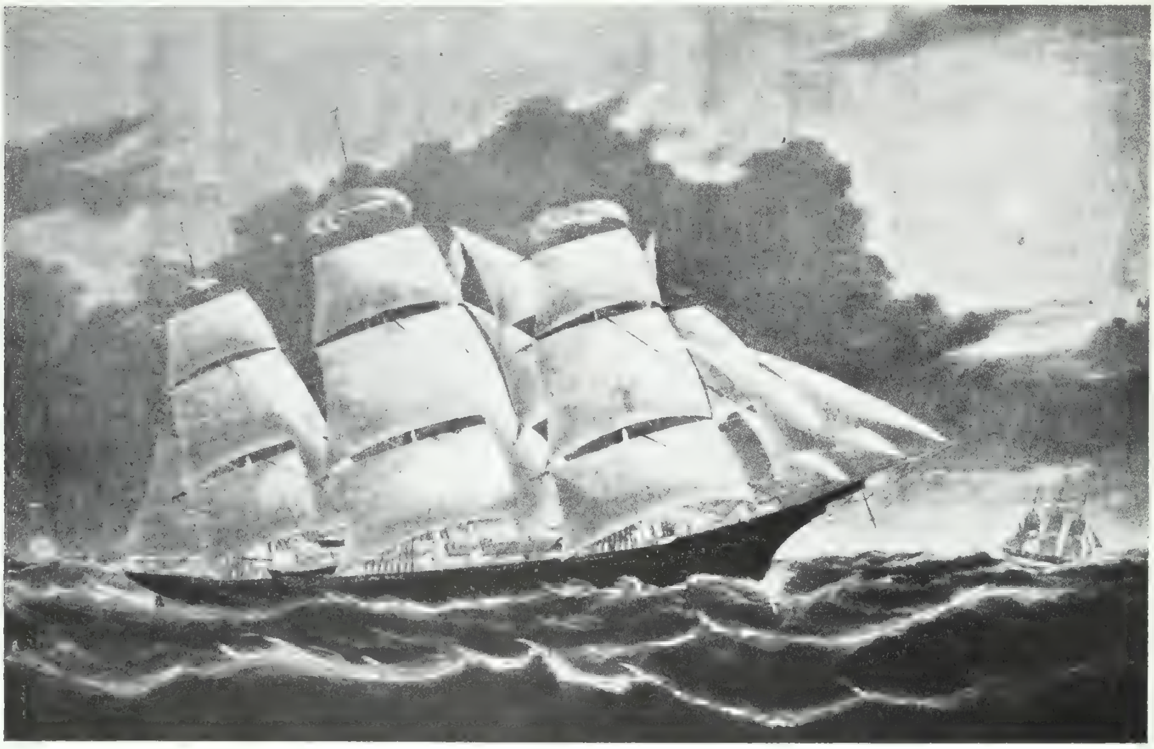
Naval vessels and merchantmen were quite different, observed Samuels. And what berth would Dubois want?

Well—second mate.

"Have you ever handled a ship?" Samuels inquired.

"No, sir; but I think that I could."

He got the berth.



Packet Ship Dreadnought

"This ship must go," said the famous sail-carrier to his new mate. "We don't like to break up anything; but the ship must go."

Thus he stated the policy that shone like the Pole Star for those old-time masters. And history records that the Dreadnought did go, even if she did not break the records of the Flying Cloud, Lightning and Red Jacket.

"How did I do, sir?" asked Dubois after the first voyage.

"Pretty well for a greenhorn. But I expect better next time."

A Ninety-two-Day Passage

The Dreadnought's days as an Atlantic packet were done. About the end of June, 1866, as Dubois recalls the date, she sailed from New York for San Francisco with a general cargo, and made the passage in ninety-two days, only three more than the record runs of the Flying Cloud and Andrew Jackson. From San Francisco she took wheat for Falmouth for orders, and made the passage in 120 days, passing everything "right and left." At Liverpool, whither she carried her grain, all hands were discharged except the two mates and the steward. After lying there for six weeks she took railroad iron (a usual export from Europe to the States) for New York, and there loaded again for San Francisco. That voyage she made in 102 days.

Bound from San Francisco for New York, she sailed out of the Golden Gate, one of seven ships in line. Leading the way was a big four-master. She had been sold by Commodore Vanderbilt to the government, converted into a frigate; discovered to be enormously expensive, and was sold in San Francisco to Jabez Howes and rechristened the Denmark.* After her, in the line, came the in the water), the Jabez Howes, the Dreadnought, Henry B. Howes, and Helicon—all New York-San Francisco traders. At sundown the Dreadnought saw the last of them and led the fleet to Sandy Hook in eighty-four days. The Jabez Howes was second in eighty-six.

362 Miles in One Day

On this voyage, said Dubois, the Dreadnought made a run of 362 miles in twenty-four hours—an average of slightly more than fifteen knots an hour. This probably was no faster than some of her passages on the New York-Liverpool route, and of course was far below the famous record of the Lightning, 436 miles in twenty-four hours, March 1, 1854; but it was flying through the water for all that. Off Cape Horn, with a strong southwester blowing, and all sail set, the Dreadnought Young America, the Herald of the Morning (a witch

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In this, Dubois evidently is in error. The Vanderbilt was rechristened the Three Brothers, and was a three-masted ship. There was a "big four-master" named Denmark; none other than the Great Republic, Donald McKay's masterpiece, but not until 1869 was the Great Republic sold to English owners and renamed, so that she could not have been the vessel in question.

stood "right in the trough of the southwest wind" from Staten Island to the Falklands before hauling to the east-northeast.

On one of these homeward voyages from San Francisco to New York, the Dreadnought ran to pick up Cape Hatteras light before squaring away for New York. The anchor chain had been dragged from the locker and was lying piled on deck. The day being Sunday, Captain Samuels was sitting on the capstan reading his Bible, when a sudden lurch of the vessel into a trough sent the chain flying through the rail and overboard.

Dubois chuckles as he relates that yarn.

"Captain Samuels stood right up, with the Bible still in his hand, and sung out: 'You —— —— —— ——, save that chain!' "

From the Dreadnought Dubois went to the J. P. Wheeler, the Mercury and the "Big" Webster. Bound west in that vessel in 1869 with coal for the Pacific Mail at Panama, Dubois again met his mates of the Dreadnought, then commanded by Captain P. N. Mayhew.

Dreadnought Lost Off Horn

The old packet had been lost off the Horn. Taking to the boats, the crew got to land, where the Patagonians annoyed them so that they put back to sea. The natives followed in their "leather canoes" and had to be beaten off. It was "right off the pitch of the Horn," at daybreak on Sunday, that the mate of the Webster sighted the four boats, then seven days at sea, and all the men suffering severely from frostbite. When the castaways had been taken aboard the Webster, the boats were turned adrift, and that was the last of the Dreadnought.

From the Webster Dubois again went to the navy—receiving ship North Carolina, sloop of war Saranac and frigate Lancaster. In the last vessel he remained almost six years. When his enlistment had expired he was urged to remain in the service (then, as now, there was a shortage of men); and he did remain because of three months' extra pay and two weeks ashore, during which he spent his money. His next ship was the sloop of war Syan (I am a trifle doubtful about the correctness of that name), which had been captured from the British in the War of 1812. In her he remained for three years; then he found himself in Panama Bay and again aboard the Lancaster—a fifty-two gun vessel: twenty-five 9-inch guns above and below and two 11-inch pivot guns above, one forward, one aft. Within a week the Lancaster sailed for Honolulu. "King Billy" (Lunalilo's nickname among the seamen) had a pocketful of coins in those days (English, American and Mexican) and a handy riding-crop for the bare backs of his fellow-Hawaiians. For some reason or other (probably one of those perennial pilikias with England or France) the Hawaiian government requested that the Lancaster remain; and Secretary of the Navy Welles directed that she comply "for the good of the king." And remain at Honolulu she did, for six months.

With the San Francisco mails, she sailed to the Golden Gate in nine days. After she had been overhauled at Mare Island she was returned for another inspection, and it was discovered that her timbers were quite rotten, so that she had to undergo extensive repairs. Two six-inch oak timbers were spliced together to make a twelve-inch side.

Meets the March Gales

This done, she sailed for the East Coast, calling at Callao, Valparaiso and the Barbados, until, within 300 miles of Norfolk, she met the March gales. Against them she could make on headway. Five days' rations remained when the admiral mustered the crew. "Men, we're not making a foot against this gale. We have five days' full rations, or we can go ten days on half. Shall we go on half-rations or square away for Nassau?"

"Square away for Nassau, sir!" said the crew; and so she did.

When the Lancaster arrived at Norfolk (a schooner having been sent to Key West and New York for coal and provisions), all hands were discharged and the officers went to their homes. Dubois enlisted again and was assigned to the frigate Wabash. He was on the European station for three years; returned to the States; went to the sloop of war John Adams, in which he sailed for eighteen months on the coasts of "the Brazils" and the other Southern countries; then, from New York, he went to the Mediterranean for three years. Upon arriving in New York from that cruise he was discharged, for the last time, at the end of his sixth enlistment.

A Hot Day and Cold Water

On the ship Caravan, Dubois went to the Pacific, being ten months on the voyage from New York to San Francisco. Thereafter he was first or second mate of the bark Minnehaha; bark Eureka; bark Speedwell (which took tobacco from New York to Gibraltar, proceeded to Messina to load and arrived in New York after a round-trip of three months, for "her name was Speedwell and she lived up to it"); ship Herald of the Morning (102 days, New York to San Francisco); and from the Herald, Dubois went ashore on the coast; sailed south once or twice, and at length became first mate of the Encore. She was bound to San Francisco from the West Coast with nitrate, when the captain died of the untimely conjunction of an equatorial day and a cask of chill rain-water. Dubois took the vessel to the Golden Gate and swore a great oath that he never would go to sea again; and in 1900 he went to Honolulu, where he since has remained.

Once upon a time Dubois was in a vessel bound out of Puget Sound with coal for San Francisco. With his ship sailed the old Blue Jacket.† Off Cape Flattery she fell to pieces—that famous vessel; and Dubois tells of her loss not without emotion. Staunch as were the clippers of sixty years ago, the sailors who manned them were even stauncher; the ships have gone, but here is Dubois, at eighty, still running free between Pearl Harbor and 1156 Richards Lane, Honolulu.

† This probably was the second, not the first, Blue Jacket.

European Marine Notes

Exclusive Correspondence of Pacific Marine Review

A WAVE of optimism appears to have now come over the shipbuilding business in this country. The voice of the croaker, it is true, is still heard in the land, but it is a feeble pipe. Several things have helped the better tone. For example, the record of Lloyd's Register of Shipbuilding returns for the quarter ended on March 31 provides gratifying evidence of the way in which the British mercantile marine is recovering its former supremacy. This record shows that there were building in the United Kingdom at the end of March, 865 merchant steamers of 3,394,000 tons. This amount shows an increase of 400,000 tons as compared with the figures for the end of December, and of 1,140,000 tons as compared with the amount building at the end of March, last year. The largest increase has taken place on the Clyde, Scotland, where there is now 1,178,692 tons under construction.

210 Large Ships Building

The total tonnage "commenced" during the quarter amounts to 708,031 tons, represented by 203 vessels, and it includes many large ships. There are now building 210 ships of 6000 tons and upwards, as compared with 173 at the end of December. The vessels of 10,000 tons and upwards amount to sixty-two. The output of tonnage shows, however, a slight decrease as compared with that for the previous quarter. In the past three months 123 vessels, of 451,236 tons, were launched, as compared with 137 vessels, of 451,915 tons, in the quarter ended December 31.

Building abroad at the end of March was 4,547,000 tons, a figure which shows a decrease of about 320,000 tons, as compared with that at the end of December. This decrease is due to the decline in construction in the United States, which shows a decrease of 393,000 tons as compared with the figures for the end of the year. There are now (April) building in the United States 535 vessels, of 2,573,000 tons. Construction in Italy amounts to 355,000 tons, and represents an increase of 41,000 tons. The figures include those for Trieste, which represent more than 113,000 tons. Figures for Holland show an increase of 38,000 tons, at 366,000 tons; and those for France an increase of 23,000 tons, at 240,000 tons.

2205 Building Throughout World

The number of vessels building throughout the world at the end of March was 2205, and the tonnage was 7,941,000. These figures show an increase of sixty-seven in the number of vessels and of 81,000 tons. It may be recalled that, at the end of March, 1914, there were building in the United Kingdom 1,891,000 tons, and abroad 1,452,000 tons, making a total of 3,343,000 tons. Of this amount 2,001,000 tons was being built under the supervision of Lloyd's Register of Shipping. Today there are building under the supervision of the Register in the United Kingdom 2,648,000 tons, and abroad 2,317,000 tons, making a total of 4,965,000 tons. As compared with the figures of six years ago, the total construction in the United Kingdom thus has increased by 1,503,000 tons, while the tonnage building abroad has increased by 3,095,000 tons. The total tonnage building under the supervision of Lloyd's Register has increased by nearly 150 per cent.

There is, of course, still a good deal of leeway to be made up before the losses during the war are fully compensated for, but the figures given suggest that it will not be very long before the supply of tonnage available will be greater than ever. This does not necessarily mean that freights will come back to pre-war levels. Costs have risen, especially as regards the price of fuel; and the prolonged delays caused by the congestion of nearly all the principal ports prevent vessels from being employed to the full extent, the number of voyages covered being naturally reduced by the delays in port. These two factors are at present the main causes of high freights, and there does not seem much prospect of alleviation in the immediate future. Still, as the mercantile tonnage of the world increases, competition is bound to have its effect in reducing rates, particularly in the case of cargoes the slow delivery of which does not much matter. It is noticeable that the number of sailing vessels building tends to increase, and these, of course, are not hampered by the high price of bunker coal; while the increase in the number of small tramp steamers designed for coastwise traffic already has resulted in a reduction of freights to Channel and nearby ports, although on one or two long-distance routes quotations have actually been raised.

$100,000,000 Shipbuilding Flotation

Other outward and visible signs of the more hopeful note are found in the numerous flotations of concerns to take over shipping, and especially to put into stronger positions some of the companies left derelict by the passing of the war boom. The greatest issue of this kind ever known in this country is just announced. It is a financial company of exceptional interest. All the subscribers are directors of Swan, Hunter, and Wigham-Richardson. The nominal capital is $100,000,000 in 20,000,000 shares of $5 each. It has been registered under the title of Shipbuilding & Associated Industries, Ltd., and its omnibus objects are comprehensive: to promote, organize, co-ordinate, direct and finance shipbuilding, shipping, steel, armament, blast furnace, motor car, aircraft, mining, engineering, manufacturing and allied or subsidiary undertakings and operations and operations; to acquire any stocks, shares or debentures of any other companies; generally to act as capitalist and financier in relation to any branch of industry or commerce; and to carry on the business of shipbuilders and repairers, shipwrights, shipowners, lightermen, steamship agents, managers of shipping companies, carriers by land, sea and air, ship and insurance brokers, marine and general underwriters, salvage contractors, dock owners, wharfingers, motor builders and owners, garage proprietors, electrical and general engineers, founders, colliery owners, etc. The subscribers to the memorandum of association are: Sir George B. Hunter, K. B. E., The Shipyard, Wallsend-on-Tyne, shipbuilder; T. E. Thirlaway, The Shipyard, Wallsend-on-Tyne, shipbuilder; Earl Grey, Howick, Les-bury, Northumberland; C. S. Swan, Broomhanger House, Riding Mill, shipbuilder; G. B. Richardson, The Shipyard, Wallsend-on-Tyne; J. D. Christie, Neptune Shipyard, Newcastle-on-Tyne, shipbuilder; and G. F. Tweedy, Neptune Works, Newcastle-on-Tyne, engineer. The first directors are Sir George B. Hunter, T. E. Thirlaway and Earl Grey. The registered office is at 21 Russell Square, London, W. C.

Cunard Report Issued

Just prior to mailing this article, the Cunard Steamship Company has issued its report for 1919. It is a statement of colossal figures and record profits. The following is a summary of the results compared with those of the previous year:

	1919	1918
Profits	$9,490,785	$6,773,385
Depreciation of ships, etc.	1,852,145	1,766,155
Balance available	5,660,530	3,453,605
Reserve	2,036,490	427,015
Dividend on ordinary shares	2,228,105	1,485,405
Carried forward	720,935	866,158
Rate per cent	10	10

The freight and passenger services of the company and its associated lines have been maintained as adequately as circumstances permitted, assisted by chartered tonnage. Several of the passenger vessels require to be reconditioned after government service. The company's steamers continued to carry large quantities of government cargo throughout the year at rates based on Blue Book rates of hire. A service between New York and English Channel ports was inaugurated during the year. The services based on Rotterdam, formerly maintained by the Uranium Steamship Company, the interests of which were purchased during the war, have been resumed. Additional services from America to the United Kingdom and the continent have been established and developed, also from the United Kingdom and continental ports to the Mediterranean, Levant and Black Sea.

New Cunard Vessels

With the launch of the steamer Albania by the Scotts' Shipbuilding & Engineering Company at Greenock, April 17, 33,000 tons have been added to the Cunard fleet in less than a month. The Albania is the second of twelve post-war Cunarders, the first being the Scythia, launched at Barrow in March. The Albania will carry some 500 first-class cabin passengers and have considerable cargo space. She will burn oil fuel and be propelled by double reduction geared turbines at a sea speed of 14½ knots. It is expected that ten other Cunard steamers now under construction all will be launched in course of the present year, this reinforcing the fleet to the extent of more than 200,000 tons.

The recent formation of a large oil bunkering company, under the chairmanship of Lord Inchcape, is another link in the chain of developments which are making possible the more general use of oil as a burning fuel for ships. The advantage of oil over coal is appreciated by most shipowners, and the furnaces of many vessels have been adapted to the consumption of liquid fuel, but the difficulty that confronts users is the inability to secure adequate supplies at points of call where it is necessary to bunker. This difficulty is to some extent being met by the establishment of oil wharves and tanks at various centers, and the formation of supply companies on the lines of the one just announced will go far to help the situation. William Cory & Son, Ltd., will be the selling agents of the new company. Lord Inchcape, the chairman, is a director of the Anglo-Persian Oil Company.

Your correspondent has already mentioned in a previous article that some alarm has been felt in Glasgow over the future of the port. The past two years have witnessed an unprecedented number of absorptions and amalgamations of Scottish companies with English concerns, and this has resulted in tonnage being shifted from Glasgow to English ports. Before the war three liners a week left the Clyde for North America. Now there are not three a month, and those liners still on the Clyde runs are of inferior class. The reasons are two: The first is the shortage of steamers. Liner losses during the war were heavy, and very few liners were built during the war years. The military and naval requirements were for cargo carriers, and of the hundreds of ships ordered by the shipping controller not one was a liner.

Trade Routes Recast

Moreover, the result of the war has been to recast the system of trade routes. With German shipping off the map, the British lines have the continental trade open to them. The southern ports, therefore, are of relatively greater importance than is Glasgow. Both Liverpool and Southampton are developing at the expense of the Clyde port, but eventually it appears certain Southampton will scrape the butter off Liverpool's dish. Geographical and economic conditions dictate what route the companies will adopt. The main emigrant traffic both to and from America is continental, and this condition necessitates the shortest route to and from the ports there.

The English Channel again will become the world's chief ocean highway. This means, of course, prosperity for the Channel ports, even though it means a diminished prestige for Liverpool and Glasgow. Most of the big liner companies, not only those in the Atlantic trade, now have regular sailings from Hamburg, Bremen and Antwerp. As feeders for their main services it is worth noting that the liner companies are gradually acquiring some of the most important of the coastal and short-sea companies. The connection of Sir Owen Phillips and Lord Pirrie with Coast Lines, Ltd., and the purchase by the P. & O. of 95 per cent of the shares of the General Steam Navigation Company, Ltd., are interesting evidences of this tendency.

SITUATION IN BRITISH GUIANA

All coal consumed in British Guiana has to be imported since none is produced in the colony, states Consul McCunn. The quantity of coal imported from the United States and Great Britain in 1918 was 86,600 tons, whereas in 1919 only 11,090 tons were received because of the lack of coal importations from the United States and the curtailment of those from Great Britain. In February the market was bare of all supplies. Georgetown is not a coaling station, and ships expecting to bunker there will generally meet with disappointment or be obliged to pay very high prices for any coal procurable. An American ship before leaving the port recently was compelled to use wood with coal for steaming purposes.

Ishikawajima Shipbuilding & Engineering Company

Front of Ishikawajima on Sumida River, Tokyo

ON an island in the Sumida River, Tokyo, is the modern plant of the long-established, self-contained Ishikawajima Shipbuilding & Engineering Company—a corporation known as well for its manufacture of general machinery and structural materials as for building ships. It makes boilers, engines, marine auxiliaries, pumps, air-compressors and blowers, cranes of many types, electric and hydraulic machinery, and bridges, girders and structural steel. It does not make its own steel castings or marine electrical equipment; nor does it roll its own plates and shapes; otherwise, it can produce a vessel almost unaided, besides supplying other yards with engines and cranes.

Two vessels were built by Ishikawajima for the United States Shipping Board in its present program—the Eastern Belle and the Eastern Maid, both of 5000 tons deadweight. The two sisters are 305 feet long between perpendiculars, 43 feet 9 inches molded beam and 27 feet 3 inches molded depth; fitted with triple-expansion engine and single-screw. Another sister, completed in midsummer 1919, was the last of five for the Suzuki company; and, after the launching of the two for the Shipping Board, still another of the same type was built for stock.

Limited by Water

When the Ishikawajima yard was founded, years ago, the depth of water in the river (really an estuary) was not of great importance; the time has come when it is. The average depth near the ways is only fourteen feet at high tide, and the width about 600 feet, or twice the length of the largest steamers built. A natural limit thus is placed on the size of vessels that can be launched; in fact, the Suzuki-Shipping Board class is the largest yet laid down, and 6000 tons' deadweight is the estimated possible maximum size.

There are four building ways, in addition to a drydock which is used also as a way. All the ways are of wood on wood piling. Two are 350 feet by 50 feet; one is 260 feet by 43 feet; the fourth, 280 by 43 feet. The drydock has the following dimensions: Length at bottom, 300 feet; width at entrance, bottom 50 feet, at water-level 52 feet 9 inches; width at water-level 68 feet 6 inches, depth 23 feet; height of keel-blocks, 4 feet 9 inches. These ways give an annual capacity of about 42,600 tons gross.

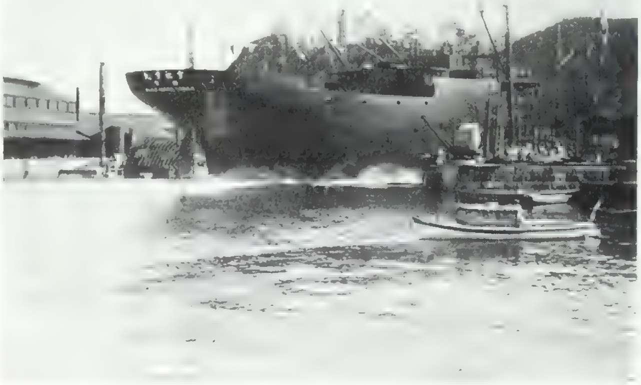
All the yard cranes were constructed in the Ishikawajima plant, as were those of the Asano yard, which are a striking landmark against the sky, seen from the lower end of Tokyo Bay. Two of the ways and the drydock are served by three tower traveling cranes, "six and three-ton," the former when the trolley is centered; and at the shore end of this group is a seventy-five-ton electric hammerhead derricking crane (twenty-five-ton auxiliary) for handling engines and boilers at the outfitting wharf. One crane serves the two remaining ways; and the last, remote from the ways, is for handling materials. These cranes are identical with those at the first group: six and three-ton. There are three six-ton locomotive cranes, also built at the yard.

Nine Boilers a Month

Eight or nine Scotch and two or three watertube boilers a month can be built in the boiler shop, which is equipped with one forty-ton overhead crane, having a fifteen-ton auxiliary, and two fifteen-ton cranes. Watertube boilers have been built largely for stationary engines, the only marine watertube boilers built thus far being for naval vessels, for one of which, also, the first turbine recently was completed. The boiler shop employs about 300 men.

The crane shop is not a shipbuilding unit. The 200 men employed there can turn out an average of fifteen to twenty cranes a month, ranging from five to ninety tons, and of all designs. To handle the crane-shop materials there are three cranes: ten-ton, twenty-five-ton and fifty-ton, the last having a fifteen-ton auxiliary.

There are two compressor-houses, one serving the boiler shop, machine shop and girder shop, and the other the ways. All the compressors were



A Japanese Launching

built at the plant, which has been engaged in that work for several years.

Three engines, for steamers of from 5000 to 8000 deadweight tons, are the average monthly production of the engine shop, which employs about 400 men. The girder shop builds girders principally for cranes; and, besides those mentioned, there are a machine shop, foundry, both iron and brass; forging, joiner, valve and pattern shops and a mold loft. There are three scarphing machines, two flanging machines and three punching machines. All told, the plant employs about 3500 men, of whom some 2000 are engaged on actual shipwork.

Diverse Work Done

Examples of the diverse work done by the Ishikawajima plant are: Pressure pipes for the Inawashiro hydro-electric power plant; self-propelling bucket and suction dredges; structural steel for the Tokyo railway passenger station; a 400-ton hydraulic press; railway bridges; steel towers; water pumps and dynamos.

Soon after the coming of Commodore Perry, the first Ishikawajima plant was established in 1855 by the Tokugawa shogunate, with which the Prince of Mito was connected, so that both he and the shogunate are given credit for this early beginning. The first vessel, built for the Mito clan, was the Asahi Maru. Then came a vessel of the kimizawa type (Kimizawa was the village at which the first vessel of Occidental design was built; wherefore it gave its name to foreign ships in general). A man-of-war of the Chiyoda class, the Chiyodagata, followed.

When the imperial dynasty was restored, the Ishikawajima yard passed into the emperor's control, and in 1871 it was placed in charge of the construction bureau. When the navy department was organized it was decided to construct and repair all warships at the Yokosuka naval arsenal, and the Ishikawajima equipment was removed.

Tomiji Hirano thereupon leased land at Ishikawajima of the navy department and opened the Ishikawajima Hirano Shipbuilding Yard in 1876. This was the first private company for the construction of "foreign-style" vessels established in the empire, the plant records state. In 1879 Mr. Hirano leased the naval iron foundry at Ishikawaguchi, Yokohama; renamed it the Ishikawaguchi Iron Foundry, and engaged Englishmen to superintend the manufacture of engines for steamers and other machinery. By permission of the navy department, he removed the iron works to Ishikawajima in 1884.

A 75-ton Outfitting Crane, Built by Ishikawajima

Ironclad Launched in 1887

In 1887 the yard launched the Chokai, an ironclad man-of-war of 614 tons displacement, which was both the first iron vessel built at Ishikawajima and the first man-of-war built by a Japanese private firm. Two years later the company was reorganized as a joint stock corporation and named the Tokyo Ishikawajima Zosenjo, the capital being 175,000 yen. The capital was increased to 250,000 yen the following year. There was still another increase, the capital being doubled when the Sino-Japanese war brought prosperity to the shipyards; and a branch plant was started at Uraga in August, 1896, and completed in June, 1899. The capital was raised to 1,500,000 yen, and the company became the largest of the Tokyo district. However, the Uraga Dock Company had been established meanwhile, and the keen competition resulting led Ishikawajima to sell its new branch to Uraga and to decrease the capital to 360,000 yen, although, in 1907, it was increased to 1,020,000 yen.

There was another extension in 1912, when the Shibaura Engineering Works, except for the electric machine shop, was purchased, and Ishikawajima began to manufacture electric cranes.

Expansion Comes With War

Dr. K. Watanabe became president in May, 1912. When the war broke out the company contracted to build eighteen freighters, ranging from 2100 to 5000 tons; it extended the drydock, foundry, boiler shops, turning and fitting shops, and increased the plant area greatly, to 25,000 tsubo (900,000 square feet). In March, 1916, the capital was increased to 2,040,000 yen and new machines were installed. The capital was increased again, in June, 1917, to 5,000,000 yen, at which it remains. A branch factory was established at Wakamatsu, Fukuoka prefecture, in 1918, for the building of stationary and marine engines and boilers, bridge girders, iron building and general engineering work.

Tokuro Uchida is managing director; Kintaro Kurita, manager of the engineering department; Baikichi Tanaka, manager of the sales and stores department; Tsunetaro Nishinoya, manager of the treasury and business department; Tetsugoro Ogawa and Ryoichi Idzumi, sub-managers of engineering and shipbuilding.

BLUE FUNNEL RETURNS

A recent feature of shipping at Singapore was the return of the Blue Funnel Line, whose ships have not been seen in Singapore since the beginning of the war. As a result there has been a falling off in the cargo carried by Japanese vessels, which have hitherto enjoyed the lion's share of the freight from and to this port. American vessels are now calling at Singapore with greater frequency than ever before, and it is believed there will soon be sufficient tonnage to lift all produce offering.

Portable and Semi-Portable Electric Tools

This article is compiled from the subject matter of an illustrated lecture delivered before the Cleveland Section of American Institute of Electrical Engineers by Edwin L. Connell, Electrical Engineer of the Van Dorn Electric Tool Company, Cleveland, Ohio, to whom we are indebted for the material used in illustrations herewith and the use of the manuscript. The flexibility of electrical installations and the possibility of arranging them so that they are practically free from leakage losses is resulting in their gradual adoption by industrial plants to take the place of the older methods of transmitting power.

DIRECT or alternating current is practically always available at any point needing industrial power. This current may be carried either on a standard lighting circuit or or power circuit, and if on a lighting circuit, it will either be direct current or alternating current of 60-cycle frequency and usually with a power of 660 watts. Small tools are, therefore, usually designed to operate on either direct or alternating current, and are equipped with a standard plug or socket. A direct current series motor with a laminated field will operate on alternating current. This is the type commonly known as a universal motor and is used on nearly all vacuum cleaners and other household devices. In this motor the speed is determined by the load, and at light loads the speed characteristics are the same on alternating as they are on direct current, but as the load increases the speed on alternating current will be lower than on direct current. The lower the frequency of the alternating current the more nearly do the speed curve characteristics of the motor on alternating and direct currents coincide.

These universal motors are only practical in small sizes, as is shown by a comparison of the characteristics of a one-quarter horsepower motor with those of one delivering about one-half horsepower, in which it proved that in the larger machine we should expect from three and a half to four times the output of the smaller, and that with the same weight four times the output could be obtained in the larger size designed for a straight direct current or polyphase alternating current motor.

The power required for drilling in 20-30 carbon steel is usually taken as the basis for power requirements in portable drills. A cutting speed of 50 feet per minute is about right for carbon steel drills or reamers. Tapered bridge reamers require three times the power of the same size drill at the same cutting speed.

The Van Dorn Electric Tool Company builds a portable electric drill for use on direct current for 15/16-inch to 1-3/16-inch structural reaming or for drilling up to 1½-inch holes.

It has hardened alloy steel gears, ball bearings, semi-automatic switch, and a grade of workmanship which is seldom approached in the ordinary electric motor. This is a two-man tool, as are any for reamers over 11/16-inch.

The semi-automatic switch is a very important part of the portable electric reamer, especially in the larger sizes, because if one of these tools becomes stalled the torgue would throw a man off his feet if he were caught napping. This danger is eliminated by the switch which opens the line instantly when the trigger is released.

In considering the questions—will it pay to replace air equipment with electric equipment, and should new installations be pneumatic or electric three factors must be analyzed: source of power, distribution and performance. Cost of operation is a function of all three of these factors.

In a great majority of cases, electric power is available and we can dismiss the source of power item. Where electric power is not available, we must make a choice between generating electricity or compressed air. It requires about 22 b. h. p. to deliver 100 cubic feet of free air per minute at ninety pounds' pressure. This 22 b. h. p. will deliver 14 kilowatts of electrical power with generator efficiency of 85 per cent.

The power must now be distributed. The distribution of electric power is flexible, permanent, efficient and can be installed at low cost. The installation of pneumatic is costly, inflexible, subject to freezing, very subject to leakage, and with a comparatively high cost of maintenance. With the electric power 10 per cent is the maximum allowance that need be made for loss between the generator and the point of application. We would, therefore, have 12.6 kilowatts of the original fourteen at the tools.

We are willing to be very charitable to the pneumatic system and allow only a similar loss of 10 per cent, although in the vast majority of cases, particularly in shipyard work, this is perhaps greatly exceeded, and we would then have 90 cubic feet of air at the tool under eighty pounds' pressure. The question then would be—which will do the most work, 90 cubic feet per minute of compressed air at eighty pounds, or 12.6 kilowatts of electrical energy?

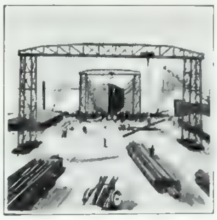
The efficiency of an electric motor is practically constant throughout its life, but the efficiency of an air motor falls continuously as the piston and valves wear.

Assuming that we have a new air drill, let us take a comparison on the basis of a one-half-inch hole. If we now take the figures given out by the manufacturers of two standard makes of pneumatic tools, we find that the one-half-inch drill will use fifteen cubic feet of air per minute for the four-cylinder piston type, and twenty cubic feet for the rotary piston type, so that ninety cubic feet per minute of compressed air would take care of five or six one-half-inch pneumatic drills.

On test recently a one-half-inch tool equipped with one-half-inch high speed twist drill bored at the speed of 1⅝ inches per minute into mild steel. The standard one-half-inch electric drill at 550 watts input drills one-half-inch holes into mild steel at the rate of 1¾ inches per minute. It will be seen that the 12.6 kilowatt will take care of twenty-two one-half-inch electric tools, and that, therefore, the power cost is about four to one in favor of the electric tool.

The efficiency of the portable tool in the hands of an operator is greatly affected by weight, balance and vibration. In some sizes of air tools there is a decided advantage in weight over the electric, but this is more than offset by the better balance and lack of vibration in the latter. In reaming operations the vibrations of the pneumatic tool often makes the hole quite noticeably elliptical.

Material Handling



Acceleration of Miscellaneous Cargo Movements at Ocean, Lake and Inland River Terminal Piers

By H. McL. Harding
Designing Engineer, Harbor Commission, City of Milwaukee, Wisconsin

THE most important feature at terminals for water-borne freight is securing the utmost possible speed in transferring cargoes between vessel and shore and the handling of the freight upon the shore, this latter comprising assorting, distributing and tiering.

By rapid speed of transference there are attained the following results acknowledged by all to be most desirable:

First, the least possible detention of the ships at ports. This reduces the charter expense and many other expenditures. Second, more trips can be made in a season. Third, this speed acceleration renders a terminal in comparison to competing terminals more popular with the vessel-owner, the shipper and consignee. Fourth, demurrage charges are eliminated. Fifth, more ships can occupy a berth during the year. Sixth, less berths need be provided; hence there is less investment in the terminal, and a resulting higher return from the investment, as the return from the terminal is directly proportional to the tonnage or volume of freight transferred.

By transference is signified the movement of the freight between vessel and shore; this relates both to the outgoing and incoming freight. Ships are being constructed with greater carrying capacity, cost much more to build, and therefore their idle, non-income-producing time at terminals should be kept down to the minimum. From the delay of months of the old sailing ship, from the week detentions of the small tramp steamer, from the few days' waiting of the coastwise ships, the holding time at the present day at port terminals for modern ships, as on the Great Lakes, is reckoned by hours. Every effort is now being made by progressive steamship executives to find ways to reduce even more this port delay with its continuing expense, which is expense without any compensating return.

Naturally, as with all improvements, there are some officials too conservative to change even for the better. This probably is a form of inertia due to strength of habit.

Warehouses and Docks at Ascuncion on Paraguay River

Freighters Unloading at an American River Pier. Note insufficient Room on Quays Outside Shed

Greater freight-carrying ships have larger and more hatchways.

More speed of transference is obtained by keeping the freight moving from all the hatchways simultaneously and as many drafts an hour at each hatchway as may be possible.

Keep the Freight Moving

The number of hatchways is being continually increased, and ultimately it will be possible to uncover the whole cargo space in the vessel so as to permit a free vertical movement of all the cargo, as is the best practice with the carriers on the Great Lakes, and even the "cleaning up" does not produce delay.

Wider and longer open hatchway spaces of such size as are not practical with side ports will soon be designed.

Low and narrow openings in the sides of ships which are frequently even too small to receive certain classes of case or crated goods cannot be permitted to exist beyond the lives of many present officials.

Freedom of transference without congestion-delays for all inbound and outbound movements from between decks of freighters, from the decks of barges and lighters to the shore and the reverse movements, are essential in obtaining speed.

Handling Cargo and Freight

The ship, however, may be discharged and loaded with the utmost rapidity, but unless there are means for removing the freight as soon as it is deposited upon the quay or pier, the congestion occurring there immediately will cause delay and prevent the all-desired speed from being attained.

Many think that the movement betwen the ship and the shore is all that is necessary to consider, and they utterly ignore the provisions for the movements of distribution and tiering. So far as is possible, only freight of one mark or consignment, or for one car or destination, should be transferred in one draft. This method has been followed by the railroads for floor trucks and prevents most of the errors of distribution and routing. To prevent this congestion, mechanical facilities must be provided for handling—that is, the distribution and tiering.

As fast as the freight is taken from the ship, it must be kept moving, without delay, to the tier in the shed, to the car, dray area or open space.

In loading, the freight should flow continuously, not being retarded at any point in its movement to its place in the ship.

In discharging the cargo from the ship, which has more complex movements than has the operation of loading, since the freight must be separated and piled in many different places, the limited floor space should be relieved of all congestion. If the ship is discharged with any approach to the possible speed of transferring, there is never sufficient area for the necessary freight movements on the floor alone. It is, therefore, necessary to utilize overhead spaces.

Plans to Relieve Floor Congestion

This floor congestion has been recognized and various suggestions have been made to relieve it. One was to make the shed of two stories instead of one, using one floor for the outbound and the other for the inbound. If the upper story is for inbound freight, the difficulties of operation are many, particularly the movement from the upper to the lower story and distribution to drays, railway cars and open areas without interfering with the floor space of the lower story and the outbound movements. It is earnestly desired that those who advocate this pier-shed-design would consider all the successive movements of the freight from its start to its ultimate place at the terminal, and not one movement by itself.

The same study should be made of the outbound freight, whether from railway car, dray, open area, warehouse or shed or remote areas, to its storage place in the ship.

The above is not given to start an argument, but to urge a sincere study of freight movements at water-borne freight terminals from the beginning to the end of movements, and not consider one movement only of some thirty movements.

A shed of from 30 feet to 35 feet clear height under the trusses will have more cubic feet holding capacity than a two-story shed of the same height. The cost of the two-story shed is more than double that of the one-story shed of one-half the height, whereas the one-story shed of double the height costs only about 19 per cent more.

The superiority of the one-story shed of double the height is the speed and ease with which freight can be handled when overhead mechanical appliances are installed for distribution and tiering. In comparing the high tiering shed with a shed of one-half the height, but covering more ground, there is the first cost of the land to be considered. In the former high shed the longitudinal travel is reduced proportionally to the height of tiering. For example, in a terminal shed 600 feet in length, the average length of the longitudinal freight movements will be about 300 feet when tiering five feet in height, which is the average height throughout the world where mechanical tiering is not installed.

Reduce Longitudinal Movements

By mechanical tiering at an average height of fifteen to twenty feet, the longitudinal movements would not average more than one-third of this, or 100 feet. Therefore, with this high tiering, 200 feet in length would have the same capacity as 600 feet under the old methods.

The vertical movements of lifting would be simultaneous with the horizontal movements of traveling. There would, therefore, be an increase of speed in the handling.

By this overhead distribution and tiering supplementing any floor movements which may be necessary (the machinery being properly proportioned, as described later), the freight can be removed as fast as it is transferred from the ship, and similarly the outbound freight can be deposited for loading within the reach of the draft hook of the fall rope for loading without any waiting.

Too narrow piers, by causing congestion, will quickly neutralize any speed advantage that may be attained. A pier of such a length as to have one berth on each side should have a certain width. The width of a one-unit ocean pier, which is 700 feet to 1000 feet long, should be a minimum of from 140 to 150 feet. A pier 1400 to 1500 feet long should then have a minimum width of 160 feet to 180 feet.

The width of the slip should be 280 feet for piers 700 to 1000 feet long—that is, four times 70 feet, which is the width of the ship. For piers 1400 to 1500 feet long the width of the slip should be not less than 335 to 350 feet.

One-Story Sheds Preferable

The sheds should preferably be of one story, but from 30 feet to 35 feet in clear height below the trusses. A shed 700 feet long must be able to hold a certain portion of the volume of inbound freight from two vessels, each of a length of from 600 to 700 feet or from more ships of less length. In addition, space should be provided for a certain proportion of outbound freight for the same vessels.

If the pier be 1400 feet to 1500 feet in length, provision should be made for a portion of the four cargoes inbound and for portions of four cargoes outbound. Not only must there be this cubical capacity for temporary holding of cargoes, but there must be longitudinal passageways to and from the shore entrance to the piers inside the sheds. The width of the piers, therefore, must be more, especially to provide for the longitudinal movements, otherwise there would be great delay due to the congestion of freight movements.

The cost of the pier increases according to the increase of width. It follows that, to avoid too great an increase in this cost, an equivalent capacity by higher tiering must be secured, so as not to increase abnormally the pier's width.

The waterfrontage must be conserved. This can be accomplished through correct engineering design. The reasons and methods may be better understood by asking several specific questions.

Thirty-six Feet of Clear Height

How can a pier with a minimum width of 140 feet, 700 feet long, with its sheds and railway tracks, have sufficient capacity for two ships, one on each side, including that portion of inbound and outbound cargoes which experience has shown would remain on the pier for a maximum of seventy-two hours? This would be impossible if the shed has only about 18 feet clear height under the trusses. If, however, the shed be about double this height, correctly designed, and overhead tiering machinery be installed, then a pier 700 feet long with the width of sheds 70 feet, and 35 feet on each side of the shed for railway tracks, would be sufficient. If the pier be 150 feet wide, then there can be more space between the shed and the edge of the pier, or the shed may be 85 feet wide and of less height.

The above dimensions are sufficient for great speed of cargo movements, if properly proportioned and designed. In some cases, those not familiar with the possible increase of shed capacity, or what is being done by mechanical tiering in some cases, desire wider piers. Sometimes, there not being any definite principles for guidance, piers are made too narrow and there is sure to be congestion which will seriously diminish the speed of discharging and loading. There is, however, a width which will not cause an idle investment in pier or shed, or decrease in the speed of freight movements, but the width of pier, shed and railway track area should be correctly proportioned to the length of the pier so as to secure the highest speed of all the freight movements. The above pertains to piers for miscellaneous cargoes and not for bulk freight. The underlying principles consist in securing the greatest speed of all freight movements and eliminating all congestion points.

Sin Against the Future

Too narrow piers, and especially those having sheds close to the water's edge, whereby there cannot be satisfactory rail and water co-ordination, are a mistake committed against future generations. To build a shed over railway tracks is not good designing; for, besides the unnecessary expense for the additional roofs and columns, it

Truck and Trailer Accelerating Movement of Cargo takes more time to transfer between car and vessel if the cars are within a shed.

If, however, there are no tracks on the pier and the cars have to be unloaded on the areas to the rear of the shed, and then moved to within reach of the machinery on the ship or shore to transfer into the shed, what an unnecessary delay in comparison to bringing the cars to the side of the ship!

At some ports there can be installed what may be called double piers. Such a pier is about double the width of a single pier and its width when 280 feet is generally divided as given below. If of 300 feet or more instead of 280 feet, the outside track and drayway spaces each may be 45 feet instead of 35 feet. Width from the edge of the pier to the shed, 35 feet; then the shed, 70 feet in width; then central open area, 70 feet; second shed, 70 feet; and finally space between the second shed and the quay wall. These width distances are 35+70+70+70+35=280 feet.

Two railway tracks are laid in each of the 35-foot spaces along the side of the pier and three railway tracks in the center area. There also are drayways in all the open areas, as the top of the rails are flush with the pavement. The tracks should not be depressed.

Ample Waterfrontage Available

Such a wide pier is advisable only when there is ample waterfrontage, as there will be less berths for ships. On such a pier there can be attained a wonderful speed in all longitudinal freight movements and in the transference between vessel and shore. Where the pier is from 1400 to 1500 feet, this is the pier of quick movements.

It often happens, however, that in an inbound cargo there is much freight that must be assorted, distributed, generally in the shed or open area and then be moved transversely across the pier to another vessel on the other side of the pier. With such a broad pier as described with two sheds, the cross movement takes more than twice the time of the narrow pier.

As to the relative advantages of piers at right angles to the line of the waterfront in comparison with those at an oblique angle, it is evident that within a given length of shore frontage more berths can be installed where the berths are at right angles than at oblique angles, but longer piers are possible extended to the same distance from the shore.

Conclusions Are Drawn

There are sometimes local physical limitations under which the following conditions are not applicable; otherwise these are the conclusions deduced from this paper:

First: To obtain acceleration in the speed of freight movements on a pier about 700 feet in length preventing congestion with sheds for high tiering, the pier should be from 140 to 160 feet in width.

Second: There should be railway co-ordination between vessel and car by having not less than two railway tracks, not depressed, on each side of the pier which are spanned by gantry jib cranes. Three tracks are preferable where is ample space. By using ship's winches for drawing from between decks to the upper deck and from there burtoning to the gantry crane, the greatest speed in discharging is attained.

Third: In loading the traveling gantry jib crane swings the draft into the ship's hold.

Fourth: The handling (assorting, distributing and tiering) supplementing the transferring (discharging and loading) is accelerated by overhead transverse assorting and tiering machinery occupying no valuable floor space.

Fifth: All sheds must be supplemented by many-storied warehouses located to the rear of the sheds.

Cost of Waste

By Harwood Frost

ONE of our favorite topics of conversation of late has been the high cost of living. We have been told that it is caused by profiteering, by high labor costs, by under-production, by the excess profits tax, by inflation, extravagance and other causes, most of which can be traced directly or indirectly to the war. No one or two of these factors can be said to be the cause of high prices. They, with many others, are all contributory, and, among these other factors, are the wastes involved in the traffic in goods, or in the handling of materials in transfer.

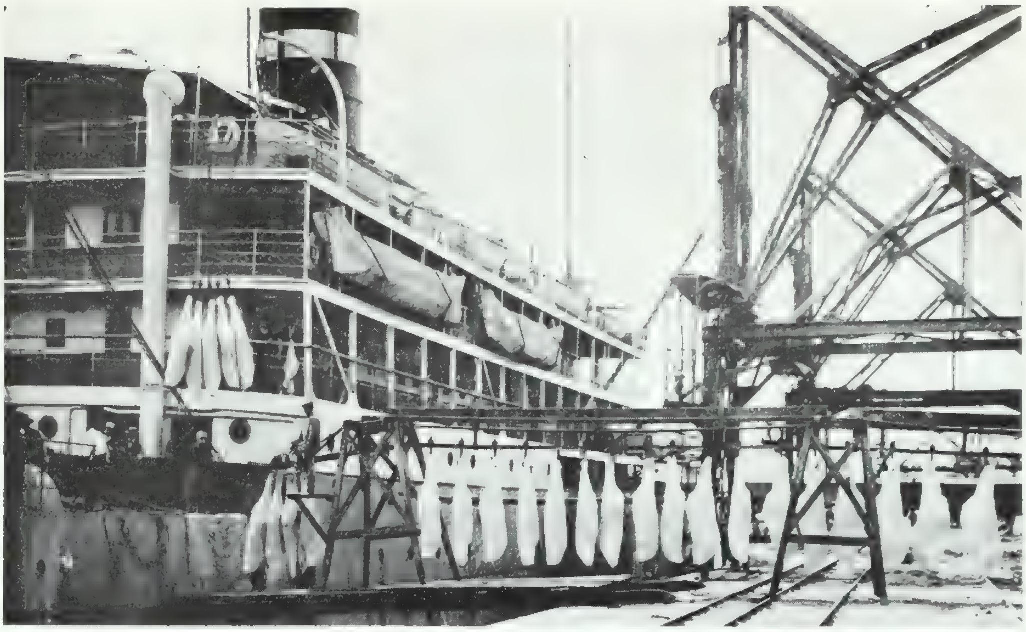
The railroads and the water routes are the lanes over which the traffic passes, but the ends of these lanes are our railroad and marine terminals, and through them passed goods representing last year a commerce of nearly ninety billions of dollars, representing a per capita expenditure of $806.

$30,000,000,000 Wasted

It has been stated by authorities that of this expenditure about one-third, or a total of between twenty-five and thirty billion dollars, can be traced to inefficiency and preventable wastes in our methods of handling materials in transfer from producer to consumer. This enormous sum, much greater than the total issue of Liberty bonds, is incorporated in our expenditures by a system of multiplication and addition in the progress of commodities from the source, through the hands of the middleman, to the consumer. It plays an important part in making up our present high cost of living, largely because of indifference of shipping interests, political influence and ignorance of the general public to the conditions which exact this burdensome and unwarranted tax.

Waste in materials-handling methods hampers production and there cannot be any doubt that this unnecessary tax of between twenty-five and thirty billion dollars has a most serious effect on one of our great problems—under-production.

The handling of commodities is purely a non-productive expense. No amount of lifting and hauling increases the quality or the intrinsic value of the article. The ultimate price depends on transportation and handling. As the goods pass from producer to consumer through the hands of wholesalers and jobbers, each adds his profit in addition to his expenses; as the bags or other packages are loaded into cars or boats, unloaded and trucked across docks and warehouses, piled for storage and otherwise handled, each handling increases the ultimate cost.



Refrigerated Beef Pier at Buenos Aires. Beeves Are Handled Mechanically from Cold Storage Warehouses to to Refrigerated Space on Steamers.

Now, assume that a farmer gets a dollar for a bushel of potatoes. The commission merchant pays 25 cents to get them to market; he adds 100 per cent to cover transportation, wastage and profit, selling to the retailer at $2.50; the retailer adds 50 per cent to cover his expenses and profit and sells to the consumer at $3.75. In the original transportation to the city market, assume a waste of 10 cents due to inefficient handling methods; the commission merchant's 100 per cent multiplies this to 20 cents and the retailer's 50 per cent adds another 10 cents, so the consumer pays an unnecsary tax of 30 cents, or three tmes the original waste.

Take the case of sugar: it grows in Cuba, is carried in the form of cane to the grinding mill, is processed into raw sugar, packed in bags and piled in the warehouses. There are no sugar refineries in Cuba, so the bags are transferred to cars and hauled to the port, where they are again piled for temporary storage. They then are transferred to ships and carried to one of the American ports, unloaded and piled, lightered or otherwise transferred to the refinery, unloaded and piled; passed into the refinery, and processed into refined sugar, packed in 100-pound bags, trucked to warehouse and piled; later, when sold to jobbers, these bags are transferred to cars, hauled to Chicago or some other city, unloaded at a warehouse, and again piled. Finally, they are loaded into trucks and distributed, and when you buy your your little package at the grocery, you pay in proportion for all of these handling processes and all the waste, multiplied many times.

Consumer Gets the Bill

This waste is multiplied and then added to by the terminal piling and loading method; the total is multiplied and again added to by the refiner, and a fourth multiplication of the total and an addition is made by the jobber, etc., and the consumer is handed the bill for the whole thing. What this total is in such a large industry no man can tell, but it is well known that since the introduction of mechanical handling methods in Cuba, hundreds of men who formerly did non-productive work now produce, and one man does more nonproductive handling than formerly was done by ten men.

Now, consider our American cotton industry: our cotton is treated in a barbarous manner. It is first hauled to local stations, where it frequently remains for long periods, lying on the ground or in uncovered sheds, unprotected from the weather. The "country damage" resulting from this neglect at the source is shown by the statistics of the United States Department of Agriculture to amount to more than $75,000,000 annually. Baling the cotton and the first handling of the bales cause an annual loss, officially estimated by the American Cotton Association, of $200,000,000. The cotton is cut, recut and otherwise abused; then passed from the gin to the compress, where it is unloaded, compressed, reloaded; and thence it goes to the re-compress, where the process is repeated. It is dragged by hooks, dumped about in the most criminal way, and ultimately reaches England in a disreputable condition. At Manchester, practically every bale of American cotton must be opened and re-baled. In our methods of sampling and testing cotton, it is estimated that more than 10,000 bales are wasted annually.

One Billion Tons of Freight

The railroads of the United States handle under normal conditions more than one billion tons of miscellaneous freight annually, as was shown in the Interstate Commerce Commission's report of 1914, the handling of which, not including the rail haul, costs from a few cents up to 50 cents a ton, and in some special cases much more, depending on many varying conditions. It is asserted that from 10 to 30 cents a ton can be saved by the introduction of mechanical equipment, which would indicate, at an average saving of even 15 cents a ton, a saving to the railroads of about $150,000,000 a year on each handling. As all this freight is handled at least twice, the possibilities in saving would be double this figure——$300,000,000 per annum. The facts are, however, that much of this freight is handled five, six, seven or eight times, exclusive of the hauling.

And yet there is not one single railroad terminal in the United States completely and efficiently equipped with mechanical appliances for the handling of package freight.

In the marine field, it is estimated that under normal peace-time conditions, considerably over 300,000,000 tons of miscellaneous freight are handled at our seaport terminals every year. The conditions of handling in this field and the costs are essentially the same as in the case of the railroad terminals, so with an average reduction in cost of 15 cents a ton, there would be an approximate annual saving of $45,000,000 on each handling, and as this freight also must be received inward and shipped or delivered outward, the possible saving would be $90,000,000. Add to this $10,000,000, which is a most conservative estimate of the saving that might be effected in handling the vast tonnage of our inland waterways and lakes, and we have a possible saving of $100,000,000 a year in the terminal handling of our water-borne commerce.

Not One Equipped

And yet there is not a single marine terminal in any one of the hundreds of ports in the 5000 miles of sea coast of the United States nor a single lake or river port in the thousands of miles of our navigable waterways completely and efficiently equipped for the handling of package freight.

If these figures may be considered as even approximately correct, the railroads can save $300,000,000 every year by improved methods, and the steamship and steamboat companies can save another $100,000,000 a year. In other words, the transportation or terminal operating companies of the United States are unnecessarily wasting $400,000,000 of their stockholders' money every year by lack of efficient handling methods.

$400,000,000 Annual Saving

The savings effected by a properly co-ordinated system of mechanical freight-handling equipment run from 10 to 80 per cent, according to the many conditions affecting each particular installation, but 40 per cent may be considered as a fair average. If we assume the average possible reduction of 15 cents a ton in the expense of each handling to be represented by this 40 per cent, then this $400,000,000 would represent an expenditure for labor alone of about a billion dollars a year, which is actually less the amount so expended at our terminals.

Experience has shown that where labor-saving machines of this nature are in fairly continuous use, the savings they effect will repay the investment in from six to eighteen months. From this rough basis we may estimate that the value of the equipment necessary to effect a saving of $400,000,000 a year, repaying its cost in approximately fifteen months, would be $500,000,000—only 6 per cent of the labor investment represented in the annual waste, only half of the actual labor cost of one year, and only 2½ per cent of the amount of Liberty bonds bought by the American people.

But this is not all. These figures refer to labor only. Add to this possible saving of labor the savings due to quicker deliveries of goods, the savings due to quick release of cars, ships and trucks, the elimination of damage to packages, the prevention of loss of perishable freight, etc., and you can well realize that any substantial proportion of these combined savings for a single year would be sufficient to pay for the erection and complete equipment of a large number of terminals, and that the elimination of such wastes would mean the transfer of thousands of laborers from non-productive to productive work.

Terminal Charges Great

It has been estimated that the average expense of hauling a ton of freight 240 miles is 74 cents, while the average expense of handling the same ton of freight at the terminals is 75 cents—that is, the terminal handling charges equal the haul of 240 miles. As an example of the expenses involved in the short haul from New York to Philadelphia by rail: the cost of handling at the terminals is $3.65, and the railroad cost for the ninety-mile haul is 27 cents. The terminal expenses are nearly fourteen times the rail haul.

It costs as much to deliver a shipment from a freight terminal in New York to the hold of a ship as it does to transport it by rail from Chicago to the New York terminal. The 1300-mile marine haul from Havana to Boston is cheaper than the transfer from one pier in Boston harbor to another. It costs more to load a box of canned goods on a car in Chicago than it does to carry it by rail from Chicago to New York. It costs more to transfer a barrel of flour over the wharf and to the hold of a ship in New York than to carry it by that ship from New York to Liverpool. It is said that the waste caused by idleness of motor trucks at terminal points due to inefficient loading methods and congestion is more than $250,000,000 a year.

New York, where half the nation's imports and exports are handled, is planning to build a terminal practically devoid of modern materials-handling appliances. New York plans to spend many millions of dollars on docks of exactly the size and type built in the days of the clipper ship, with no regard to a possible decrease in handling costs to America's manufacturers and distributors.

But we are all paying our tax for New York's inefficiency in the price of every pound of sugar we eat, every cigar we smoke, every cup of coffee we drink; we are paying for it daily in every dollar we spend. It cannot be said that the terminal problem is a local one that affects New York, Seattle or New Orleans only. It is a national problem that affects every one of us.

Invent Much; Use Little

America has invented and manufactured more modern freight-handling machinery than any other country in the world, and uses comparatively less. Still, we are building up a merchant marine in an effort to compete for the world's trade and at the same time are neglecting the very methods that made for the profitable operation of many foreign ports and that contributed largely to the normal low cost of living in these foreign countries.

Not until our terminals are properly designed with regard to the goods to be handled, and adequately equipped with machinery that will reduce both the time of the cargo and the idle time of the carrier, will we be able successfully to compete with these older, more experienced and more efficient maritime peoples, and only when the general public has been enlightened as to the economic effects of our present wasteful methods and aroused to the realization of its powers and responsibilities in the matter, will we have efficiency in place of the present chaos, and a terminal system that will be a credit to the engineering ability of the American people and a worthy support of our prospective and much-talked-of mercantile marine.

Two Notable Shipyard Cranes

WE are glad to be able to publish herewith a very fine picture of the cantilever type gantry crane, which operates above the side launching shipbuilding ways of the Long Beach Shipbuilding Company. This crane was constructed by the Fulton Engineering Company of Los Angeles to the designs and under the supervision of Wm. Van Den Heuvel, whose offices are at 632 Homer Laughlin building, Los Angeles. The crane was especially designed for the handling of plates, shapes and fabricating parts for ship construction on sidewise launching ways and runs on 100-pound rails with a 72-foot gauge, having one stiff leg supported by the rail on the seaward side of the launching slip and one pin leg supported by the rail on the landward side of the slip. These two legs support a cantilever truss 150 feet long, having a 20-foot overhang on the water side, which is used for swinging plates through and around, and a 50-foot overhang on the land side projecting over the fabricating parks and plate racks. The crane has a clear height of 72 feet from the gantry runway rails to the under side of the trolley rails hung from the cantilever trusses. The operator's cage is hung from the trolley and is out of the way of the hook so that a clear lift is obtained to within two feet of the rails.

These rails are 6-foot gauge and the trolley carries the motors and gearing for the hoist and for the traverse of the trolley. The gantry is operated by two 7½ h. p. motors connected by equalizing shafting in such a way as to eliminate any possibility of racking the crane due to one leg getting ahead of the other. All the motions of the crane are under the direct control of the operator in the cab hung from the trolley under the bridge trusses. Both dynamic and mechanic braking are provided on all of the motions and in the hoisting.

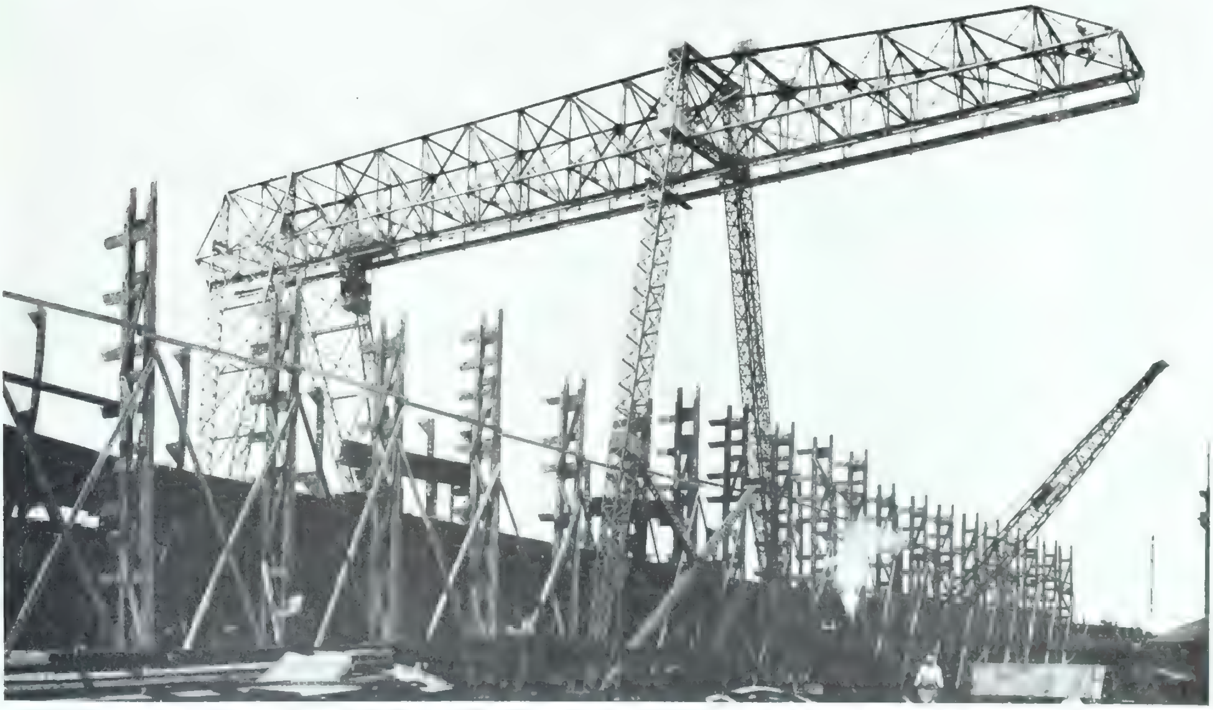
The specifications call for a speed of 30 feet per minute hoisting on a 10-ton hoist; 65 feet per minute hoisting on the 5-ton hoist; 200 feet per minute linear speed of trolley under full load; and 150 feet per minute linear speed of gantry under full load. All of these specifications have been exceeded in practice and on test the crane picked up a 12-ton collision bulkhead on the land end of the cantilever and moved same under and through the pin leg to the final position on the hull of the ship.

The crane is electrically operated throughout, direct current at 220 volts being delivered by contact shoes from a third rail. The structure was designed with an ample factor of speed under all possible loading conditions, and taking into account even the most unusual wind stresses, it has proved itself to be safe and efficient under the most severe operating conditions.

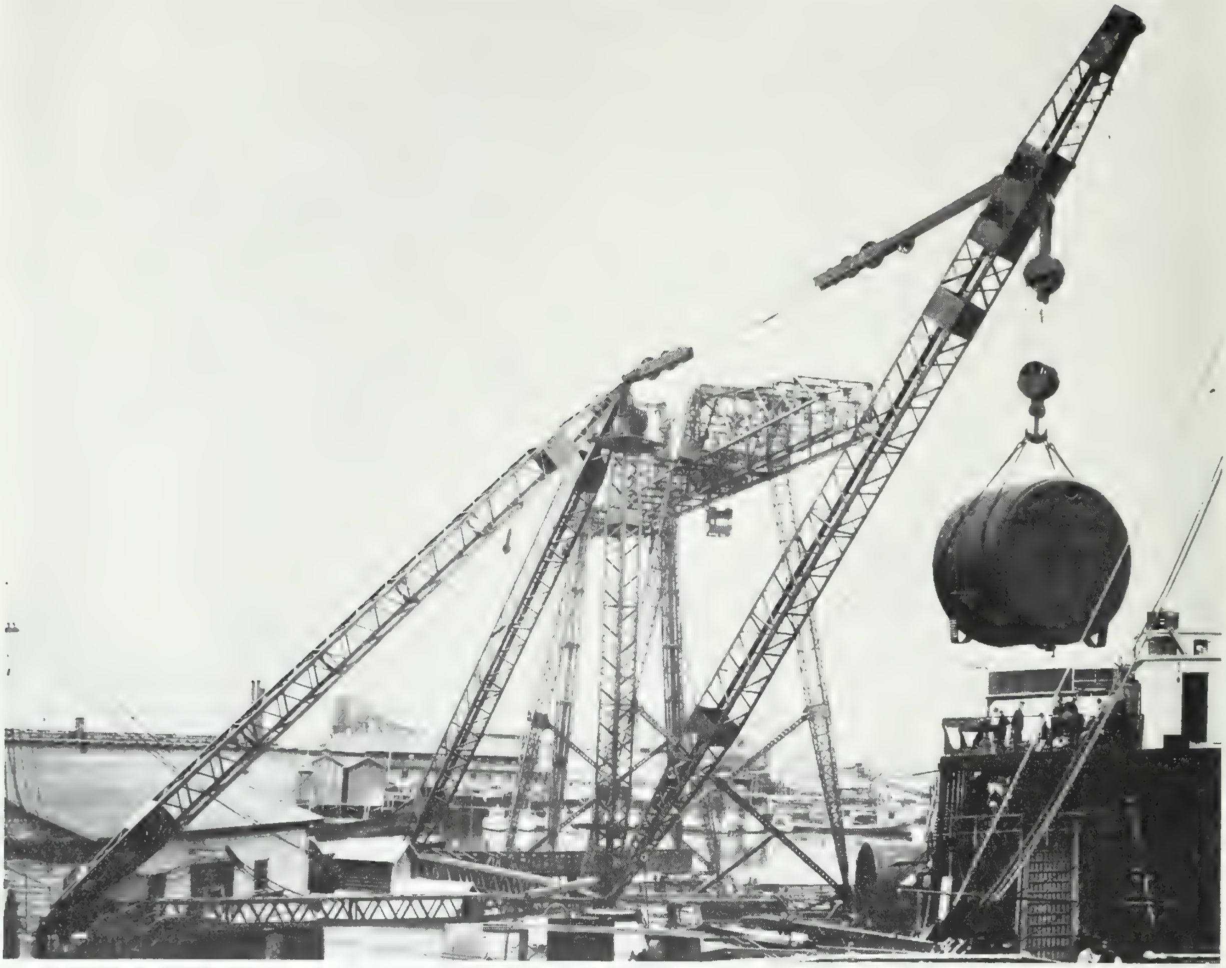
At the same yard, and also constructed by the Fulton Engineering Company under the same supervision, there is installed a 75-ton outfitting crane of the stiff leg derrick type which has also proved itself to be a very useful tool. This crane is installed on heavy concrete piers having a foundation of piling. These piers are 10 feet high and give the crane an initial elevation over the level of the dock.

The boom has a total length of 105 feet and a length of 90 feet to the point of main load suspension. The mast and stiff legs are 60 feet in length and are so placed as to permit a total swing of 220 degrees. The main load is lifted by the use of a forged steel sister hook and two 5-sheave blocks, using a 10-part line 6-37, 1⅛ inches diameter plow steel rope.

The luffing line for the mast is arranged in nineteen parts and consists of 6-37, ⅞ inch diameter



Cantilever Type Gantry Crane Over Shipbuilding Ways of Long Beach Shipbuilding Company. Designed and Constructed by the Fulton Engineering Company of Los Angeles



Seventy-five-ton Outfitting Crane of Stiff-leg Derrick Type on Outfitting Wharf of Long Beach Shipbuilding Company. Gantry Crane Shown in Background

plow steel rope. The blocks for this line have three sets of sheaves set tandem. The luffing line and the load are hung from an equalizing beam of triangular shape, which is so designed to avoid all bending stresses in the boom.

All ropes are led to the top of the mast and from thence downward through the hole in the step plate and the pier to a chamber in the pier; from whence they are led to the hoists mounted on a platform at the end of one of the sills. It was originally intended that this crane should be operated by electric motors, but these were not readily available at the time of its installation and it was therefore fitted with a large steam hoist which was already in the possession of the Long Beach Shipbuilding Company and which has functioned very satisfactorily in the emergency. Under test the crane easily handled 110 tons at 75 feet radius.

Navigation Signals for Drawbridges

By Paul C. Butte,

Butte Electric & Manufacturing Company,
San Francisco

NAVIGATION signals are provided on drawbridges for the purpose of indicating to the master of a vessel the open or closed position of the draw, the location of the navigable channel, and the operative condition of the draw. Thoroughly to understand the functioning of these two signals, it is necessary to explain the fundamental principles of the operation of the different types of draws now used and as approved by the United States government:

1. Horizontal swing drawbridges, Figure 1.
2. Bascule drawbridges, Figure 2.
3. Vertical lift drawbridges, Figure 3.

Horizontal Swing Oldest Type

The horizontal swing drawbridge is perhaps the oldest type of bridge now used. It consists of a swing span with a center pivot about which it revolves. This pivot is supported by a pier in the center of the stream or opening. It pivots and revolves about in the same principle as a compass needle. The objection to this type of bridge is in the fact that the center pier hinders navigation and is a source of danger due to collision. This type of bridge is practically obsolete, except for very shallow and wide channels.

The word "bascule" is taken from the French and means balanced, and refers particularly to a toy used by French children and something on the order of the seesaw used by the American boy. The bascule bridge now universally used consists of a cantilever truss, pivoted at a trunnion and counterweighted. It permits the passage of small

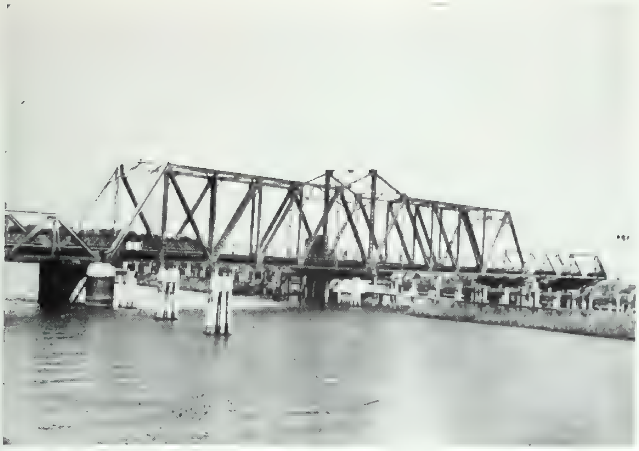


Figure 1, Closed Position, Horizontal Swing Drawbridge

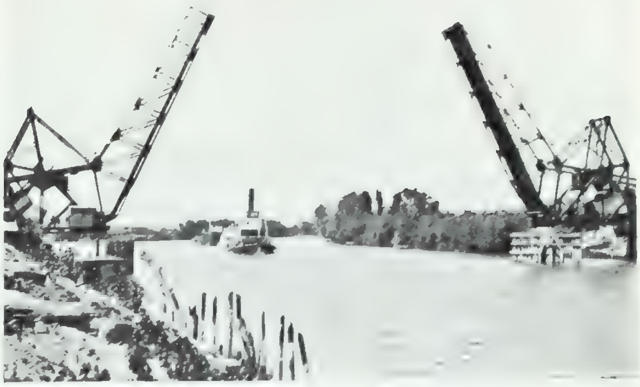


Figure 2, Open Position, Bascule Drawbridge

vessels, as the bascule need open only far enough to give sufficient vertical clearance, whereas the swing bridge must be opened fully in any event. The foundation work for a bascule bridge is removed from the channel and it therefore provides a safer opening for the passage of vessels.

Operates As Elevator

The vertical lift bridge operates precisely as an elevator does. This bridge consists of a steel span counterbalanced by weights fastened to steel cables. These cables pass over sheaves mounted on the top of a pair of steel towers. The towers support a pair of steel slides, which serve as guides to the span when operating in a vertical direction. This type of bridge permits the passage of small vessels, without completely opening the draw, and gives a clear channel, as the foundation piers are not located in midstream.

The navigation signals as installed on the above bridges by the writer consist in general of marine type apparatus. As the danger due to accident is very great in bridges of this character, the signals must be as nearly infallible as possible, so the practice has been to install apparatus that has proved reliable and satisfactory in usage. Signals are given by means of groups of electric lights, by a system of whistles or blasts from a siren, or the tolling of large bells.

Electric Light Signals

The electric light signals consist of the following, which are the standards approved by the United States government:

1. On a swing bridge there shall be a red light on each end of the draw piers. Each protection pier shall have a red light at each free end placed as low as practicable and, when protection piers are provided at the draw piers, only one light is provided on the center line of pier and two lights on the protection piers. Each center pier shall have one red light on each side where the pier is crossed by the axis of the bridge, and placed below the floor level of same. In order to make it distinct, whether the draw is open or closed, there shall be placed three square lanterns with fresnel lenses on the top of the draw span, all of them raised fifteen feet above the top of the draw. These lanterns are to show green along the axis of the draw and red at right angles to the axis. The result will be that when the draw is shut there will be shown, up and down stream, three bright red lights above the permanent low lights; when open, green lights will be seen in line, up and down the stream, with the low permanent red lights showing the width of the openings.

For the Bascule Bridge

2. On the bascule bridge with a single leaf there shall be a red light on each end or rest pier with two red lights, one on each side of protection work, placed as low as practicable. In order to make it clear whether the bridge is closed or open, there shall be placed on the leaf near the point where it rests on the end pier and on the upstream and downstream sides, a suitable marine lamp suspended to swing behind a frame containing panels of red and green colored glass. The result will be that when the bridge is closed there will be shown on the upstream and downstream sides one red light over the end pier and above the permanent red lights. When completely open one green light will be seen at an elevation on one side of the opening and above the low red lights, the latter showing the width of the opening.

With bascule bridges having two movable leaves, two red lights will show in the middle of the stream when the bridge is closed, and two green lights will

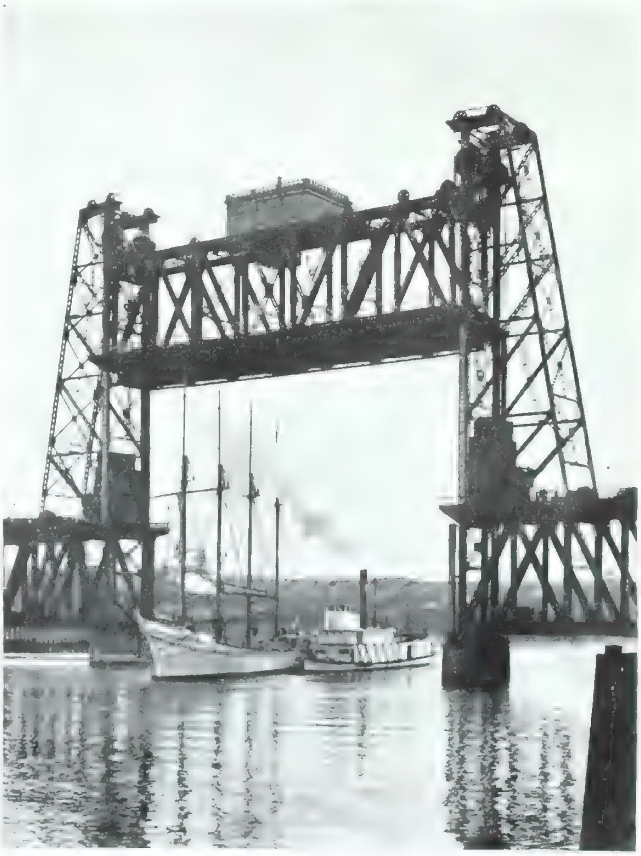


Figure 3, Open Position, Vertical Lift Drawbridge show at an elevation on each side of the opening, when the bridge is open. The permanent red pier lights show the position and width of the opening.

Machinery of Vertical Lift Drawbridge

Red Lights Show Channel

3. On the vertical lift bridge there shall be a red light on each end of the lift piers and where considerable protection work or dolphins are provided, an additional center light is to be provided on each pier. In order to make it clear whether the bridge is closed or open, there shall be attached to the middle of the lift span below the level of the girders and on the upstream and downstream sides of the bridge a set of red and green electric lights and adapted with manual or automatic switches, so that when the bridge is closed the red lights will be illuminated, and when the bridge is completely open the green lights only will be illuminated. The low red lights on the piers will show the channel opening.

The approaching signals of a vessel to a bridge consist of three sharp blasts of a steam whistle denoting that the vessel desires a clear channel. This signal is acknowledged by the bridge operator either by the sounding of a siren or by the ringing of a bell. If for some reason the operator cannot open the bridge, due to, for instance, a failure of the electric power, a number of short blasts are given by the bridge operator in answer to the vessel's signal. It is generally understood that the vessel will signal at least three minutes before reaching the bridge, as this is the time allowed for unlocking and opening the bridge.

In Foggy Weather

During foggy or inclement weather the continuous operation of a signal is required in some cases to denote to the master of a vessel the approximate location of the channel opening. This is accomplished by means of a motor operated mechanism tolling a large bell at certain regular periods.

All bridge lights of the marine type have proved most satisfactory and signals should be made of eight-inch fresnel lenses for both red and green lights. The proper construction of these signal lights means a great deal toward the avoidance of serious damage due to accident.

Marine Insurance Costs

By D. S. McComb

Manager, Marine Office of America*

MARINE insurance has received wide publicity during the last six months. Both houses of Congress have conducted extensive investigations. The report on the status of marine insurance by Professor S. S. Huebner, including the recommendations of the subcommittee on merchant marine and fisheries which resulted from these hearings, is the most complete and authoritative statement on this subject. Several state legislatures and insurance departments also have had hearings and there have been numerous addresses and discussions before the chambers of commerce, boards of trade and similar bodies. All this has been of great value in causing a greater knowledge of, and a larger interest in, marine insurance on the part of the general public, especially those who have been paying the premiums.

It is to the premium payer (and there is probably not a member of the Chamber of Commerce of the United States who is not contributing to the marine premium income of this country) that I wish to speak this afternoon, to point out some ways by which the cost of marine insurance can be reduced.

Reduced Costs—Lower Prices

In foreign trade, with all the leading nations looking for a market for their surplus production, competition will be extremely keen and it will be necessary for our exporters to examine closely each item comprising the total expense of placing their goods in the hands of their customers. A reduction in any one item naturally results in a lower price for the goods delivered.

The marine underwriter acts as the guarantor in such transactions, agreeing to make good a loss or damage caused by the perils set forth in the certificate or policy of insurance. Every shipment of goods from the instant it starts on its journey is exposed to hazards which may result in its total destruction. On railroads there are fires, collisions and derailments; on ships there are sinkings, strandings, collisions and fires. Fire, in fact, is a constant peril, whether the goods are moving, stored in a warehouse or on a pier or shed awaiting shipment. And the elements, lightning, windstorms, tornadoes and floods, at any time may cause damage or destruction. By collecting data for a period of years, it is possible to determine the approximate percentage of loss in a given trade or a given commodity, and underwriters use such statistics as a basis for rates charged.

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*[illegible]

Marine insurance companies act as collection and disbursing agents, receiving premiums from all shippers, and giving them to those who have suffered loss. The premiums in the long run must equal the losses and expenses of the insurance companies plus a reasonable profit for their services. The losses sustained are the determining factor in making the rates, so that each shipper is to some extent responsible for what he is charged. It is, of course, realized that when goods leave a shipper's possession, he has no further control over them, but he should make it his business to see that every precaution in his power has been taken to guarantee their arrival at destination in a sound condition. By careful supervision of the packing of the goods for the trip, and selection of those who will have charge of them, claims can be kept to a minimum. There are many losses which can be classed as unpreventable and humanly impossible to control, but, on the other hand, a large proportion are due to ignorance, carelessness and lack of forethought. Marine insurance premiums on American hulls and cargoes exceed one hundred million dollars a year, and this huge sum represents to some extent the loss involved in handling our goods. This can be reduced by intelligent effort and the amount involved is certainly worth some effort.

What Fire Companies Do

Fire insurance companies here have conducted an extensive campaign for reducing fire losses and many organizations have co-operated in educating the public regarding fire prevention, pointing out the absolute waste by fire, but as yet very little has been done in a broad way to focus attention on the losses from other causes.

The success of one concern in reducing the percentage of loss on its shipments will not only result in reducing the cost of its own marine insurance, but it will affect favorably the cost of others in similar businesses. Conversely, a company with an abnormally high percentage of loss not only increases the cost of marine insurance to itself, but tends adversely to affect the cost to others in similar businesses. When it can be brought home to each shipper that he may be paying for his neighbor's carelessness or incompetence, he will take an interest in endeavoring to change his neighbor's practices.

To secure the best results in transportation, a study of the different routes or lines available should be made, taking it up with consignees to secure information and advices regarding the outward end of the journey as well as information available here. This is especially necessary when the ultimate destination is in the interior—not a seaport; or when transshipment is necessary. Time spent in studying routing well may be repaid in securing deliveries more promptly and in better condition. The packing or container is a matter of the greatest importance. Methods of transportation in some parts of the world are crude and a package should be of proper size, weight and strength to stand the trip. In some cases packages will have to be carried by muleback, across mountain trails, or on coolies' heads. To some ports in China they have to be packed in cases which are metal lined and soldered, for they are thrown into the sea on arrival of the steamer. Insufficient or too light packing or crating makes all classes of merchandise susceptible to sea-water damage; causes the loss of a part of the contents; exposes the goods to climatic conditions; and especially increases the losses caused by theft and pilferage. Liquids and fragile and dangerous commodities require special care in preparation for shipment. Having goods arrive in perfect condition not only reduces the cost of marine insurance, but makes satisfied customers.

They Want Goods, Not Claims

If A and B are competitors and A's goods habitually arrive in good condition and B's goods habitually arrive in damaged condition, even though the losses in B's goods are covered by insurance, it will not be long until A has the bulk of the business. Merchants want the goods they buy and not claims against insurance companies.

The cost of marine insurance would be reduced in many cases if the insured could or did state more definitely what was required. In cases where goods are sold c. i. f., the price including cost, insurance and freight, the seller does not always seem to know definitely what c. i. f. stands for. It is known that the I is for insurance, but that is all. Now, the range of protection that can be secured from marine insurers is very broad, extending practically from covering total loss only to covering any damage whatsoever. Naturally the more complete the protection granted, the more it costs. Some bankers and others financing a foreign trade transaction in order to completely protect themselves have asked for an all-risk cover. In many cases this is unnecessary and needlessly adds to the cost of the transaction. One very large corporation here was filing actually hundreds of claims, the amount of over half of these was less than a dollar each, the corporation was getting a reputation among insurance companies for the large number of claims it was having. It was not that the claims were large, but the company always had some in the process of adjustment, so its name constantly was before the men handling the losses. This was called to the company's attention, and it was shown that its expenses in preparing the claim papers exceeded the amount of loss and it actually was losing money in presenting these claims, so it has discontinued the practice. There always is an expense in connection with the investigation of a claim, the preparation of documents in establishing it and collecting it. Although most of these expenses can be recovered with the loss itself, there is a certain amount of time and work for the assured that is not compensated for. In such cases of trifling claims, expenses of which will be out of all proportion to the loss, it is better to eliminate them.

Must Study Problems

Shippers with their insurance advisors should study carefully their shipping problems, and arrange for a cover that will give them the protection they require; but they should eliminate unnecessary or superfluous coverage and the attendant excessive costs. Many large buyers of marine insurance can reduce the cost in this manner.

Another matter that has been and is adding to the cost of insurance and which can be remedied to a considerable extent by shippers themselves is the increasing evasion of their legal liability on the part of carriers resulting in demands on the insurance companies to step in and make good. The demands on insurance companies to broaden their policies, and assume responsibilities primarily resting on others, undoubtedly will have the effect of increasing present rates, unless it is checked.

Operators Evade Responsibility

Not only with a view of reducing the cost of marine insurance, but for their own reputation abroad, all exporters should insist on having bills of lading under which the carrier is responsible for his full legal liability. And further than this, exporters should advise their consignees of the law here, with instructions immediately to file claims with the carriers in case of loss. It is necessary to advise the consignees of our laws, because there are different laws in different nations and many ship agents are in the habit of denying liability for anything. It would be advisable for exporters to get the laws of the different nations in which their consignees reside, examine the limitations surrounding the filing of claims against carriers, and, having both our own laws and those in force at the point of destination before them, prepare for the consignee detailed instructions how to proceed. There is room for improvement in the manner in which American goods are handled in foreign trade and a few successful suits under the Harter act just referred to would help materially.

Unexpected Costs

All that I have mentioned has had to do with reducing the cost of insurance through an improvement in the risk, bringing about a lower rate; there are some features, frequently overlooked when considering marine insurance, that may cost the assured more than the premium charged through difficulties in adjustments and payments of losses. Difficulties of this kind may result in the loss of customers as well as loss of property.

It has frequently happened after a bad loss that all a concern had to keep it from going under was its insurance policies. The insurance companies guaranteed that they would pay losses from certain causes and in many instances it is only after the loss occurs that the assured seriously inquires into the worth of the guarantee. Many large buyers of insurance now have lists of insurance companies which they have investigated and approved and they accept policies of companies on their list only. Statements of the financial condition of any company can be procured from the companies themselves or from any of their agents. They can also be procured from the insurance commissioners of the different states or from lists or books issued by the different insurance publishing companies. No one should accept a policy or certificate or other evidence of insurance until he has satisfied himself that the company can and will fulfill its obligations if called upon to do so. The policyholder should see that his insurance corresponds with his invoice in the description of the goods and in amount. Many losses have been sustained by taking policies in depreciated foreign currencies, which were supposed to represent the amount of the invoice, but, due to drop in exchange, were less at the time of loss. It is best always to have insurance in dollars.

Representatives Needed Abroad

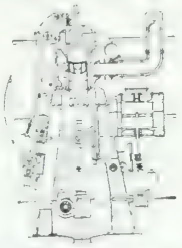
The next important thing is that the insurance company have a representative, settling agent or claim agent in the country to which the goods are to be sent, who will be in a position to survey or arrange to have surveyed any damage to goods on arrival, or put up general average bonds when occasion requires. There has been much dissatisfaction on the part of consignees who have received damaged goods to find that the insurance company insuring them had no representative in their country. They had to refer back to the one from whom they purchased the goods for instructions. Delays of this kind may result in increasing the amount of damage to the goods, and also injure the business of the concern who sold them. An occurrence of this kind may prove very costly. See that your underwriter has a representative with whom your customer may deal, and, further, that funds are available in the foreign city immediately to pay the claim when the amount has been determined. Theoretically, the interest of an exporter selling c. i. f. ceases when the goods are loaded on the steamer and he hands over the bill of lading, invoice, insurance certificate and other papers and receives his money; but if there is a loss it will do him no harm if the loss is satisfactorily and promptly settled—and it may do him much harm otherwise.

There is just one more point I would like to touch on (and I believe it may properly be considered with marine insurance costs, for it has undoubtedly been expensive to many Americans), and that is what might be called "nationalism," the elimination of citizens of a third nation in the business relation of two. Before the war, in foreign trade enterprises, an American frequently was compelled to place his goods and his papers in the hands of his chief foreign competitors to carry on his business. To be specific, let us consider Germany before the war, when the use of her facilities was being extended to Americans. An American sending goods to the Far East could use a German ship, be financed by a German bank and insured in a German insurance company; for all of this they got a profit and more. The shipowner, banker and insurer all got very valuable data concerning the business of the American, especially if there was a loss which allowed full examination of the goods and permitted requests for information on manufacture, costs of parts, etc. It is said that all such data was carefully compiled for the benefit of German competitors.

Deal With Fellow-Citizens

To be on the safe side, it undoubtedly is best to deal with one's own fellow-citizens and natives of the country traded with. This is the rule of the countries that have been most successful in the development of their foreign trade. Our merchants, importers and exporters are dependent on the services of ship operators, bankers and underwriters to carry on their business. The American merchant marine is now in operation, American banks have their branches throughout the world, and American insurance companies stand ready to furnish the protection for all American foreign trade transactions. Development of the idea of Americans working with Americans in foreign trade will not only strengthen them all collectively, but individually, and will tend to keep those indirect costs down. All that is saved through the prevention of waste or needless loss is equal to just so much increased production.

Oil Engines and Motorships



Motor Shipbuilding in Europe

Glengyle, One of the Glen Line's Motorships

EVENTS are moving so rapidly in the shipbuilding world in Europe that it is a little difficult to keep in touch with all the developments. A prominent shipbuilder told the writer the other day that he had to refuse an order for ten standard motor ships from one of the largest British shipowners, as he did not wish to build any further vessels until those he now had under construction had been at sea for some time, in order to prove that they were thoroughly satisfactory in every way. It is therefore not the shipowner who is unwilling to take the risk, but the shipbuilder—a complete change of attitude from that which existed some years ago, when it was almost impossible to make any shipowner consider the desirability of installing oil engines instead of steam engines. The fact of the matter is that British shipowners are now convinced that they will have to pay more and more for their coal, and what is perhaps of still greater importance to them is that they are experiencing very considerable difficulties in obtaining the necessary coal without prolonged delay in port. In spite of the statement of the coal owners that the price of bunker coal would be reduced to 75/- a ton, it is still frequently necessary to pay 105/- a ton.

Four Doxfords Being Built

Among the new orders that have been placed recently is one for a Doxford motorship, making four in all which are now being built. The first has been launched and the machinery for this is now being erected in the shop. All these vessels are of the same type and size, carrying 10,800 tons of cargo, and two of them are for the Transatlantic Company of Gothenburg, the owner of several Burmeister & Wain engined motorships; and the first is to be run by Doxfords themselves. This policy is undoubtedly wise, for they will be able to gain all the necessary experience in the working of their first vessel and embody the results in their future designs.

The engine which they are installing in each of these standard ships is the highest powered type yet fitted in any mercantile craft. It develops 3000 i. h. p. at 77 r. p. m., or about 2650 b. h. p. The reason for this high mechanical efficiency giving a relatively large brake horsepower is that there is no air compressor, and all the auxiliary pumps, including the lubricating oil and circulating water pumps, are driven separately. There is thus only the scavenging pump to be operated from the engine and it is anticipated that the mechanical efficiency will be quite as good as the average steam engine. The engine is of massive design and is probably as heavy as the average four-cycle motor. The fuel consumptions of these 10,800-ton standard ships fitted with various classes of machinery are interesting. The steamer, burning coal and averaging 10½ knots, has a consumption of 36 tons a day, whereas the same vessel with oil-fired boilers uses 22 tons of crude oil daily. With the oil engine the amount of oil consumed is only nine tons for the same speed, and the engine room staff is reduced from 21 to 10.

Engine Most Flexible

It is asserted that with this Doxford engine running at a maximum speed of about 77 r. p. m., and a normal speed in the boat of about 70 r. p. m., it is possible to reduce the speed to 18 r. p. m. and run continuously at this low rate of revolution. If this is the case, the engine will be the most flexible of its type ever constructed and will be capable of the same degree of variation as is possible in any class of steam engine. The manufacturers are so satisfied with this motor that they are considering the construction of engines of 4000 i. h. p. and later of 6000 i. h. p. motors with six cylinders.

Another well-known British shipowning firm to enter the ranks of motor shipowners is the Bibby Line, the vessels of which trade mostly to the East and South Africa. The first ship for the firm has just been launched by Harland & Wolff from Belfast and is one of the standard types similar to five or six which have already been built for the Glen Line. They have a deadweight carrying capacity of 10,500 tons and are fitted with twin-screw machinery developing about 3500 h. p. This machinery is constructed by Harland & Wolff on the Burmeister & Wain principle, and the Glen Line has found the type of ship very suitable for the Eastern run. The low fuel consumption of about ten tons of oil a day is noteworthy.

It is understood that the Glen Line has contracts for oil fuel at between £3 and £4 a ton, so that the cost of fuel for operating vessels of this class is only between £30 and £40 a day, which compares very favorably with the figure of £150 to £200 for running a coal-fired steamer of the same size. In addition to the Bibby Line, Lamport & Holt also have vessels of the same type under construction, which are due for completion before the end of the current year.

Trial of the Afrika

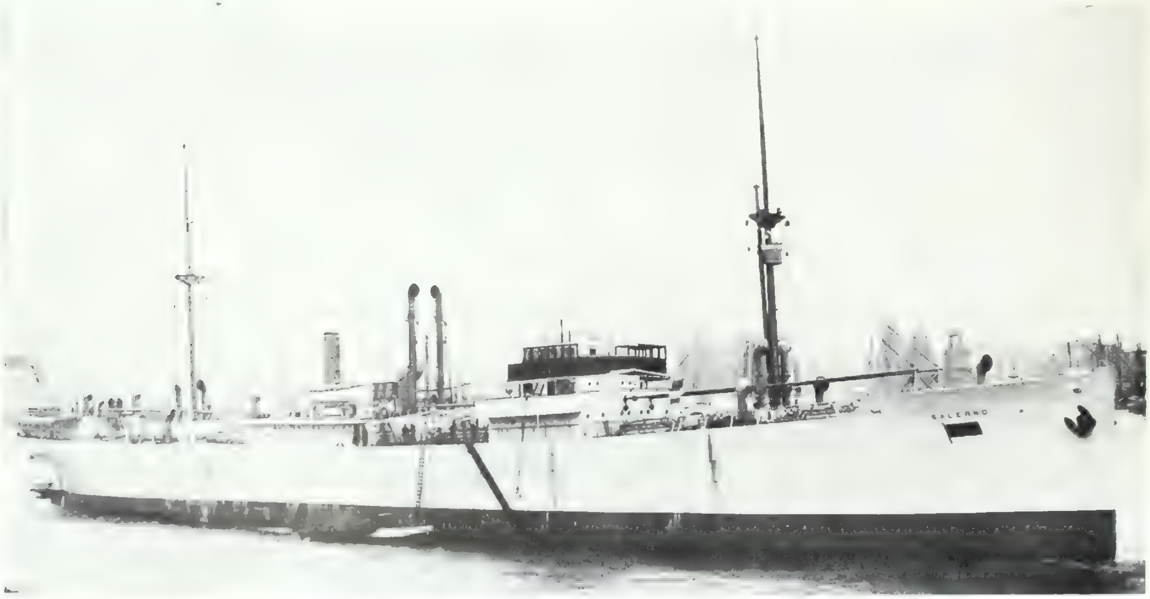
Perhaps the most interesting recent event in the shipbuilding world in Europe was the successful running of the trials of the largest motor vessel that has yet been put into commission. This is the motorship Afrika, built at Copenhagen by Burmeister & Wain for the East Asiatic Company for trade between Scandinavia and South Africa. She carries 13,000 tons deadweight and is equipped with two 2250 i. h. p. Diesel engines similar to those which are to be installed in the motorship building for the United States Shipping Board and two for the American-Hawaiian Steamship Company, recently ordered from William Cramp & Son. The trials of this large vessel were extremely satisfactory and were carried out from Copenhagen at the end of March. The fuel consumption of the ship is but little more than twelve tons a day and she averages about twelve knots when fully laden. The East Asiatic Company is so convinced that this type of large and relatively fast motor vessel is the most suitable class for its trade that it has ordered eight or nine similar ships, contracted for completion within the next couple of years.

The Glen Line, of London, which is steadily building up its motorship fleet, has just added two vessels, the Glensanda and the Glentara, both of which are to sail on their maiden voyages soon. It will be gathered that an advanced degree of standardization has been reached by Harland & Wolff in building motorships, for these two vessels are similar to six or seven others which have been turned out in the past few months and to about a dozen more which are now under construction. The aim of this firm is to turn out a motorship every two or three weeks, and in order to achieve this purpose it has just purchased a large ordnance factory at Glasgow, although its existing works have been enormously enlarged during the past year. The new ships are fitted with the usual Harland & Wolff machinery of about 3500 horsepower and the carrying capacity of the vessels is approximately 10,500 tons.

Glen Line May Build

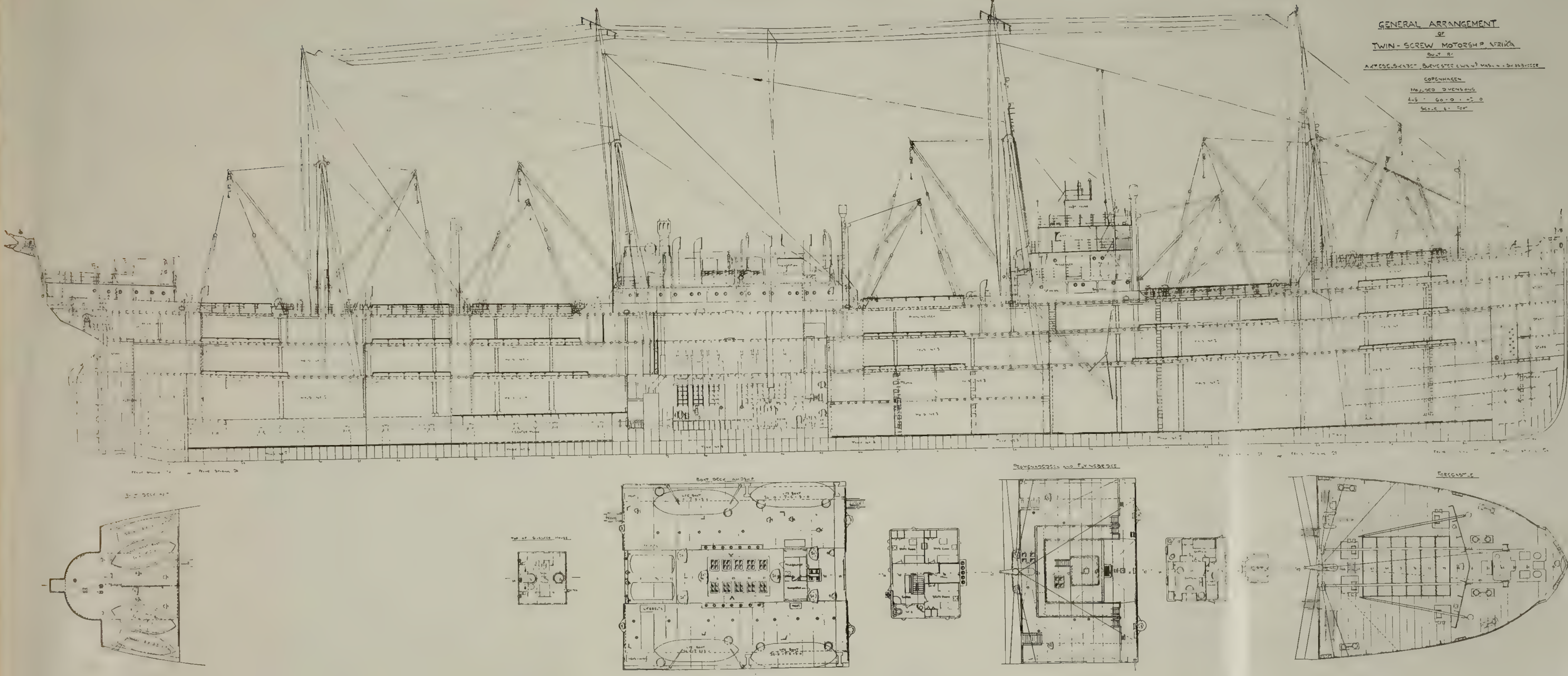
There are rumors that the Glen Line is likely to enlarge its activities to a considerable extent and to build up a fleet of about thirty or forty motorships to trade to all parts of the world somewhat on the same lines as the East Asiatic Company. The motorship offers particular advantages for very long voyages and a motor-driven fleet covering the whole world appears to be one of the soundest possible propositions. Curiously, Lord Pirrie, who controls the Glen Line, also works in conjunction with the East Asiatic Company, and it is not surprising, therefore, to find these two concerns following much along the same lines. Incidentally, all the East Asiatic Company's ships are equqipped with Burmeister & Wain engines, and those of the Glen Line are constructed by Harland & Wolff under license from Burmeister & Wain.

Two very interesting trial trips are due to take place almost immediately after these notes are written. The first is of the small 500-ton coaster, built for the Ellerman Line. In this vessel the 500-horsepower Cammellaird Fullegar engine is installed, a description of which has already appeared in these columns. This engine, which offers such great advantages, has not yet been tried out at sea and the results achieved in actual service will be of the greatest importance in showing the possibilities of the new design. It will be remembered that this is an opposed-piston type with oblique rods connecting the crosshead of one top piston



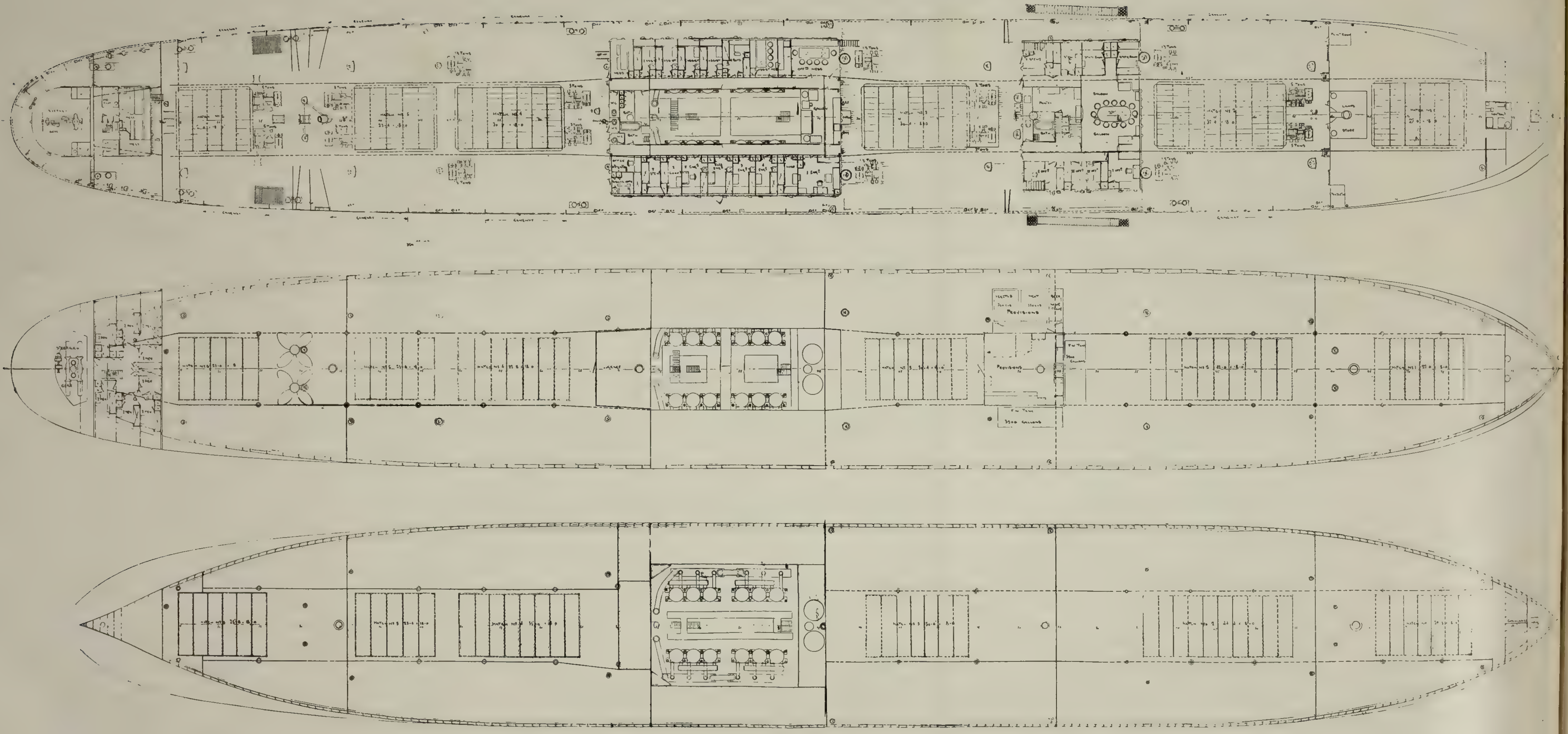
New 6500-ton Motorship Salerno, Fitted with Two 1400 i.h.p. Werkspoor Engines

The Afrika—World's Largest Motorship



Inboard Profile and Superstructure Plans

The Afrika—World's Largest Motorship



Deck Plans

with the crosshead of the bottom piston of the adjacent cylinder. The only doubt about this type of motor is the possibility of excessive vibration, and if shipowners can be convinced on this score it is probable that it will have an extended application.

Vickers Engines Different

The other trial trip is that of the first Vickers post-bellum motorship, a 10,500-ton tanker for the Anglo-American Oil Company. The engines installed are in many respects new, although in general principle they follow along the usual Vickers design with solid injection operating on the four-cycle principle. Twin-screw motors developing 2500 b. h. p. are fitted, and, as it is intended to standardize this type of motor for installation in a large number of vessels for which orders are pending, the builders naturally are anxious to ascertain that it is satisfactory in all respects. The motors were rushed through the shops somewhat hurriedly, as the boat was urgently required, so that they have not had a long period of testing in the works, which is generally desirable with a new type of motor.

Burmeister & Wain's latest Motorship, the Afrika, ready for her Trial

The World's Largest Motorship

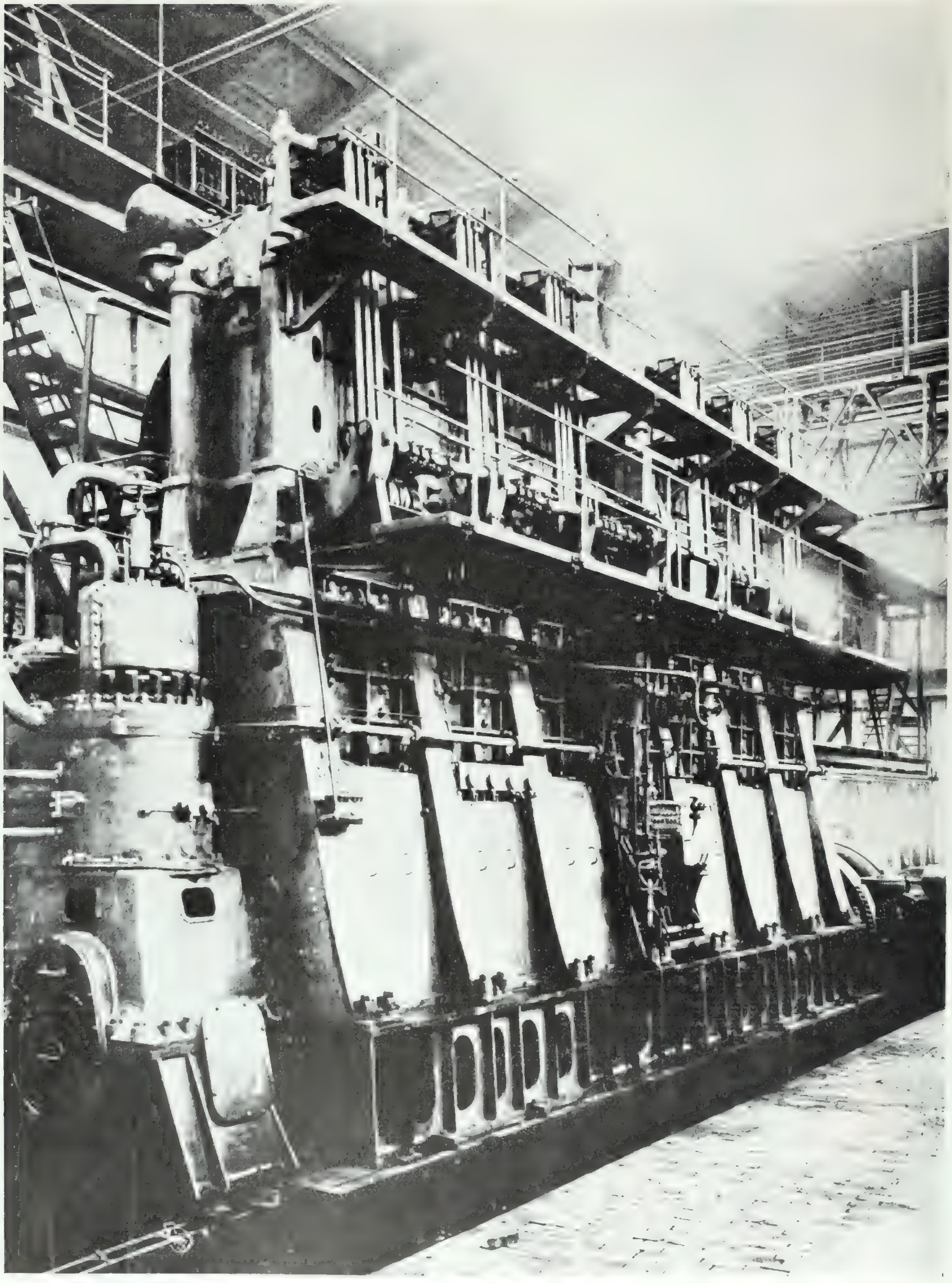
THE twin-screw motorship Afrika, built by Messrs. Burmeister & Wain of Copenhagen, Denmark, to the order of the East Asiatic Company of the same city, represents in her construction and equipment the latest development in ocean-going motorships. Her dimensions and tonnage are considerably in excess of any other motorship afloat.

This vessel was built to class under 100-A British Lloyds' special survey, and the scantlings of the more important parts of the construction are in excess of Lloyds' requirements. The leading particulars of the vessel are‘ Length overall, 464 feet 6 inches; length between perpendiculars, 445 feet 0 inches; breadth molded, 60 feet; depth molded to awning deck, 42 feet; gross tonnage, 8597 register tons; net tonnage, 5408 register tons; deadweight tonnage, about 13,300; capacity of hold, approximately 700,000 cubic feet of grain; fuel oil capacity, about 1500 tons; indicated horsepower, 4500.

The hull is built with three continuous decks and a platform deck in the refrigerated hold space. Seven watertight bulkheads divide the hold and machinery spaces. Numerous cargo hatches are provided, all of which are eighteen feet in width and vary in length from twenty-three to forty-two feet. Deck machinery for handling the cargo consists of six 1½-ton winches; ten 3-ton winches and four 5-ton winches, all electrically-operated. The foremast is equipped with a 30-ton derrick and the main and mizzenmast with 15-ton derricks. All other deck machinery, including windlass and all capstans, are operated electrically and the steering engine is of the hydro-electric type.

Accommodations for deck officers and for a few passengers are arranged in the forward deck-house and on the bridges, and are fitted out with many

One of the four 100 h. p. Burmeister & Wain Diesel Engines direct connected to Electric Generator



One of the 2250 h. p. direct reversible marine type Burmeister & Wain Diesels for the engine room of the Afrika refinements suitable for comfort in the tropics. The engine-room staff and crew are berthed amidships and in the poop, rooms for the crew being fitted out so as to allow one room for each two men. Five separate mess rooms are provided for the officers and men of different grades.

The engine-room machinery consists of two sets of Burmeister & Wain, four-cycle, standard marine Diesel engines of the enclosed forced lubrication crosshead type. Each engine has six cylinders with 740-millimeter diameter and 1150 millimeter stroke. Each engine develops 2250 i. h. p. at 115 revolutions a minute. The main compressors are driven off each engine shaft and are of the usual three-stage Burmeister & Wain standard type. All the other necessary pumps and auxiliary machinery in the engine room are independent of the main engines and are electrically driven. Four auxiliary 100 h. p. Diesel engines of Burmeister & Wain make, direct-connected to electric generators, provide the power for the auxiliaries. These engines are interchangeable in every way.

On trial the Afrika was run at an average speed of 13½ knots in four runs over the measured mile and everything about the ship worked to the satisfaction of the builders and the owners. The vessel was especially designed for the trade between Western Europe and the Far East, and the oil fuel capacity is sufficient for a journey one and one-half times around the world.

She is now on her first voyage from Copenhagen to the Orient and undoubtedly will ere long be poking her nose through the Golden Gate. Her performance is being watched with a great deal of interest by American shipowners and by the Shipping Board as her propelling machinery is practically identical with that which the Shipping Board is installing on the big motorships building at Cramp's in Philadelphia. In fact, the engines built for the Afrika were released to the Shipping Board by Burmeister & Wain and another set built for their own ship.

Submarine Light Fishing

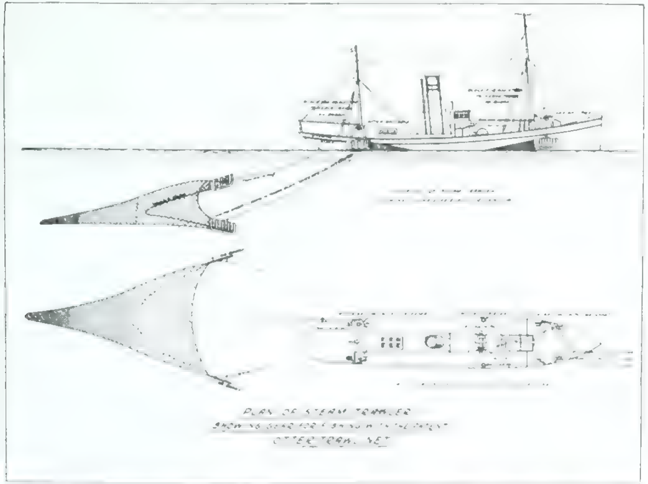
By Renwick Z. Dickie

IN practically all of the great fishing grounds along ocean coasts will be found banks with rocky bottoms that cannot be worked out by the ordinary trawling net. It is a well-known fact that many of the best varieties of fish abound on these banks, but efforts to harvest fish there have been confined to the hook-and-line method. This is very unsatisfactory, as these locations frequently are covered by a warm stratum of water where sharks and other preying fish abound; and on set lines the hooked fish often is eaten by his big brother before he can be pulled up by the fisherman.

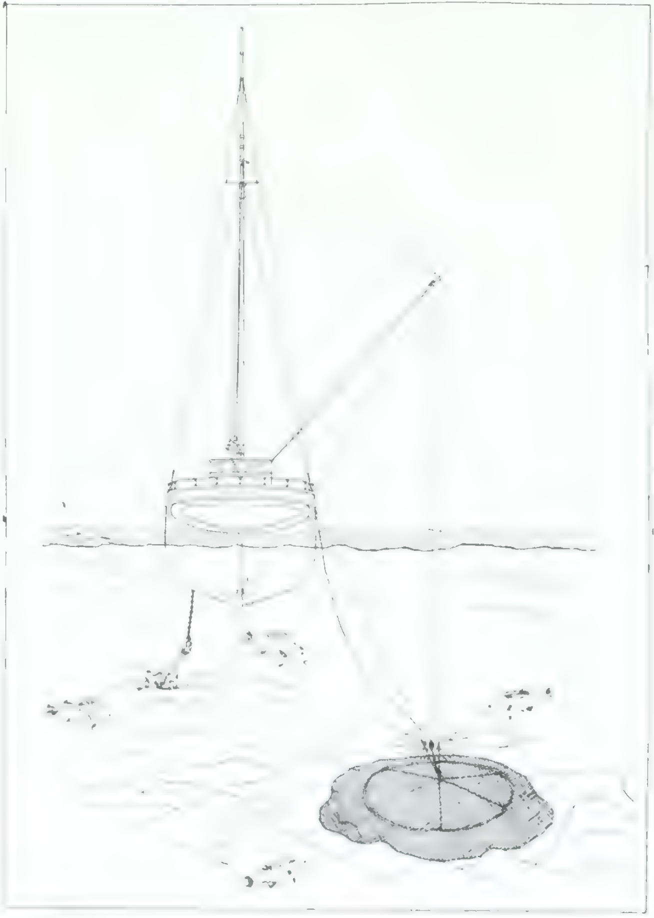
Otter-Board Trawling

The purpose of this article is to suggest a method of net fishing that would be practicable on these rocky banks and probably would result in greater overall economy for ocean fishing. The system now almost universally in use is known as otter-board trawling. The vessels used for this purpose average about 135 feet in length by 22 feet beam and are powered with engines developing from 250 to 500 horsepower. The nets used are towed by means of a three-inch steel wire cable, which usually is of a length equal to three times the depth of water desired above the net. The speed of towing is about two and one-half miles an hour and at this speed the mouth of the net, deflected by the otter boards as shown in the illustration, spreads to a width of about 120 feet.

These nets are towed for about an hour and one-half; then the otter boards are hauled up on gallows frames and the bag of the net is brailed empty of its catch. This operation takes about twenty



Diagramatic sketch showing method of fishing with otter trawl net



Diagramatic sketch showing suggested method of fishing with submarine light minutes. The net is then reset for another catch. The success of this type of fishing depends very greatly on the experience of the captain operating the boat and on the skill of the crew in handling the net.

Bottom Must Be Smooth

It will be obvious that this type of fishing cannot be used where the net would be caught by any obstructions; if the fishing is to be near the bottom, the bottom must be almost absolutely smooth.

In order to make practicable fishing on uneven bottoms, it is proposed to equip a small schooner with a number of ring nets like those used for crab fishing and with an electric drive, so that one of the main engines can be used to operate submarine electric lights for attracting fish to these nets and also for supplying power to the winches used in hoisting the net with its catch. By this method a number of booms and nets could be operated from one vessel. The bags of these nets would be brailed by the same method that is now used with the other board trawl nets. Marine Diesel electric plants in several sizes of units suitable for this purpose are now being manufactured by the Winton Engine Company of Cleveland, Ohio. The entire outfit for this method of fishing will cost less than the trawlers now in use, and the operating cost would be about one-half of that for the trawling system, so that its use would result in greater net profits to the fisherman on a smaller price to the consumer.

With Success at Gibraltar

Just how long it will take the light to attract sufficient fish to fill the bag must be determined by experience. During the war the crews of the submarine chasers, while anchored at Gibraltar, amused themselves by lowering one of the engine-room portable lights and fishing all around it with hook and lines with remarkable success.

A HAVRE-PARIS PIPE LINE

According to Le Petit Havre, active steps have been taken toward the accomplishment of the plan for the construction of a pipe line from Havre to Paris, permitting American cargoes of fuel oil to be discharged from the steamer at Havre and piped to the capital. The publication says, in part:

A few weeks ago Senator Beranger estimated that the quantity of heavy petroleum oils, of which the annual importation must be foreseen, beginning with 1921, would be 5,000,000 tons. This quantity must include 500,000 tons of heavy oils for internal-combustion motors (Diesel gas oil) and 4,500,000 tons of heavy oil for domestic use (fuel oil).

Considering the facilities of the deep-water ports and the possibilities of consumption in each region, the importation must be distributed as follows: 1,000,000 tons by the port of Dunkirk, 2,000,000 tons by Havre and Rouen, 1,000,000 tons by St. Nazaire, La Pallice, and Bordeaux, and 1,000,000 tons by Balaruc and Marseilles.

Naturally, of the 2,000,000 tons that must be discharged at Havre about 1,200,000 tons will have to be directed to Paris for supplying railways and factories. Importers of fuel oil have been led to consider the establishment of a pipe line. The calculations show, in fact, that a canalization and its accessory equipment capable of discharging at first 100,000 tons and later 200,000 tons a month would cost 75,000,000 francs ($14,475,000 at normal exchange) and could be established rapidly.

The actual budget difficulties would not permit the government to assume such an enterprise. Hence it may be readily seen that the minister received with enthusiasm the offer made to him by the Societe Francaise, which offered to construct the pipe line and the discharge dock at Havre at its expense, without subsidy, and even to pay certain duties.

The proposition was really attractive, and the plans presented all the desirable guaranties, since they were established, thanks to the assistance of three American engineers specializing in these kinds of constructions and summoned by telegraph from the United States—Commerce Reports.

DIESEL ENGINES FAVORED BY SWEDES

It is stated that about 75 per cent of the steamers now under construction in England will be equipped for both oil and coal fuel. In this connection it is of interest to note that 70 per cent of all ships now building in Sweden will be equipped with Diesel motor engines. The opinion in Sweden is that the oil engine is decidedly superior to the combined oil and coal burners and this opinion is supported by the testimony of the large Swedish shipping companies that have used the Diesel motorships for many years. As the Diesel engine steamer seems to become the prevailing type in the Swedish mercantile marine, several of the largest shipyards have changed their equipment in order to be prepared to build the new type exclusively. The largest shipyard in the country, Gotaverken A/B at Goteborg, has enlarged and altered its docks and workshops with a view to using the new type, and other large yards are expected to follow this example. At present there are being constructed at Gotaverken four Diesel engine steamers of a combined tonnage of 37,000 and one steamer of 7500 tons. At Lindholmen A/B Goteborg there are now being built three ships of the combined oil and coal-burning type with a total tonnage of 24,000; at Kockums A/B, Malmo, a Diesel engine ship of 8000 tons is under way; and at the shipyard of the Oscarshamn Shipbuilding Company there are under construction four ships for oil burning.

NEW ENGINEERING BUREAU

James McKinlay has recently opened in Portland the American Engineering Bureau, which furnishes consultation services on naval architecture, marine engineering, surveying, mechanical engineering, industrial engineering, design and construction and provides authoritative figures on estimates, purchases, appraisals and sales.

James McKinlay has had a long and successful experience as a practical naval architect and shipbuilder, covering all classes of vessels and all departments of marine engineering, and this office under his leadership should be of great service to shipowners and operators on the Pacific Coast.

The office is located in the Chamber of Commerce Building, Portland, Oregon.

Japanese Shipping and Shipbuilding

Exclusive Correspondence of Pacific Marine Review

THE shipping trade of Japan is sharing largely in the general trade depression which set in throughout Japan in March and has been gradually getting worse until fear of a panic is not far distant. As a result, the shipping companies are restricting their expenditures drastically and devoting their energies to securing higher rates on their cargoes and better fares from their passengers. The cessation in the European demand for bottoms, due largely to the heavy adverse exchange against the charterers, and the vastly increased competition from America, left the Japanese shipowners dependent to a very large extent upon the coasting and "near-sea" trade, which during Japan's heyday of war prosperity had grown most important. Now, however, with the bottom dropping out of internal business, that last ray of hope is glimmering out and the shipping interests feel that they are getting back to the stern realities of world-wide competition.

Cargo Offerings Decrease

For some time past the coasting trade has been brisk as compared with ocean carrying and it had been expected that increased shipments of beans and bean cakes from Dairen, lumber from Hokkaido and sugar from Java in a measure would revive the shipping market. With the rapid tightening of money, the fall in the prices of commodities and the timidity that these have brought to importers, together with the fact that a number of ocean-going vessels have been transferred to the coasting trade, the rates not only have fallen under extended competition, but the actual cargo offerings have decreased.

The Osaka Shosen Kaisha and the Toyo Kisen Kaisha, two of the leaders in the Japanese shipping world, already have cut down their staffs by the score, the employes released including several important officials, while more heads are expected to fall. The Nippon Yusen Kaisha has not as yet followed this example, but inasmuch as its dividend will have to be reduced to 35 per cent from what has become the regular 50 per cent, reductions in overhead are looked for.

Bankruptcy or Absorption

Some of the smaller companies born of the war conditions are reported to be in difficulties, especially those carrying ships on long-term charters taken out under high rates, which are now being operated at heavy losses. Bankers are refusing to carry some of these concerns, which face the prospect of a choice between absorption by some of the stronger companies or bankruptcy.

In addition to decreasing revenues, the working expenses of the shipping companies are growing and figures have been published to show that the advantage once enjoyed by the Japanese shipowners of being able to operate their ships at costs below those of their British and American competitors, is gone. Although the salaries of Japanese officers and the wages of Japanese sailors may be below those paid by British and American owners, the efficiency of the Japanese is lower and the ship's complement must be on that account larger, this more than equalizing the difference in pay of the individual. One Kobe shipping firm presents the following figures relative to the comparative efficiency of the Japanese, British and Americans at sea, the following being the average number of seamen employed for each class of ship:

Deck Complement

D. W. Tons	Japan	G. B.	U. S. A.
3500 - 4000	11.8	11	8
4000 - 5600	13.0	11	10
5600 - 7500	13.8	14	11
7500 - 8800	18.8	14	13

Engine Complement

D. W. Tons	Japan	G. B.	U. S. A.
3500 - 4000	13.8	8	12
4000 - 5600	16.6	9	12
5600 - 7500	18.0	16	16
7500 - 8800	21.6	16	18

On Par With Americans

It also is pointed out that, although the monthly pay of seamen and officers aboard a Japanese ship is less than that of others, the various bonuses and other concessions bring the actual earnings up to the level of British and Americans. Mr. Yonejiroh Ito, one of the directors of the Nippon Yusen Kaisha, in an article on the general shipping situation which argues for increased freight rates to save the situation, says in relation to seamen's wages: "The monthly wages of the crew of a steamer of about 10,000 tons amount to about yen 8000 in the case of British vessels, while an American ship of similar size requires about yen 12,000. In Japan the wages have increased beyond the figures of the British crew, and in some cases approximately to that of an American crew."

With increased wages and the great increase in the price of coal, the working expenses of the Japanese shipping companies are now estimated at not less than yen 5 a ton, as compared with about yen 3 a ton two years ago, while the present average charter rate is now around yen 8 as compared with yen 21.50 of two years ago. It is estimated that the receipts from abroad of the Japanese shipping companies this year will not exceed yen 100,000,000, which is only about one-sixth the net receipts in both 1917 and 1918.

Would Increase Rates

Accordingly, the N. Y. K., O. S. K. and T. K. K. have made joint application to the Department of Communications for permission to increase their freight rates for the homeward voyages on their Australasian, European, North American and South American runs, which are under government subsidy, and it is expected that the requests of the companies will be granted, at least in part. The increase to be made in respect to freights from North America must necessarily be very small, inasmuch as exchange is now running against Japan in respect to the United States, while the rates quoted by American companies for Japanese cargoes are closely parallel to those now charged by the Japanese.

Shipments from Japan to North America have been falling off, especially in raw silks, which increased bean and oil shipments have not offset; and Japan-bound cargoes have been increasing. The result is a great disparity between outgoing and incoming freight rates, the general rate from

Japanese ports to American Pacific ports being weak at $4 to $5, and to Atlantic ports at $25, while the return rates are $16 for general cargo and $12 for iron and steel from Pacific ports and $25 for general cargo and $20 for iron and steel from New York.

Australia Cargoes Decline

Australia-bound cargoes also are falling off, due to the adverse exchange against Australia, the average high price of Japanese products and in part to the anti-Japanese sentiment that is cultivated among the Australians, but exporters in Japan look for an improvement, as there are still many difficulties in the way of Australia securing her needed supplies in Europe. The standard rate on exports is now 50 shillings a ton, while the rate on Japan-bound cargoes, principally of wheat, stands at 100 shillings.

The same three leading companies that have applied for increased freight rates are preparing an application to be presented for the privilege of increasing once again their North American passenger rates. This will be based on the fact that the Department of Communications and the Navy Department are continuing to urge the operation of superior passenger ships, which the companies cannot afford to do at the present rates.

Greater competition than ever is expected this year in the carrying of Japan's tea crop, which will be about the average of 55,000 tons. Three new companies, it is understood, will be in the bidding: the Pacific Mail, Admiral Line and the Taiyo Kaiun Kaisha, to compete with the C. P. R., T. K. K., N. Y. K. and O. S. K. Last year the tea rate to America was $8 a ton.

New Organization in the Air

Baron Kondo, president of the Nippon Yusen Kaisha, at a recent meeting of the Shipping Council, an advisory branch of the Department of Communications, advocated the organization of a new shipping association, to supersede the present Shipowners' Association of Kobe, which represents the smaller independent companies, and the association which is made up of the larger subsidized corporations. The N. Y. K. president pointed out that under existing conditions in shipping, there must be unity among all the Japanese companies and not two associations more or less opposing each other.

Following this statement, the N. Y. K. made application for membership in the Shipowners' Association, which example the other big companies are expected to follow, thus making the present association of independents the one general association for all shipping concerns. In anticipation of this, the association already has begun the revision of its regulations.

Continue to Build Ships

In spite of the present outlook, however, the Japanese companies continue to place orders for new ships, and it is estimated that the output of the Japanese yards this year will be slightly larger than that of last year, when a total tonnage of 703,000 tons gross in vessels of more than 1000 tons was launched. This year it is expected that 151 ships of 1000 tons and over will take the water, aggregating 717,030 tons. Of these, the Kawasaki Dockyard will launch twenty, totaling 119,840 tons; the Osaka Iron Works, twenty-one, aggregating 98,300 gross tons; the Mitsubishi yard, fourteen, totaling 86,766 tons; the Asano Shipbuilding Company, fifteen, of 82,500 tons; the Yokohama Dock, fourteen, of 82,000, and the Uraga Dock, sixteen, of 64,720 tons. Twenty other shipbuilders will launch from one to eight ships each of 1000 tons and more.

A number of foreign-placed orders have been announced. The N. Y. K. has contracted with a Glasgow company for two passenger boats, of 4500 tons each, and with a designed speed of eighteen knots, for the special Nagasaki-Shanghai service. The price is believed to be between yen 500 and yen 600 per ton, the boats to be of superior type and with de luxe accommodations. The reason for not having them built in Japan is given out as due to the inability of the local yards to get the special materials required. This company has set out to acquire 500,000 tons of new freighters and passenger ships within the next five years, and in pursuance of this recently purchased three freighters, one of 6400 tons from the Uraga Dockyard, and two of 11,000 tons each from the Yokohama Dockyard. The Uraga ship purchase price for July delivery is given out at yen 325 a ton, the larger ships being valued at yen 320 a ton, one to be delivered in September and the other in October. The company also has recently placed orders for five 8000-ton freighters, two with the Mitsubishi Shipyard and three with the Yokohama Dock.

Orders Placed Abroad

The O. S. K. also has placed a foreign order with a London yard for two 12,000-ton freighters, to be delivered by next February or March. As the O. S. K. is closely connected with the Osaka Iron Works, the placing of this order is thought to be with an idea of testing out the latest British construction. The plans of the O. S. K. are to build seven new ships within the coming year, including the two to be built in London. The Japanese construction program includes two vessels of 10,000 tons and three of 6500 tons.

One of the early launchings of the month was that of the Eastern Sailor for the United States Shipping Board by the Harima Dockyard, near Kobe. The Eastern Sailor is an 11,000-tonner.

The Osaka Shosen Kaisha has announced that the company's South American service via South Africa has been increased to ten sailings a year, with the following ships on the run, to sail from Yokohama at regular intervals: Seattle Maru, Mexico Maru, Chicago Maru, Canada Maru, Tacoma Maru, and Panama Maru. On the outward trip the steamers will make regular calls at Kobe, Nagasaki, Hongkong, Singapore, Mauritius, Durban, Capetown, Rio de Janeiro, Santos and Buenos Aires, with occasional calls at Calcutta, Colombo, Reunion, Delagoa Bay, East London and Algoa Bay. The homeward-bound ports of call are from Buenos Aires, New Orleans, Panama, San Francisco or Los Angeles, Yokohama and Kobe, with occasional calls at Rosario, La Plata, Montevideo, Havana and Galveston.

Four Companies Strong

The latest report of the Department of Communications shows that at the end of January the Japanese merchant marine included 3059 steamers of a total of 3,043,165 tons gross. A little less than one-third of the combined tonnage belongs to four companies.

The March reports covering arrivals and departures in Japanese ports show that in that month for the first time in Kobe, the largest port, American arrivals outnumbered British, although in total tonnage the British continue to hold a small lead. During the month thirty-three American steamers entered the harbor, to twenty-nine British. Clearances for the month show British thirty-three, with 217,266 tons, against thirty-two Americans of 181,753 tons. Three French steamers, three Dutch and one each from Italy, Russia, China and Denmark were the other foreign arrivals in March, with a total of 1214 Japanese and an aggregate tonnage of 1,749,803. The reports from Yokohama show a very great increase in tonnage using that port, on April 7 there being 119 steamers and fifteen sailing vessels within the harbor and fifteen big freighters waiting outside for berths, the greatest number of ships ever at Yokohama at any one time in its history.

Harbors Are Congested

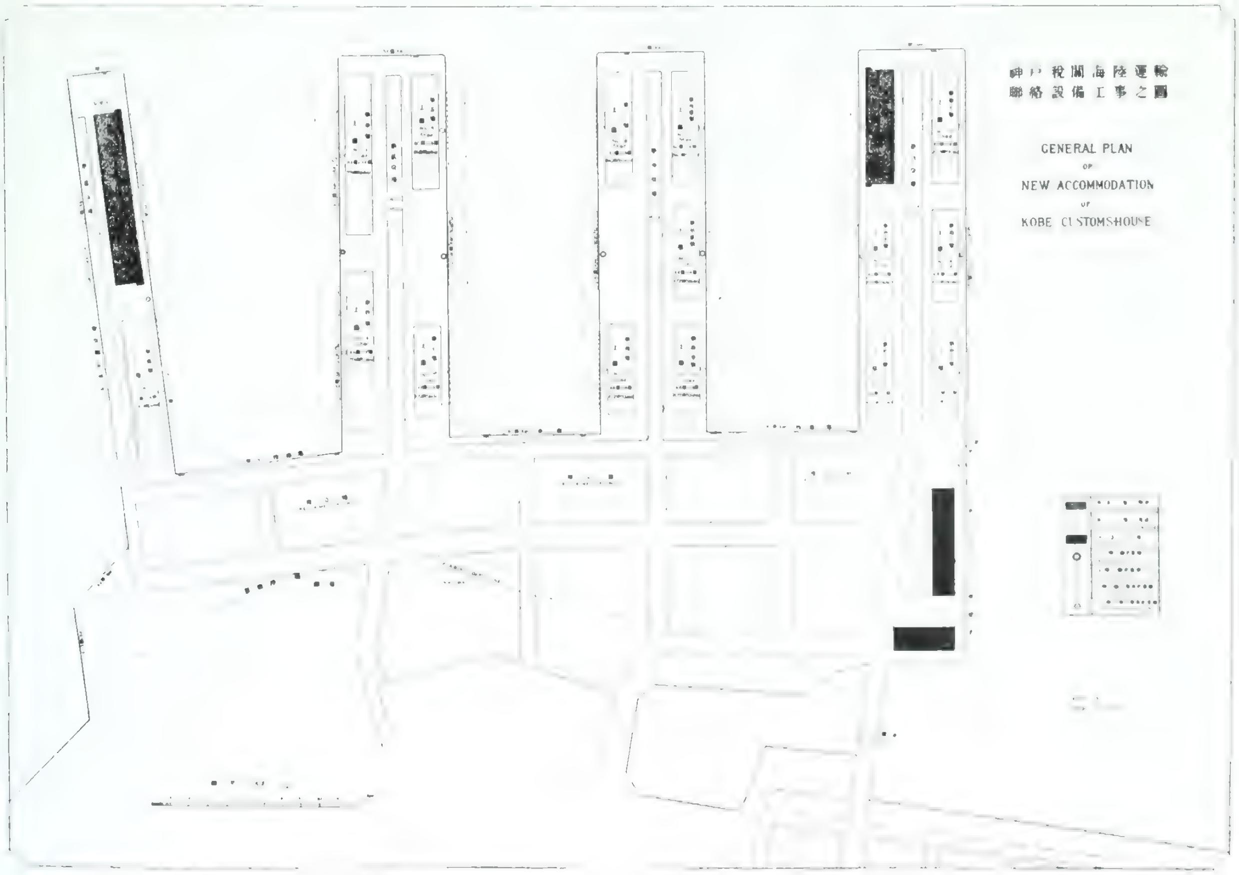
As a result of this increased shipping, both Kobe and Yokohama harbors have been congested, with bad weather and labor troubles adding to the confusion and delay. At both ports the port authorities are petitioning for the right to unload steamers into floating warehouses, into which old wooden vessels are to be transformed, there being at times no warehouse room ashore within the customs compounds into which freights can be piled. One Yokohama shipping man is credited with the statement that it would take two months to clear up the accumulated freights at that port, even if not another steamer arrived in the meanwhile. The stevedores, taking advantage of the congestion, have demanded an increase of 40 per cent in wages with 50 per cent increase in stormy weather, bonuses and a number of other concessions; and have been striking off and on to enforce the demands. Lighter owners have also raised their charter rates to yen 10 a ton a month, which is almost double what is being asked a month a ton for ocean steamers.

In recognition of the need for more storage room, the N. Y. K. has financed a corporation, known as the Yokohama Seikokai, to the amount of yen 1,800,000, while the company has secured from the Finance Department a long lease on a big warehouse site, on which warehouse facilities for storing 100,000 tons are to be erected. ....

Protest Australian Duty

A formal protest has been filed with the Australian government by the Nippon Yusen Kaisha, acting through official channels, against the proposal to impose a 5 per cent excess duty on all goods taken to Australia by steamers subsidized by foreign governments, which means the Japanese steamers and those of one French line, the Messageries Maritimes Company. The N. Y. K. now carries some 60,000 tons of cargo annually to Australia, or more than one-third of all that is exported from Japan. Competing with the N. Y. K. are the unsubsidized ships of the Taiyo Kaiun Kaisha and the East Australian Steamship Company, which lines would get all the trade if that handled by the N. Y. K. be discriminated against in the matter of duty.

The grounding of the steamship Colombia on the Saratoga Spit, outside Yokohama harbor, early this month, again has drawn attention to this menace to navigation, on which four other large vessels and numerous smaller craft have hung up during the past two years. The Saratoga Spit is a shoal, with mud and sand bottom, which damages vessels little, but it is poorly lighted, mariners frequently mistaking the shore lights for those of fishing vessels, which throws them on the wrong side of Fort 2 and aground. Shipping interests again have petitioned the authorities to have the spit properly marked.



General arrangement plan of the new piers at the Kobe custom house

Marine Securities

By John E. Barber[*]
Harris, Forbes & Company

It is not necessary to stress before delegates to the National Foreign Council the importance of providing adequate financial facilities for our newly acquired merchant marine. American shipping will thrive and prosper under private ownership and operation to the extent that it is supported by the interests and savings of the American business man and investor. Happily, there is good reason to believe that a potential market exists for marine securities, which if carefully cultivated and encouraged will eventually reach larger proportions.

Before considering the best means of attracting American investment into American shipping, we may profitably examine methods of ship finance employed by foreign maritime countries, where a wide distribution of ship securities has centered the public mind upon the development of shipping as a great national industry.

Merchants Hold Minority Stock

Originally, British tramp ships were owned in sixty-fourth shares, of which thirty-three representing absolute control were acquired by shipowners who received a percentage of the gross freight earnings for their managerial services. The significant feature, however, of such ownership was the manner of distribution of the thirty-one minority shares, which in the main were taken by British manufacturers. Such investment often yielded only a small return; nevertheless, British manufacturers, realizing that British shipping brought in their raw materials at low cost and created an international market for their goods, absorbed such minority shares as a matter of fixed policy and tradition. If a ship were lost a new and larger ship was purchased; under no circumstances were the insurance moneys disbursed to shareholders. Thus the original investment in shipping continued for generations.

A substantial amount of English ship financing is done through brokers or banks specializing in shipping mortgages. Such mortgage loans are distributed privately in varying amounts. There are also several mortgage concerns which lend money against ships at rates of interest usually 1 per cent above the bank rate. Such firms accept bills for the mortgage loan, a certain proportion of which fall due every six months.

Investment trusts specializing in shipping stocks and mortgages have provided another important method of financing English shipping enterprise. The debenture bonds of institutions like the British Maritime Trust, Ltd., and the British Steamship Investment Trust, issued against a diversified list of shipping securities, enjoy a broad market and are highly regarded by conservative investors.

New Institutions Aid

Moreover, new institutions are constantly being organized to aid British shipping. The Mercantile Marine Finance Corporation, Ltd., recently incorporated with a capital of $5,000,000, represents practically the first company organized exclusively for financing shipbuilding, particularly the smaller shipbuilders who are unable to float public issues. Also, one of the English oil companies has just created a subsidiary, known as "Tankers, Inc.," with an initial capital of $7,500,000 for the exclusive purpose of financing the purchase and construction of tankers, which are subsequently to be chartered to the parent company.

The issue of shipping bonds and shares direct to the public through underwriters after the American fashion has been adopted only recently in England, because of the difficulties experienced by some of the newer shipping companies in financing their needs through the channels described above. Securities in small denominations, usually £1 sterling, are offered for public subscription, and such is the revival of interest in marine investments that huge over-subscriptions often result, enabling the promoters of shipping companies to purchase more tonnage than previously contemplated. In connection with the recent public issue of 1,000,000 shares of one of the newer English shipping companies, no less than 8900 letters of regret over inability to allot the amount applied for had to be sent by syndicate managers.

Thus through numerous channels the distribution of ship securities is doubtless more widespread in England than in any maritime country in the world. Hardly a clerk, parson, storekeeper, school teacher, or even servant, but holds a few shares in some shipping enterprise. The extent of this distribution is indicated by the fact that five of the leading British shipping companies have over 44,000 shareholders with an average holding of only $2500.

Marine Bank of Holland

Holland originated the Marine Mortgage Bank for lending money to shipbuilders and shipowners exclusively against ships. This type of institution has since been copied in Germany, Norway, Sweden, Denmark and Belgium. Debenture bonds secured by mortgage loans restricted by law to 60 per cent of the estimated value of the ships pledged are distributed to investors. The debenture issues of twelve marine mortgage banks bearing interest rates from 4¼ per cent to 6 per cent are freely traded in on the Amsterdam Stock Exchange. Although introduced only twenty years ago, these banks have met with astonishing success and at present have loans outstanding on ship mortgages aggregating $30,000,000.

In Norway, ship loans are treated as are commercial loans in this country, and there is no class of banks specializing in lending against ships as security. Such loans are usually made for a period of six months, occasionally a year, and are renewable. They are protected by an assignment of part of the prepaid freights. Although made by the bank, directors and outside capitalists often participate in the underwriting. Marine equipment bonds, as we know them, are not issued in Norway. A newly-organized shipping company may issue its shares directly to the public, or through an underwriting bank. These shares are in bearer form and have dividend warrants attached, which, like coupons, are cut off as the dividends become payable. Such shares are extremely popular and it has been possible to distribute throughout Norway the shares of the smaller companies, and even shares in individual ships which are partly owned and entirely managed by the masters, mates and engineers who operate them.

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[*] Paper read before Seventh [illegible] Convention, San Francisco, May 13, 19[illegible]

The experience of foreign maritime countries demonstrates that it is possible to popularize shipping investment irrespective of the size of the borrower or his sphere of activity.

How to Finance the Sale

Of immediate interest to the Shipping Board, prospective shipowners and the business and financial community, is the problem of financing the sale of the government's ships. Only a portion of the vast tonnage owned by the board can be absorbed by the older and richer American shipping companies and since the full benefit of our merchant marine may best be realized from the establishment of a large number of moderate-sized firms of shipowners, new purchasers must be found, particularly among smaller firms desiring to expand or among those concerns exclusively engaged in operating government ships. However, a majority of these firms are not plentifully supplied with capital and the problem is to furnish funds for the purchase of ships by those who have acquired the ability to operate them.

Ship loans running for a period of years are not suited for investment of commercial banks desirous of maintaining a liquid position, which fact limits the amount of credit shipowners can reasonably expect from this source. The conclusion is unescapable, that the investor is the key to the situation, and the education of the business man, merchant, banker and private investor to the merits of ship securities becomes of paramount importance.

Fortunately, ship securities are not entirely unknown to American investors, although their market has been confined chiefly to seaboard cities and the region of the Great Lakes, where it has been easy to visualize such investment. Financial publications list a total of $145,000,000 of shipping bonds outstanding in 1919, including the obligations of shipbuilding, drydock and terminal companies as well as shipping companies operating on the Great Lakes and inland waterways and those engaged in coastwise and foreign trade. However, this sum represents only a relatively small number of borrowers—less than eighty.

A Substantial Market Developed

In the past twenty years a substantial market has been developed for marine equipment bonds issued against Lake ships. It is estimated that $150,000,000 of such bonds have been distributed to investors during this period. Only a part, of course, of these bonds have been outstanding at any one time. Such bonds have had a good investment record and occupy a deservedly high place in the estimation of the investor. One institution alone in Detroit has since 1900 distributed to the public marine trust bonds covering 122 vessels ranging from 4000 to 10,000 tons deadweight, and during this entire period neither the institution nor its customers have suffered the loss of a dollar. Marine trust bonds which conform to carefully-drawn restrictions are legal investments for savings banks and trustees in Ohio and Michigan and many recent ship loans issued in New York and other Eastern cities have been so framed as to permit advantage to be taken of the Great Lakes market with its large absorptive capacity.

Our successful experience in the financing of our Great Lakes and coastwise marine shows that private capital can and will support shipping where conditions are made favorable, but a broad national market for securities issued against our ocean carriers can only be developed under a favoring national shipping policy.

Furthermore, before there can be nation-wide absorption of marine securities, interest in shipowning similar to that aroused during the war in shipbuilding, must be created in the minds of the general public. Broad national agencies like the Shipping Board, National Foreign Trade Council, Chamber of Commerce of the United States, American Bankers' Association, and National Marine League, working directly and through their affiliated bodies, are best qualified to picture to the individual farmer, merchant, manufacturer or wage-earner throughout the country, especially in the interior where most of our cargoes originate, just what advantages a native merchant marine afford him. With this is a foundation to build upon, investment bankers can more effectively conduct an intensive campaign to popularize shipping securities.

Bankers' Aid Needed

Ninety-five per cent of public investment in any new type of security is influenced by the recommendations of bankers who for this reason constitute the best and most direct approach to the savings of the investor. There are throughout the country approximately 1000 bond houses, banking firms and institutions engaged in distributing securities to the public. Collectively, these form a powerful agency for the popularization and distribution of marine securities.

Through patient, persistent campaigns of education, investment bankers have in the past convinced investors of the merits of various types of new securities. For example, mainly through such efforts, the market for municipal, public utility and industrial issues has grown from a strictly local affair to one of national proportions. The same procedure may be followed with marine securities, and provided such investment is properly safeguarded through enactment of wise laws affecting shipping, it will not be difficult to educate the investing public to the desirability of ship investment. It will require time and patience, but the effort will be justified.

Other agencies for obtaining public participation in ship investments are already being created in this country. Among them may be mentioned an investment trust modeled upon the English plan, which offers to the public "certificates of beneficial interest" secured by a diversified list of the securities of companies directly or indirectly connected with United States maritime activities. Also, a "marine corporation" under which "certificates of equitable ownership" in merchant vessels actually in commission enable investors to participate in the full net earnings of the ship against which they are issued.

Must Improve Mortgages

However, before investment bankers can conscientiously recommend the investment of their clients' money in ship securities, it is essential to improve the status of ship mortgages, which must offer the investor as good protection as railroad and industrial mortgages. The present situation under which the holder of a first mortgage on a vessel may find his investment impaired or even totally destroyed through priority of claims filed on account of repairs, supplies and contractual liabilities, is not conducive to extensive investment in marine equipment bonds. This imposes a particular hardship on the smaller companies owning only a few ships or unable to pledge piers, terminals and warehouses as additional security.

It is also extremely important to the establishment of a market for ship securities, that bankers be satisfied that American navigation laws permit our shipping to operate profitably under normal conditions and rates, since earning power is fundamental to sound investment; furthermore, that the prices asked for the government ships are reasonable under prevailing conditions; and that the purchasers of such ships at the current high price level are enabled by law rapidly to amortize the cost price to values which place the owners in a sound competitive position.

At the outset, marine equipment bonds will make the strongest appeal to investors. Such ship bonds, secured by a first mortgage upon our new steel ships and issued to the extent of approximately 50 per cent of a conservative valuation for such vessels, and protected by complete and thorough insurance provisions, offer the investor good security, which constantly improves as the loan is amortized through semi-annual maturities of principal over a five- or ten-year period. The market for this type of bond is constantly widening and there has been steady absorption not only in seaboard cities like New York, Boston, Philadelphia and Baltimore, but in interior markets such as Albany, Pittsburgh, Cleveland, Detroit. For those investors who are not content with a relatively low fixed income yield, junior issues of debenture notes or preferred and common stock, offer an apportunity to participate more directly in the profits of shipping companies.

Government Aid Needed

Although the older, better-known American shipping companies can doubtless successfully obtain capital through issues to the public, the most difficult problem in ship finance is to provide for the legitimate needs of the smaller shipowner unable to offer, as a background for his securities, a record of years of successful management, established connections over profitable trade routes, or large financial responsibility. Desirable as it may be to encourage the establishment and growth of these smaller companies, it is extremely difficult under present market conditions to arrange such financing except at a cost for capital so high as to impose a burden upon such borrowers. It is, therefore, the conclusion of many bankers that for the present at least, pending the establishment of a broader market for marine securities, the government will itself have to finance on liberal terms the smaller purchasers of its ships. Such action will lighten new demands from shipping upon the already strained credit resources of the country.

The Shipping Board has already recognized this necessity by providing a liberal "charter purchase plan," under which a cash payment of only 2½ per cent of the purchase price is required, followed by monthly payments representing a reasonable charter hire which is subsequently applied to the purchase price. This plan enables shipowners to acquire Shipping Board tonnage without a large capital outlay, the purchase price being worked out gradually under this plan in about eight years.

Should Not Tax Resources

The apparent impossibility of interesting private capital to the extent of entirely absorbing the government's $2,000,000,000 investment in ships has led many to advocate a continuation of government ownership in order to prevent sacrifice. However, it should be borne in mind that a large part of the government tonnage, such as the wooden and many of the smaller coal-burning steel ships, will not prove attractive to American purchasers and will doubtless be sold to foreign flags. In fact, eliminating troop ships, refrigerator ships, tankers, etc., the Shipping Board owns only 746 vessels of 6000 tons deadweight and over, whose economies of operation make them entirely suitable for use in foreign trade. To finance the initial cash payment of 25 per cent of these ships, representing 6,450,000 tons deadweight, even at $200 per ton, would require less than $325,000,000, a large but not impossible sum. Furthermore, the present market for ships in this country is limited and, irrespective of price, the ships cannot be sold faster than the capacity of the market to absorb them. Viewed from this angle, the financial requirements of American shipping, spread over the five- or ten-year period necessary to the sale of the government vessels, ought not to tax unduly the resources of our investment markets at any one time.

American bankers face a twofold opportunity: first, to develop, through the introduction of marine securities, a new source of profitable business; and secondly, to perform constructive work of prime importance and far-reaching benefit. The financing of an industry so essentially international in character as shipping is a progressive step toward a recognized position in the world of international finance. There is ample evidence that bankers are alive to this opportunity and are studying the possibilities of shipping securities. Already, there is competition among bankers to purchase securities issued by leading shipbuilders and shipowners.

The attitude of the bankers is reinforced by gratifying evidence of interest on the part of the public, which, judging from the successful distribution of recent issues to people of moderate means located at points distant from the seaboard, is more receptive to marine securities than is commonly supposed. In fact, the conclusion may be justified, providing Congress adopts, within a reasonable time, a definite and fixed national merchant marine policy favorable to American ownership and operation of ships, that private capital can be obtained as needed, sufficient to sustain our shipping on a permanent basis.

NEW INSURANCE COMPANY IN PERU

During the past few years such large dividends have been paid by the Peruvian fire and marine insurance companies that great interest has been shown in this business, and several new companies have recently come into existence, reports Vice Consul Roth. The latest fire and marine insurance company to be organized is "La Peruana," with an authorized capital of 200,000 Peruvian pounds, of which amount 15 per cent has been paid up. The new company will be prepared to do business as soon as the by-laws have been approved by the government and a place of business secured.—Commerce Reports.

Progress in Mathematical Cartography

By Charles H. Deetz
Cartographer, United States Coast and Geodetic Survey

ONE of the results of the great war is an ever-increasing demand for maps of all kinds and of better quality, such as will meet the critical needs of a public that is acquiring the map habit. Through military necessities and educational requirements, the science and art of cartography have demanded better draftsmanship and greater accuracy, to the extent that many of the older studies in geography are not now considered worthy of inclusion in that class. The whole field of cartography, with its component parts of history and surveys, map projection, compilation, nomenclature and reproduction, is so important to the advancement of scientific geography that the present-day higher standard is due to a general development in every branch of the subject.

More Study of Late

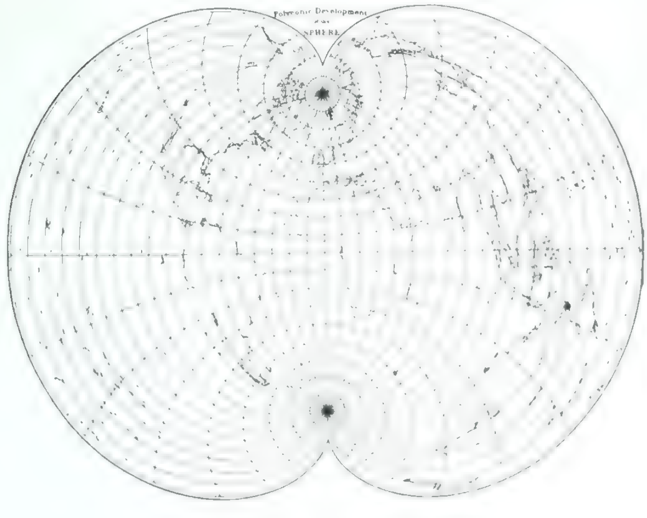
To overcome the inadequate character of maps and plans of former years, many of which are still reproduced, the first and most important raising of the standard was due to the mathematical element of cartography; that is, the study of map projections. On account of its specialized nature, this branch of the subject heretofore has not appealed to the amateur geographer, and the number of those who have received an adequate mathematical training in this field of research has been few. Mathematical geography has, however, taken the lead in recent years, and in the study of map projections considerable activity has been in evidence. The selection of suitable projections is receiving more careful attention than was formerly accorded to it.

In the construction of maps, the initial problem is the representation of a portion or all of the surface of the earth on a plane which shall be representative of all meridians and parallels as accurately as practicable. As a curved (or spheroidal) surface cannot be fitted to a plane without distortion, such a representation must necessarily involve a certain amount of approximation or compensation. The object, then, is to devise some system of projection best adapted to meet the requirements the map is to fulfill, whether the desirable conditions be a matter of correct angles between meridian and parallel, scaling properties, equivalence of areas, rhumb lines, etc.

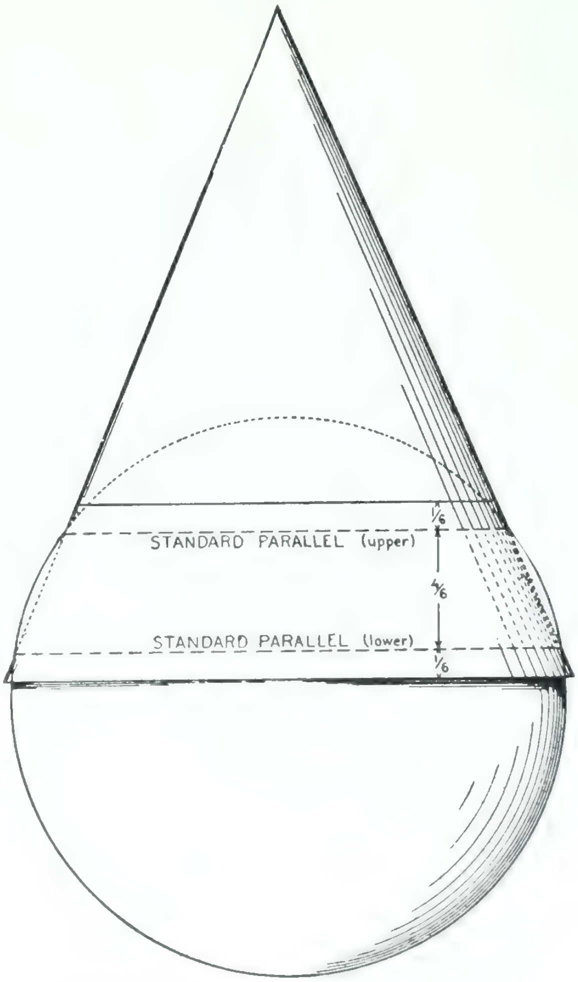
Lambert's Zenithal Projection

An outline base map of the United States on the Lambert zenithal equal-area projection, scale 1:7,500,000, dimensions 19¾ inches by 25¾ inches, price 15 cents, has just been issued by this bureau of the government. It covers the whole of the United States, including the northern part of Mexico. Only state names and boundaries, principal rivers, capitals and largest cities are shown, the chief object being to furnish a base map for political, census or statistical purposes on a projection in which the property of equivalence of area is one of the essential features. It is the first publication of a projection of this type by the United States Coast and Geodetic Survey.

The two errors, to one or both of which all map projections are liable, are changes of area and distortion, as applying to portions of the earth's surface. The former error is perhaps best illustrated by the Mercator projection, in which a unit of area at the equator is represented by one approximating infinity as we approach the pole, the projection being thus responsible for many false impressions of the relative size of countries differing in latitude. Likewise the polyconic projection, when used for the whole of the United States, has the serious defect of exaggerating the areas of its eastern and western limits. Errors of distortion imply



Polyconic Development of the Sphere



The Lambert Conformal Conic Projection

on account of repairs, supplies and contractual liabilities, is not conducive to extensive investment in marine equipment bonds. This imposes a particular hardship on the smaller companies owning only a few ships or unable to pledge piers, terminals and warehouses as additional security.

It is also extremely important to the establishment of a market for ship securities, that bankers be satisfied that American navigation laws permit our shipping to operate profitably under normal conditions and rates, since earning power is fundamental to sound investment; furthermore, that the prices asked for the government ships are reasonable under prevailing conditions; and that the purchasers of such ships at the current high price level are enabled by law rapidly to amortize the cost price to values which place the owners in a sound competitive position.

At the outset, marine equipment bonds will make the strongest appeal to investors. Such ship bonds, secured by a first mortgage upon our new steel ships and issued to the extent of approximately 50 per cent of a conservative valuation for such vessels, and protected by complete and thorough insurance provisions, offer the investor good security, which constantly improves as the loan is amortized through semi-annual maturities of principal over a five- or ten-year period. The market for this type of bond is constantly widening and there has been steady absorption not only in seaboard cities like New York, Boston, Philadelphia and Baltimore, but in interior markets such as Albany, Pittsburgh, Cleveland, Detroit. For those investors who are not content with a relatively low fixed income yield, junior issues of debenture notes or preferred and common stock, offer an apportunity to participate more directly in the profits of shipping companies.

Government Aid Needed

Although the older, better-known American shipping companies can doubtless successfully obtain capital through issues to the public, the most difficult problem in ship finance is to provide for the legitimate needs of the smaller shipowner unable to offer, as a background for his securities, a record of years of successful management, established connections over profitable trade routes, or large financial responsibility. Desirable as it may be to encourage the establishment and growth of these smaller companies, it is extremely difficult under present market conditions to arrange such financing except at a cost for capital so high as to impose a burden upon such borrowers. It is, therefore, the conclusion of many bankers that for the present at least, pending the establishment of a broader market for marine securities, the government will itself have to finance on liberal terms the smaller purchasers of its ships. Such action will lighten new demands from shipping upon the already strained credit resources of the country.

The Shipping Board has already recognized this necessity by providing a liberal "charter purchase plan," under which a cash payment of only 2½ per cent of the purchase price is required, followed by monthly payments representing a reasonable charter hire which is subsequently applied to the purchase price. This plan enables shipowners to acquire Shipping Board tonnage without a large capital outlay, the purchase price being worked out gradually under this plan in about eight years.

Should Not Tax Resources

The apparent impossibility of interesting private capital to the extent of entirely absorbing the government's $2,000,000,000 investment in ships has led many to advocate a continuation of government ownership in order to prevent sacrifice. However, it should be borne in mind that a large part of the government tonnage, such as the wooden and many of the smaller coal-burning steel ships, will not prove attractive to American purchasers and will doubtless be sold to foreign flags. In fact, eliminating troop ships, refrigerator ships, tankers, etc., the Shipping Board owns only 746 vessels of 6000 tons deadweight and over, whose economies of operation make them entirely suitable for use in foreign trade. To finance the initial cash payment of 25 per cent of these ships, representing 6,450,000 tons deadweight, even at $200 per ton, would require less than $325,000,000, a large but not impossible sum. Furthermore, the present market for ships in this country is limited and, irrespective of price, the ships cannot be sold faster than the capacity of the market to absorb them. Viewed from this angle, the financial requirements of American shipping, spread over the five- or ten-year period necessary to the sale of the government vessels, ought not to tax unduly the resources of our investment markets at any one time.

American bankers face a twofold opportunity: first, to develop, through the introduction of marine securities, a new source of profitable business; and secondly, to perform constructive work of prime importance and far-reaching benefit. The financing of an industry so essentially international in character as shipping is a progressive step toward a recognized position in the world of international finance. There is ample evidence that bankers are alive to this opportunity and are studying the possibilities of shipping securities. Already, there is competition among bankers to purchase securities issued by leading shipbuilders and shipowners.

The attitude of the bankers is reinforced by gratifying evidence of interest on the part of the public, which, judging from the successful distribution of recent issues to people of moderate means located at points distant from the seaboard, is more receptive to marine securities than is commonly supposed. In fact, the conclusion may be justified, providing Congress adopts, within a reasonable time, a definite and fixed national merchant marine policy favorable to American ownership and operation of ships, that private capital can be obtained as needed, sufficient to sustain our shipping on a permanent basis.

NEW INSURANCE COMPANY IN PERU

During the past few years such large dividends have been paid by the Peruvian fire and marine insurance companies that great interest has been shown in this business, and several new companies have recently come into existence, reports Vice Consul Roth. The latest fire and marine insurance company to be organized is "La Peruana," with an authorized capital of 200,000 Peruvian pounds, of which amount 15 per cent has been paid up. The new company will be prepared to do business as soon as the by-laws have been approved by the government and a place of business secured.—Commerce Reports.

Progress in Mathematical Cartography

By Charles H. Deetz
Cartographer, United States Coast and Geodetic Survey

ONE of the results of the great war is an ever-increasing demand for maps of all kinds and of better quality, such as will meet the critical needs of a public that is acquiring the map habit. Through military necessities and educational requirements, the science and art of cartography have demanded better draftsmanship and greater accuracy, to the extent that many of the older studies in geography are not now considered worthy of inclusion in that class. The whole field of cartography, with its component parts of history and surveys, map projection, compilation, nomenclature and reproduction, is so important to the advancement of scientific geography that the present-day higher standard is due to a general development in every branch of the subject.

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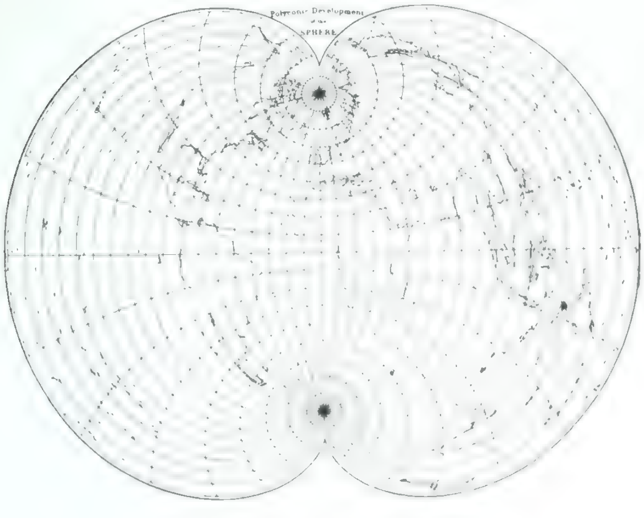
In the construction of maps, the initial problem is the representation of a portion or all of the surface of the earth on a plane which shall be representative of all meridians and parallels as accurately as practicable. As a curved (or spheroidal) surface cannot be fitted to a plane without distortion, such a representation must necessarily involve a certain amount of approximation or compensation. The object, then, is to devise some system of projection best adapted to meet the requirements the map is to fulfill, whether the desirable conditions be a matter of correct angles between meridian and parallel, scaling properties, equivalence of areas, rhumb lines, etc.



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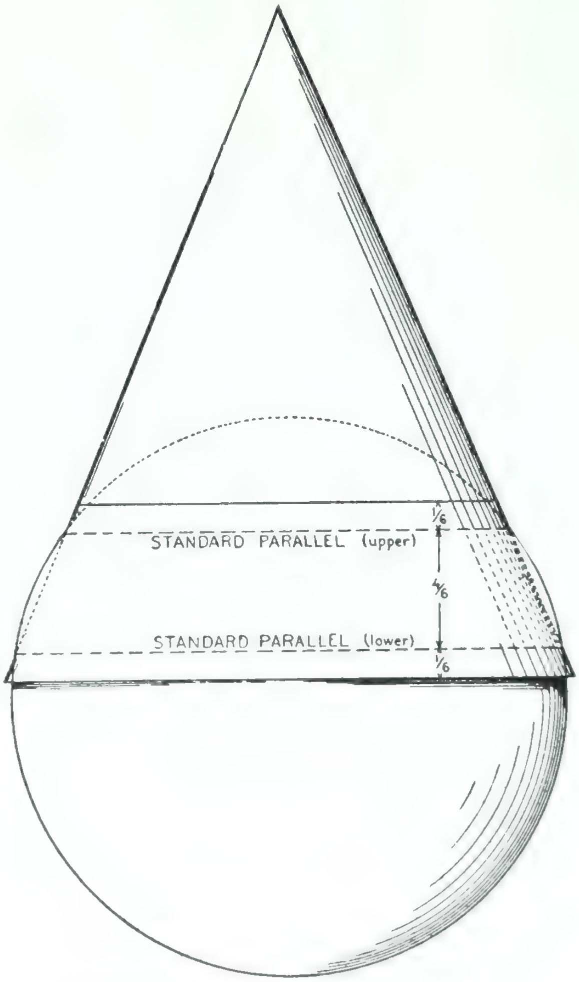


The Lambert Conformal Conic Projection

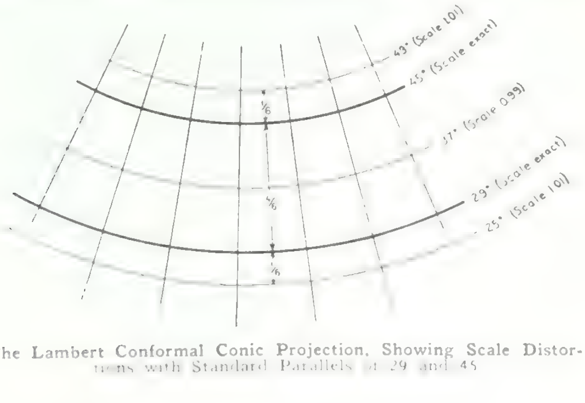
deviation from right shape in the graticules or network of meridians and parallels of the map, involving deformation of angles, curvature of meridians, changes of scale, and errors of distance, bearings or area.

In the Mercator projection, as well as in the Lambert conformal conic projection, the changes in scale and area cannot truly be considered as distortion or as errors. A mere alteration of size in the same ratio in all directions is not considered distortion or error. These projections being conformal, both scale and area are correct in any restricted locality when referred to the scale of that locality, but as the scale varies in latitude from point to point large areas are not correctly represented.

Sacrifices Must Be Made

Inasmuch as the favorable showing required to meet any particular mapping problem necessitates the sacrifice of other less desirable properties, the choice of a projection should be made the subject of special study, and as a rule that system of projection should be adopted which will give the best results for the area under consideration. The use of a projection to which it is not suited is, therefore, generally unnecessary and should be avoided. On the one hand, a projection may be constructed in which there is no change of area, as in the projection under consideration, but with distortion for localities that are distant from the center; on the other hand, a projection may have little distortion, but great change of area in distant parts. Between these lie the properties usually adopted by geographers with the tacit purpose of greatly reducing the error of one kind by the admission of a small error of the other kind, so that the result of their combination shall be most advantageous to the general use of the map.

In the Lambert zenithal projection the zenith of the central point of the surface to be represented appears as pole in the center of the map; the azimuth of any point within the surface, as seen from the central point, is the same as that for the corresponding points of the map; and from the same central point, in all directions, equal great circle distances to points on the earth are represented by equal linear distances on the map. The amount of scale error, as we depart from the center of the map radially, increases (scale becoming smaller), while in a direction at right angles thereto the scale is by the same amount too great. For a distance from the assumed center of the map equal to 22 degrees of arc of a great circle, an extent embracing the whole of the United States, the maximum scale error is but 1⅞ per cent. The amount of this error is less than one-third of the scale error in a polyconic projection of the same area, while the direction errors (errors of angles and azimuths) are likewise considerably less than in the latter projection.



The Lambert Conformal Conic Projection, Showing Scale Distortions with Standard Parallels at 29 and 45

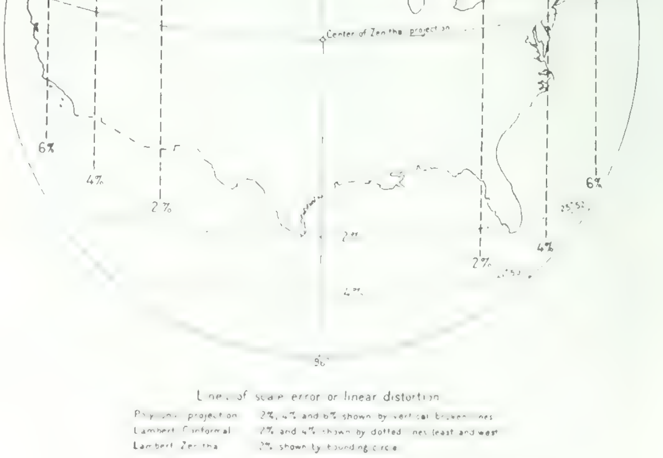
Province of the Zenithal

Whereas the Lambert conformal and the polyconic projections are suited to areas of large extent, the former for predominating east and west dimensions and the latter for predominating north and south dimensions, the zenithal projection is specially suited to large areas of circular outline, the reason for its selection in the present base map being governed by the inclusion of a large extent of Mexico within its limits.

The more essential or desirable feature of the projection under consideration, however, and the one that will meet numerous modern demands, is the property of equivalence of area. An equal area or equivalent projection is one in which areas on the projection are proportional to the corresponding areas on the sphere; that is, any portion of the map bears the same ratio to the region represented by it that any other portion does to its corresponding region.

In the Lambert conformal conic projection, for which the projection under consideration should not be mistaken, the property of equal-area representation is sacrificed, but this feature can largely be overcome by the use of a scale factor (divisor) given on page 36, Special Publication No. 52, United States Coast and Geodetic Survey, or by the employment of Smithsonian Geographical Tables, 1897, Tables 25 to 29. These tables give the areas of quadrilaterals of the earth's surface for different extents of latitude and longitude.

The last-mentioned type of projection is also published by the United States Coast and Geodetic Survey on a base map of the United States, scale 1:5,000,000, its advantages over other projections being as follows: (1) conformality; (2) straight meridians, cutting all parallels at right angles; (3) simplicity of construction and use; and (4) two


Line of 2% scale error of Lambert Zenithal projection
4%
2%
Center of Zenithal projection
6%
4%
2%
2%
4%
6%
40°
90°
Lines of scale error or linear distortion
Polyconic projection 2%, 4% and 6% shown by vertical broken lines
Lambert Conformal 2% and 4% shown by dotted lines (east and west)
Lambert Zenithal 2% shown by bounding circle

The Lambert Zenithal Equal Area Projection selected standard parallels of latitude are of true scale.

Near Geographic Center of Country

The center used for the Lambert zenithal projection is latitude 40 degrees and longitude 96 degrees, corresponding closely to the geographic center of the United States, which has been placed by this projection approximately in latitude 39 degrees 50 minutes and longitude 98 degrees 35 minutes, a point near Lebanon, Smith county, Kansas. Directions from this central point to any other point being true, and the law of radial distortion in all azimuthal directions from the central point being the same, this type of projection was admirably suited for the determination of the geographic center of the United States, the means employed being similar to those used in finding the center of gravity of a body equally weighted (per unit area) of the outline of the country.

For a map of the whole of the North Atlantic Ocean, this projection offers advantages superior to others. The somewhat circular configuration of the Atlantic basin is more correctly represented by this system of projection than by any other, and with less scale error. The projection would be admirably suited to a map covering the whole of North America.

The useful property of equivalence of area as a controlling element to be ascertained directly from the map gives the Lambert zenithal projection a place in cartography accordingly as the shapes of extensive areas have approximately equal magnitudes in all directions.

Conformal Conic Projection

An outline base map of the United States on the Lambert conformal conic projection, scale 1:5,000,000, dimensions 25 by 39 inches, price 25 cents, has also been issued by the United States Coast and Geodetic Survey. This map is similar to the one on the zenithal equal-area projection in general treatment. It is larger in scale, however, but embraces a lesser extent of latitude, being limited to the area of the United States, whereas the zenithal equal-area map includes the greater portion of Mexico. The map is of special interest from the fact that it is based on the same system of projection as that which was employed by the allied forces in the military operations in France. This projection is also used in a map (No. 3070, United States Coast and Geodetic Survey), covering the North Atlantic Ocean, including the greater part of North America and Europe.

The term "conformal" has been defined as follows: If at any point the scale along the meridian and the parallel is the same(not correct, but the same in the two directions) and the parallels and meridians of the map are at right angles to one another, then the shape of any very small area on the map is the same as the shape of the corresponding small area upon the earth. The projection is then called orthomorphic (right shape).

The value of this new outline map can best be realized when it is stated that throughout the larger and most important part of the United States—that is, between latitudes 30½ degrees and 47½ degrees—the maximum scale error is only ½ of 1 per cent. Only in southernmost Florida does this projection attain its maximum scale error of 2½ per cent. This implies, however, an error in the areas at these extreme parts of 5 per cent. Although this error iin area may be accounted for by methods already described, the zenithal projection, on the other hand, is free from this inconvenience.

Advantages of Each

The choice, then, between the Lambert zenithal and the Lambert conformal for a base map of the United States, disregarding scale and direction errors which are conveniently small in both projections, rests largely upon the choice of equal areas as represented by the zenithal and conformality as represented by the conformal conic projection, the former properly appealing directly to the practical use of the map, the latter property being one of mathematical refinement and symmetry with definite scale factors available, the projection having two parallels of latitude of true scale, the advantages of straight meridians as an element of prime importance, and the possibilities of indefinite east and west extension without increase of scale error. For the purposes and general requirements of a base map of the United States, either of these recent publications of the United States Coast and Geodetic Survey offers advantages to other systems of map projection heretofore in use.

Comparison of errors of scale and errors of area in a map of the United States on three different projections follows:

Maximum scale error:	Per cent
Polyconic projection	7
Lambert conformal conic projection with standard parallels of latitude at 33 degrees and 45 degrees	2½
(Between latitudes 30½ degrees and 47½ degrees, only ½ of 1 per cent.)	
Lambert zenithal equal-area projection	1⅞
Maximum error of area:	
Polyconic	7
Lambert conformal conic	5
Lambert zenithal	0

The Mercator Projection

In view of the frequent misunderstanding of the properties of the Mercator projection, a few words as to its true merits may not be amiss. It was invented by Gerard Mercator in 1569 and is probably the most widely-known of all map projections. It is by no means an equal-area projection, and the mental adjustment necessary to this idea in a map of the world has caused unnecessary abuse in ascribing properties to it that are peculiarly absent. It is, however, the only one that meets the requirements of navigation, and it has a world-wide use due to the fact that a ship's track on the surface of the sea under a given course is a straight line on the projection, cutting all the meridians at the same angle. Inasmuch as it is desirable to follow the great circle or shortest routes in navigation, the Mercator system is the only one in which the great circle plotted thereon can be subdivided into convenient sailing cords. Another advantage is that meridians, or north and south lines, are always up and down, parallel with the east and west border of the map just where one expects them to be. The convenience of plotting points or positions by straight-edge across the map from the marginal divisions in either direction prevents errors, especially in navigation, and, furthermore, the projection is readily constructed. Finally, for a nautical chart and for no other purpose whatever, Mercator's projection, except in high latitudes, has attained an importance which puts all others in the background.

The use of the Mercator projection by the Coast and Geodetic Survey is, therefore, not due to the habit of continuing the old system, but to the desirability of meeting the special requirements of the navigator. It was adopted by this bureau within comparatively recent years, superseding the polyconic system formerly employed.

Co-ordinates have recently been computed for the construction of an equal-area representation of the United States on a system known as Alber's projection with two standard parallels, in which the maximum scale error in a map embracing the whole of the United States is only 1¼ per cent.

Co-ordinates for Aitoff's equal-area projection of the whole sphere are also available at the Coast and Geodetic Survey. No maps have as yet been published on the latter two systems, the computations of which are the most recent contributions to mathematical cartography by this bureau.

The subject of map projection in this excellent paper by Mr. Deetz deals with regional maps of a limited area, such as the United States. This is quite a different problem from that involved in showing the whole world, which covers an area over sixty times that of the United States. This government map of the United States on Lambert's conic projection is the same in principle as the projection used on the central portions of each octant of the Butterfly map described in these pages, with this difference: in the latter, 45 degrees of north and south latitude are mapped in a continuous strip around the world (from 22½ degrees to 67½ degrees), whereas in the former the belt to include the United States extends from 25 degrees to 49 degrees only, 24 degrees of latitude in the regional map as against 45 degrees of latitude in the world map. It is interesting to note that, although the standard or exact parallels are necessarily farther apart in the world map of larger scope (30 degrees and 54 degrees), one of them is practically the same as the regional map of smaller scope (29 degrees and 45 degrees).

Thus on the Butterfly map and the map No. 4, the United States will show identical scale-accuracy (having a standard parallel in common within one degree), in the neighborhood of 29 degrees, 30 degrees. However, the maximum of scale compression, which on the United States regional map occurs at 37 degrees, will be greater on the world map, where it occurs at nearly 42 degrees. The second standard parallel of scale exactitude, moreover, on the United States regional map occurs at 45 degrees and on the Butterfly world map at 54 degrees.

The United States, therefore, on the Butterfly world map comes near to approximating the accuracy of the United States when mapped alone on the most accurate scale projection possible. Now, it is an axiom of cartography that the larger the area the greater the difficulties of projection. That the Butterfly map should show the whole world with an accuracy approximating the best that can possibly be done over an area sixty times smaller should particularly commend its value to the mathematical cartographer when he directs his attention to a world map instead of a local map.—Editor.

AN ACKNOWLEDGMENT

For the photographs of E. L. Barry and C. H. Williamson, which appeared on pages 175 and 176 of the May number, Pacific Marine Review, we were indebted to the Bushnell studio, San Francisco.

BROKERS MOVE OFFICES

Finn, Sanberg, Raynes & Lee, insurance brokers and average adjusters, have recently moved to larger quarters at 51-53 Maiden Lane, New York City.

AGENCY AT BOSTON

The Black & Decker Manufacturing Company has established a Northeastern branch office at 169 Massachusetts avenue, Boston, Massachusetts. At this office D. G. Caywood will promptly take care of any matters pertaining to the Black & Decker line and will establish and maintain a service so as to give prompt and efficient attention to the New England trade of the Black & Decker Company.

Early Hawaiian Outrigger Canoes Photos, Williams, Honolulu

Island Wrecks, II

By Andrew Farrell

Diamond Head from Honolulu, 1874

AND now for the swims. In these brief tragedies the actors for the most part are Hawaiians, and the setting is water, their native element. Such dramas as these will be witnessed less and less as time goes by, for, although the waters remain about the Eight Islands, the Hawaiian slowly departs.

In a letter dated at Lahaina, May 21, 1840, Doctor D. Baldwin narrated the adventure of the Keloa. Today, eighty years afterward, nothing can be added to what he wrote; and certainly nothing should be taken away:

"You have heard, I suppose, the report of the loss of the vessel Keloa, as the report reached here just as Brother Green was sailing for Oahu. The same day he sailed the persons who escaped arrived here and told us all the sad particulars. You will be afflicted to learn that our friend Mauae is among those who are lost. As his wife is among the saved, and as they both swam about twenty-five miles together before he died, we have a full account of him to the last. What is wonderful beyond description is that his wife carried him when he could no longer swim himself, and carried him till after he was dead. She left him when they were less than one-quarter of a mile off the shore of Kahoolawe. There are supposed to have been, in all, between thirty and forty persons on board, only four of whom have escaped. These are the wife of Mauae, the wife of Thompson, and two young men who belonged to the vessel. The following is a brief history of the melancholy affair:

Only Haleakala Visible

"The Keloa left Lahaina for Kawaihae Saturday evening, May 8, in a somewhat leaky condition, as all were aware of by the amount of pumping required. The next day (Sabbath), after dinner, they were in sight of Kahoolawe Point, which was not at a very great distance. Nothing of Maui could be seen except Haleakala, and Kahoolawe was lost in the misty distance. The wind was strong, and, as the young men say, the stone ballast rolled over to leeward. They put it back again and soon after two barrels of molasses and a cask of water—but poorly blocked up—rolled to leeward. This is supposed to have been the immediate cause of the disaster, though as the vessel had been aground five times since she was examined, she might have been very weak. Her bows were thrown so suddenly under, that it is supposed that some who were lying in the hold were never extricated, but went down with the vessel. Thompson was writing in the cabin and had little more than time to get out on deck. The natives were soon all in the ocean, and Thompson, poor fellow, unprepared, was hanging to a part of the stern still above the water, while Mauae, who had held morning prayers and conducted Sabbath services with the people in the forenoon, now, in the water, called the natives around and implored help from on high. Then they looked about to see what they could do to help themselves. A current was setting to the north, so that none thought of swimming to Haw-

Captain Sam Manu

aii. Thompson could not swim at all. He threw out an oar on which he and his wife left. By her aid and the current they proceeded to Kahoolawe. Monday morning he died, and she landed in the forenoon, with the oar, on Kahoolawe. A vigorous young man seized the cover of the hatchway for himself and little brother. The boy died before daybreak, Monday, but the elder one reached Kahoolawe at seven or eight in the morning, while a very slender, weakly youth left the vessel without any help but his skill in swimming, and landed on the same shore before morning.

Three Men Disappear

"Mauae and his wife took each a covered bucket for a mouo (buoy) and, having thrown away their contents, they tied some of their garments around them and swam for Kahoolawe. They had three young men with them who disappeared one after another, either by drowning or going in different directions. Some were in sight on the Sabbath, but during the night all disappeared and left them to pursue their watery way alone. Monday morning Kaluahinenui's bucket came to pieces, and she swam without anything till afternoon, when Mauae became too weak to proceed. They stopped. She lomied (massaged) him till he was able to swim again. Then they went on till they had Kawaihae in full view, but Mauae became more feeble than before, so she took his bucket and had him hold to the hair of her head, whereby she dragged him, but soon his hand slipped and she tried in vain to rouse him even to such an effort. She then put his arms around her neck, held them with one hand and made for the shore. When as near the shore as where small vessels anchor at Lahaina, and after they had been swimming twenty-eight or thirty hours, she found he was entirely dead; and leaving him, reached the shore near night, much exhausted, on the opposite side from the only settlement. Her eyes were so affected that she could not see for a while; and she was a stranger there. Tuesday, Wednesday and Thursday she looked around in vain for inhabitants, with nothing to eat all the time, and would have perished but that there had been considerable rain and she found water standing in some of the brooks. Friday morning she found some watermelons growing, and, after eating one, was discovered by some fishermen and by them conducted to the village, and the next day brought here.

"The young men were as lively when they reached here as before they were wrecked; the women somewhat exhausted. Their preservation we record as almost miraculous."

The Wreck of the Moi Wahine

On the night of February 27, 1911, the schooner Moi Wahine was under sail in the channel between Oahu and Maui. At a time when, according to her master, Captain Sam Manu, all hands were on deck and her lights were burning, she was struck amidships by the United States lighthouse tender Kukui. This mishap aroused a most heated, acrimonious controversy in the Islands nine years ago, for the statements of the masters of the Moi Wahine and Kukui were utterly at variance in important particulars. We shall leave them to their debate: the purpose of this narrative is not to deal with the wreck itself nor with the discussion that followed, but to chronicle the fortunes of Captain Sam.

Let us forget momentarily the loss of the Moi Wahine and go back to December 29, 1906. On that day the schooner Lavinia was bound from Kohala, Hawaii, to Honolulu. Off Lanai she picked up a southerly wind astern. About 11 o'clock that night, when she was near Diamond Head, approaching Honolulu, a Kona (southerly) gale suddenly struck her. So thick was the weather, so soot-black the darkness, that no gleam of light whatever could be picked up from ashore; but bursts of lightning and thunder followed one another in quick succession. Wind and rain became more violent; and in the storm flamed a terrific sheet of lightning, which was followed by a blast of wind that surpassed anything that Captain Sam had felt in forty years at sea. Every sail was blown out; the vessel heeled over and swung around, drifted into the breakers and struck. A rush of water from below indicated that she had split in two. The crew waited on the vessel while the lightning split the sky and they felt their faces grow hot with its flame; waited until the keel appeared to be working through the planks of the deck; and then, in that inky darkness, broken by searing fire that showed them the surf boiling white on the Waikiki reef, they took to the water; and one and all made shore. Prouder of Captain Sam's exploit than of their own, the men could not say enough in his praise, for at that time the skipper was about seventy-five years old.

That appears to be a fitting introduction to what happened the night of February 27, 1911.

According to Captain Sam's narrative, the Kukui suddenly changed her course, bore directly upon the schooner and struck her amidships. Evidently the Moi Wahine was rotten, almost falling to dust in her topsides (as a fragment that fell on the deck of the Kukui proved); and she broke as matchwood. Seven men went down with her; and Manu reported himself as the only survivor.

Clutch at Straws

"You haoles (white men) tell of drowning men reaching for a straw," said he. "Some of my men clutched splinters of boards and stray strands of rope and sank with these in their hands."

But the aged master, years past his "allotted span," was not of the sort that grasps at splinters of boards and stray strands of rope. However, it was a trifle hard. In his younger days he would have thought nothing of the swim ahead, so he said solemnly, but at eighty or so one's body is not what it has been, and he did not face the prospect with equanimity. He stripped, so he could swim better. Then something bumped his side. A shark! thought he, and his heart well-nigh stopped beating. He splashed to frighten the monster; because, although he never had feared sharks, and had swum and dived with them, now, in his age, "he didn't want to have his old body torn to pieces to become kaukau for any sharks." In this thought the reader will mark a degeneracy due to years.

Then came the thought that perhaps the thing was no shark and that, whatever it was, use might be made of it, so he struck out and found a small board. He got another; crossed the two in the form of an X; put his arms over them and began his journey. The distance to Molokai, he estimated, was twenty to twenty-five miles, but Molokai lay to windward, the northeast trades were blowing strongly offshore; and he chose Lanai, even though it was more distant.

It was about nine o'clock in the evening when he started. He swam all night. By treading water as he rose on the waves, he could see Lanai, red in the morning sun. The day wore on, and Captain Sam, who had been in many wrecks and more than once had swum to save himself, went over all his experiences — thought, among other things, of how hard it once had been to untie the wet shoelaces of some haole sailors.

In the Lee of Lanai

And so the morning passed. About noon the wind died, and he observed that the current was not carrying him: He was in the lee of Lanai and near the shore, after a swim of about sixteen hours. He dropped one piece of board but kept the other (since that must go to keep company with a bit he had saved from the wreck of the Lavinia), and struck out for land.

Heavy rollers were running on the beach, and on the jagged rocks surf broke high. It was useless for him to attempt to go through (inasmuch as he was nearly eighty and not so spry as he had been); and he lay still and prayed. And then came the usual miracle (usual to Hawaiians gifted in helping themselves), for the waves quieted and the way stood open—a smooth sea and a landing place. But scarcely had he crawled ashore and above the water line when the sea broke violently again, and spume splashed on him as he lay panting on the beach. There he fainted.

The sun had started toward the west when he awoke. Over the sharp lava of Lanai he walked to the hamlet of Awalu. Those rocks cut his feet cruelly and the sun blistered his bare back, so that he suffered exquisite torture. Empty was the first house he found: a door sagged on one hinge and in the corners sprouted weeds in the earth that had drifted before the Lanai winds. When he had rested he tore up a mattress to clothe himself, and in another house found some beans and caught some crabs for kaukau. Much refreshed, he made his way to a habitation, and soon was in Honolulu. But he had left the fragment of wood on Lanai.

Han Duck Hyung Appears

Captain Sam said that his crew of seven perished; and so he believed. But on March 31, 1913, a Korean appeared at the police station in Honolulu with a fellow-countryman in tow—one Han Duck Hyung. And Han also was a survivor of the wreck of the Moi Wahine.

He was asleep in his berth when the Kukui rammed the schooner. Some time in the night another Korean awakened him, and he went on deck, to find everything in confusion.

"Great waves were breaking over the deck. I heard the captain give an order to lower the sails, to right the ship, and then to cut the masts. While we were doing this she rolled over. When I saw that it was becoming dangerous I drew my knife and held it in my teeth. I found a bundle of sails tied up and cut the lashing. When the ship turned over I held to this and was floating on it when the ship went down. But it was too rough to stay on the sails. The waves were very high and threw me around so much that I had to get off the sails and swim. I swam for some distance and started to swim back."

Vagueness characterized the remainder of his narrative. With increasing exhaustion his recollection became less vivid; he did recall the first pang of his muscles failing when it still was night. For a time he floated on his back. He knew, as he said, four ways of swimming, and he employed them all. At what hour the vessel had sunk he did not know; but with the coming of day he was almost completely exhausted.

On the Islet of Molokini

He swam in a stupor, broken by bursts of paddling and frequent rests of floating; going whither he knew not, not aware of what he thought. After an interminable period he struck a rock. Whether he had been in the water one day or two he could not say: the question was of no consequence and his mind ignored it. He pulled himself on the rock; fell exhausted; and recovered to find that he was on a small, barren, deserted islet that, from the description, must have been Molokini, which lies in the lee of Maui, twenty to twenty-five miles from the scene of the wreck.

Han's memory failed him as to how long he was on Molokini. That islet was visited infrequently by the lighthouse tender, and he might have remained indefinitely, until he died of hunger, thirst and madness, for he drank salt-water, as drink one must, even though his latter state be worse than his first. He knew that he was fast going mad—"a naked, demented thing, a picayunish thing, crawling around a bleak rock."

At length, Japanese fishermen, whose sampans are about the islands everywhere, landed on Molokini. Whether he saw them first Han did not know, so completely were the details of those three or four days blotted out. They took him to Molokai, to what hamlet he knew not, where he earned money enough to go to Maui and thence to Hawaii. After several months he returned to Honolulu, crippled, enfeebled, ruined physically, marred by tremendous suffering, unrecognizable except for scars on his body by which he was identified.

One Man Left Alive

Edward Duvauchelle departed from Pukoo, Molokai, in May, 1906, for Lahaina, Maui, with three natives in a small boat. They made the passage safely, delivered a cargo of fish and departed from Lahaina for Molokai soon after daybreak. Soon they were enveloped in a dead calm, and they rowed for a time; then came a breeze, so they hoisted sail. Off Kaunakakai the wind freshened, bringing down a squall upon them, and the boat went over on the port side and filled.

The four men threw off their ballast and signaled for help, but no one ashore saw them, and they set about to save themselves. Two of the natives made a raft of four oars, on which they embarked. The raft washed ashore. The men were never seen again.

Duvauchelle and Pawaa, the remaining Hawaiian, remained clinging to the capsized boat, which drifted with the current; until, despairing of making land otherwise, they decided to swim. Having lashed the mast and boom together they set out for land, swimming for a time, and floating to rest themselves, as the current bore them toward Molokai.

At sunset they sighted a reef, but Pawaa was growing weaker and weaker with each moment, so that Duvauchelle surrendered the raft to him. When they were within 500 yards of the lofty rock of Hokuhooniki, Pawaa turned to Duvauchelle; said a few brief words of farewell; threw up his hands; and disappeared.

Of four who had put to sea, one remained. But he kept on; and climbed on the rock after a swim of seventeen hours. In the afternoon he swam the mile of channel that separated Hokuhooniki from Molokai.

(To be continued)

The General Steamship Corporation

Commander Charles Belknap, president, General Steamship Corporation

TO the newly-organized General Steamship Corporation of San Francisco, the United States Shipping Board has intrusted the operation and management of a freight line between the Pacific ports of the United States and Australasia. This is the first venture of the nature to be made by the Shipping Board. and, on the whole, is the first attempt to give the trade of America with Australasia its proper freight tonnage. Several years ago a freight line from Puget Sound to Australia was established, only to be withdrawn; and on the combination passenger and freight liners of the Oceanic Steamship Company largely has fallen the burden of connecting the Pacific Coast states with Australia. Otherwise, the vessels engaged in that trade have been British.

Three 8800-ton vessels have been allocated by the Shipping Board to the General Steamship Corporation: West Mahwah, West Holbrook and Las Vegas. The last was put on the berth in May for the Oceanic Steamship Company; she will be turned over to the General Steamship Corporation, however, after one voyage under the Oceanic management. With these three vessels a monthly service will be maintained.

The steamships will load at the principal ports of the Pacific states. For the time being voyages will be confined to ports of Australia and New Zealand—Auckland, Melbourne, Adelaide and Sydney; but the company will have extensions of this service in view. With the opening of the Australian line, the General Steamship Corporation will be represented by agents at the different ports.

Coal Cargoes Offering

It is anticipated that general cargo business with Australia will be good in both directions; and that in addition there will be heavy coal offerings from Newcastle to Manila, Honolulu and the Pacific States.

The General Steamship Corporation also has in charge the operation of a Shipping Board line to the principal ports of the west coast,, with sailings to ports as far south as Valparaiso, depending upon cargo offerings. Four vessels are available for this service: steamship Meriden, bought by the General Steamship Corporation of the Shipping Board; and the Shipping Board vessels Wallingford, Silverado and Lake Filbert; the four averaging about 3500 tons deadweight. These vessels probably will permit of a twenty-day service from Puget Sound, Portland, San Francisco and Los Angeles to Central and South America.

When they have been placed on the southern routes, two Norwegian steamships, the Baja California and Sinaloa, will be loaded on the west coast and dispatched to their home waters. These vessels were sent to San Francisco by A. O. Lindvig and were operated under the name of the South American-Pacific Line, giving about a forty-five-day service between San Francisco and South and Central America. In the winter of 1914 the Baja California, built in Europe for the west coast trade, was sent to the Pacific; and she was followed by the Sinaloa in 1915. Primarily, these vessels were designed for the San Francisco-Mexico-Central America trade, but the shortage of tonnage on the South American routes led to an extension of the service to ports south of Panama. Following upon the dispatch of these vessels to the Pacific, Mr. Lindvig bought the Philippine steamship Governor Forbes (which later was sold to the Caribbean Steamship Line), and he also ordered the steamship Regulus of the Union Iron Works, the vessel being delivered early in 1917. She is in the trans-Atlantic trade now, leaving the Lindvig business in the Pacific to the Baja California and Sinaloa.

Successor to Lindvig

When the General Steamship Corporation was organized, it took over all the Lindvig business on the Pacific Coast, including the management of the two remaining vessels; the continuance of their operation, however, was conditioned on the policy of the United States Shipping Board: if the board decided to establish an American service to the west coast, the General Corporation was privileged to withdraw from the Lindvig agency. Now that the Shipping Board has decided to establish a service to the west coast, the Lindvig ships will be taken off the run and, on arriving at San Francisco, will be loaded for their home ports and dispatched to Norway. When that has been done, the connection of the General Steamship Corporation with A. O. Lindvig will end.

In this manner an American steamship line will supplant a foreign. This fact will be greatly to the advantage of both American importers and exporters; the service, moreover, will be improved, inasmuch as the two Lindvig vessels have given only about a forty-five-day service, whereas the General Steamship Corporation will give a twenty-day.

In Naval Transportation Service

Charles Belknap, formerly commander, United

States Navy, having resigned last December, is president of the General Steamship Corporation. Commander Belknap was director of the naval overseas' transportation service during the war, a capacity in which he had charge of the operation of hundreds of vessels. Associated with him in the management of the corporation are R. S. Silva, traffic manager, San Francisco; E. N. McConalogue, traffic manager, Seattle; H. H. Birkholm, in charge of the Seattle office; Captain A. T. Hunter, formerly of the Hill steamship Northern Pacific, port captain, San Francisco; and David Dorward, Jr., port engineer, San Francisco. Mr. Silva was traffic manager of C. Henry Smith. This company acted as general agent for the Lindvig interests in San Francisco prior to the arrival of the younger Lindvig. When the Lindvig company established its own offices, Mr. Silva entered its employ, in October, 1917.

The General Steamship Corporation proposes to build its own vessels if it is unable to buy from the Shipping Board suitable ships at fair prices; but, in common with many other American shipping companies, it intends to go slowly until Congress has taken definite action in formulating a governmental policy.

The head office is at 280 Battery street, San Francisco. The Seattle office is in the Colman Building. Within a short time offices will be opened also in Callao and Valparaiso.

Daily of the Merchants' Exchange

THERE are few men in San Francisco today to whom the name of the schooner Halcyon would mean anything; mention of the brig Tahiti and the steamer Monserrat would leave Sansome street cold and indifferent; yet these vessels had to do with exceedingly stirring times in the Pacific—times that are not remote, measured in years, but relatively are nearer the ages of Morgan and English than they are to the present. What became of the old frigate Vanderbilt? In what service was the Tropic Bird engaged? How did the schooner Annie Johnson gain American registry? Where is the brig, or brigantine, Lurline today—where reported last? What was the best sailing time of the year 1893 between Hongkong and San Francisco? Those questions might be multiplied indefinitely; and probably only one man in San Francisco could answer them all—answer most of them offhand, without consulting a record of any sort.

Thirty-five Years of Service

This man, the living shipping register of the Pacific Coast, is J. M. Daily, manager of the marine department of the San Francisco Chamber of Commerce. In November, 1920, Mr. Daily will finish his thirty-fifth year in the service of the Merchants' Exchange and of the Chamber of Commerce since the consolidation of the different associations. It was in November, 1885, that Mr. Daily entered the old exchange as a messenger boy; twenty years ago he became secretary of the Merchants' Exchange Association; he continued in the service of that organization, of the Merchants' Exchange (the name having been changed in 1901), and, since 1911, of the Chamber of Commerce. Nine years ago, upon the latest consolidation, he assumed the duties of manager of the marine department, a capacity in which he is known to virtually every offshore and coasting skipper that visits or has visited San Francisco.

At best, thirty-five years is a long period; but to shipping circles of San Francisco, that time has brought very great changes, both as regards men and ships. Of the older men, there are few ship operators left about Sansome street who were in active business when Mr. Daily entered the employ of the Merchants' Exchange Association; of the vessels that were plying the Pacific then there are very few remaining; not only that, but during the last thirty-five years the old square-rigged windjammer has given way to things modern; the steamship has come into its own, and even now there is talk of superseding it with the Diesel-engined steel cargo carrier; and during these years, seeing these changes at first-hand, watching the remarkable development of San Francisco in common with many other ports of the Pacific, Mr. Daily has remained in the famous rooms of the exchange.

Most Windjammers Then

When Mr. Daily became a messenger boy of the Merchants' Exchange Association, most of the deep-water commerce of San Francisco was carried by windjammers; although, of course, there were several steamship lines, some of which survive, some of which already are half forgotten. The Pacific Mail was operating its lines in 1885, Williams, Dimond & Company being agents; the Pacific Coast Steamship Company was in the freight and passen-

Photo by Bushnell, S. F.

J. M. Daily, manager of the marine department of the San Francisco Chamber of Commerce ger service; the vanished Occidental & Oriental Company was running vessels to the Far East; the Oceanic liners were plying the Pacific then as now; there was the California & Mexican, headed by John Birmingham; the Oregon Coal & Navigation, with vessels running to Coos Bay; the Union Pacific Railroad, which operated two steamships to Portland; the Oregon Railway & Navigation, also in the Portland business; the Pacific Improvement Company's steamships handled coal for the Southern Pacific; running to Yaquina Bay were the passenger and freight vessels of the Oregon Development Company; Hobbs, Wall & Company transported lumber and passengers and general cargo between Crescent City and San Francisco; the Humboldt Steamship Company had one vessel in the Eureka freight and passenger service; but there were few steamers besides these. Between New York and San Francisco there plied virtually no steamships. To Hawaii there was some steam transportation, principally by the Pacific Mail, O. & O. and Oceanic; and Tahiti relied on three windjammers. Those Tahiti vessels had to depart on time; if one failed to arrive in San Francisco before the day for her outbound sailing, her luckless owner chartered another vessel. To Honolulu, Williams, Dimond & Company, E. L. G. Steele & Company, J. C. Merrill and the Spreckels fleet of sailers, all carried passengers and freight.

Forty Sailers a Day

It was in the Atlantic and European trades, however, that the sailing fleet was found in those days. Sometimes, at the beginning of the wheat-loading season, thirty-five or forty windjammers would arrive at San Francisco in one day. All vessels were reported from the Merchants' Exchange by a messenger on horseback, who called at the different offices and hotels, after Point Lobos lookout had made out the identity of the ships; and at Meiggs wharf a representative of the exchange boarded each incoming steamer or sailer.

In those days the masters of vessels transacted much more of their owners' business than they do today; the position of the agent was more subordinate. Things were more free and easy, happy-go-lucky; it was not uncommon for two wealthy shipowners, in doubt as to who had paid the duty on the last cargo of coal, to shake dice, "with a bottle of wine on the side," to determine which should pay. Even though this informality was marked, it was as nothing compared with the manner of some of those old-time owners and operators in making charters or selling cargoes: oftentimes a vessel might be chartered for a long voyage, a cargo sold involving many thousands of dollars, without "the scratch of a pen."

Familiar Figures Then

Some of the familiar figures of thirty-five years ago were: John D. Spreckels, Captain J. Sennett, Captain J. N. Knowles, A. M. Simpson, G. W. McNear, Isadore Gutte, G. S. Holmes, Messrs. Pope and Talbot, Alex Duinsmuir, Nick Bichard, Frank Barnard, Captain John Birmingham, Leon Blum, C. Beyfuss, W. A. Boole, Captain J. F. Chapman, William T. Coleman (who formerly operated a clipper ship line between New York and San Francisco), Commodore T. H. Allen, Thomas Young, Horace Davis, W. J. Dutton, John H. Rosseter (then a boy), and C. E. Hazeltine—few of whom are living today.

And the ships, no less than the men who owned, sailed and chartered them, have disappeared for the most part. For example, it is interesting to list some of the record-holders for different years, as Mr. Daily set them down then:

New York to San Francisco: 1890, ship St. James, Captain Burnham, 105 days; 1892, ship Henry B. Hyde, Captain Pendleton, 105 days; 1893, ship Henry B. Hyde, 105 days, and ship Jabez Howes, Captain Henry, 106 days; 1894, bark Olympic, Captain Gibbs, 114 days; 1895, ship A G. Ropes, Captain Rivers, 115 days; 1897, ship Kenilworth, Captain Baker, 114 days; 1898, ship Charmer, Captain Holmes, 114 days.

Hongkong to San Francisco: 1890, ship W. H. Macy, Captain Amesbury, 34 days; 1891, British ship Adelana, 31 days; 1895, ship Tillie E. Starbuck, 39 days; 1892, ship William J. Roach, 46 days.

Honolulu to San Francisco: 1890, barkentine Planter, Captain Perriman, 12 days; 1890, German bark Pfluger, 12 days; 1891, barkentine W. H. Dimond, Captain Drew, 12 days; 1891, brig Lurline, Captain William Matson, from Hilo, 13½ days; 1892, bark Albert, Captain Griffiths, 11½ days; 1892, schooner Puritan, Captain Henrix, from Hilo, 11½ days; 1893, barkentine Irmgaard, Captain Paul, 10½ days; 1893, barkentine Charles F. Crocker, Captain Lund, from Hilo, 11½ days; 1893, John G. North, from Mahukona, 11 days.

London to San Francisco: 1891, British ship Bidston Hill, 110 days; 1892, British ship Tinto Hill, 119 days; 1893, British ship Melita, 122 days; 1894, British ship Oranasia, 118 days; 1895, British ship Cuthona, 122 days.

Liverpool to San Francisco: 1890, British ship Aeolus, 115 days; 1890, British ship Scottish Hills, 115 days; 1891, British ship Larnaca, 114 days; 1892, British ship Alcedo, 109 days; 1893, British ship Sierra Parima, 105 days; 1894, British ship Mowhan, 118 days; 1895, American ship Shenandoah, 118 days; 1895, British ship Wasdale, 115 days.

Many Noted Windjammers

In those days deep-water American shipping had not fallen to the low ebb of 1914; and there were many noted windjammers, even if they were not of the blue-blooded family of clippers—ships Oriental, Cassandra Adams, Jabez Howes, Sterling, R. D. Rice, Edward O'Brien, Henry B. Hyde, Commodore T. H. Allen, Arabia (commanded by Captain MacLoon, now of Alameda), C. F. Sargent, Undaunted, Cyrus Wakefield (commanded by Captain I. N. Hibbard), A. G. Ropes, Frederick Billings, Willie Rosenfeld, Charmer, Seminole, Joseph S. Spinney, Snow & Burgess, W. F. Babcock, and the bark St. James, commanded by Captain Burnham, one of the founders of the American-Hawaiian.

From this rapid and incomplete sketch, it may be deducted that J. M. Daily has seen a very great deal indeed, has witnessed the passing of one shipping age and the dawn of another; and, from his desk in the Merchants' Exchange, has seen written not a few pages of shipping history.

Pacific Port Notes

A SUMMARY of statistics recently published shows that the trade between the continent of the United States and the territory of Hawaii, a large proportion of which passes through the ports of the Pacific Coast, reached in 1919 a record in value far ahead of any previous year, the total shipments aggregating $148,346,884, of which $98,000,000 was sent by Hawaii to the mainland and $50,000,000 represented the amount of Hawaiian purchases.

Merchants on the Pacific Coast during the past month have been somewhat agitated about the small purchases of supplies by the Navy for the Pacific Coast fleet and many rumors have arisen that purchases were being made in foreign markets. These rumors were investigated by Senator Phelan, who declares that they are absolutely unfounded, the light purchases being due to the shortness of personnel and the small amount of cruising.

On May 17 the United States Supreme Court at Washington decided that the act of Congress giving states the right to enact compensation laws with regard to persons injured in maritime employment was unconstitutional. This will affect directly more than one hundred thousand marine workers along the Pacific Coast who will now have to seek financial compensation for any industrial accidents by suit in the admiralty courts.

Shortage of fuel oil in Oriental ports is causing the conversion of many steel steamers from oil-burners to coal-burners and the competition by Shipping Board vessels built in Japanese yards has brought the rates for east-bound freight in some cases down to a point as low as at any time previous to the war.

Passenger accommodations east-bound from the Orient are still inadequate and Oriental Pacific ports are crowded with business men and tourists seeking passage bookings.

Victoria

WOODEN shipbuilding is again under way at Victoria, the first keel having been laid in the Cholberg Shipyard under the contract for the construction of four wooden barkentines for the Victoria Shipowners, Ltd., a company backed by a Dominion government loan and the money of Victoria citizens. The construction of three of the boats is to proceed simultaneously.

The contract for a steel cargo barge to increase the service between Vancouver and Vancouver Island has been let to the Harbor Marine Company of Victoria by the Canadian Pacific Railway. The barge will have two tracks capable of holding eighteen cars.

The Harbor Marine Company has received a number of inquiries from Europe recently concerning the building of oil tankers. The cables offer the contracts if they are taken at a stipulated figure, but so far these figures have been too low to make the work worth while. The inquiries are from French and Norwegians.

A delegation from the Harbor Marine Veterans' Association, the yard organization of the Harbor Marine Company, was sent to Ottawa in May for the purpose of interviewing the government to induce further contracts to be let to the Victoria shipbuilding plant. The yard is now working on two steel freighters for the Dominion government.

The Esquimalt Naval Yard now has only a care and maintenance force, the stores department staff, and a small number of other officials, still working within its gates. The partial shutting down is due to the policy of the Dominion government in putting Canada's naval affairs on such a basis that a reorganized navy may replace the old with new personnel and new equipment.

It has been announced definitely that the old cruiser Rainbow, which came to the Esquimalt station about ten years ago, will be sold.

The C. P. R. is still searching for a steamer to add to the fine coastal fleet of the British Columbia Coast Steamship Service. Captain J. W. Troup, manager of the service, made a trip to the United Kingdom for the purpose of investigating the opportunities of building or buying. Prices were so high and delivery promises so far ahead that the company decided to buy a boat if possible and is now looking over several vessels in the United States.

During the winter nearly 100 of Puget Sound's purse seine fishing boats have been sold to Southern California interests for fishing on the tuna banks. Most of these vessels are 65-footers.

On May 18 the four-masted steel bark William T. Lewis arrived at Puget Sound via Panama Canal, having left Plymouth, England, on February 2. This vessel is famous as the only American sailing vessel which survived a German submarine attack.

Vancouver, B. C.

THE Dominion government and the Great Northern Railway have failed to agree on the negotiations over the price of property needed as a site for the new public dock on Burrard Inlet. The government announces that it will expropriate the property required and settle the price by arbitration.

During the last week of April, J. Coughlan & Sons completed the trials of the steamer Canadian Inventor and she was turned over to the Dominion government merchant marine and loaded about three million feet of lumber at the Hastings mills for Australia.

The Isthmian steamer Steel Voyager arrived on April 30 with 6000 tons of Cuban sugar for the British Columbia Refinery. On April 26 the steamer Makura arrived from Australia with 350 passengers and 20,000 carcasses of mutton.

Since May 6 all pilotage has been optional in British Columbia waters and the seventeen pilots now in service have formed an association under the name British Columbia Pilotage Association, which is making arrangements to carry on pilotage business along the old lines.

The British Columbia Marine Company during the first week in May was awarded a contract to build a wooden ship for the Alaska and Arctic service of the Hudson Bay Company. This vessel will be 200 feet long and it is expected she will be completed in about four months.

On May 18 the Coughlan yards launched the Margaret Coughlan, an 8000-ton steel freighter.

Coastwise boats out of Vancouver have been pretty well tied up during May on account of the strike among the stewards, firemen and deck hands, and many of the companies have seized the opportunity to lay up their ships for the annual overhauling.

Seattle

THE arrivals and departures at the port of Seattle for the month of March, 1920, included 589 deep-sea vessels with a total tonnage of 666,869. The deep-sea passenger list inbound amounted to 8645 and outbound 11,993. The foreign exports for the same period amounted to 80,090 tons, valued at $19,331,571, and the imports to 78,586 tons, valued at $41,276,787.

Announcement has been made by the Norwegian-Pacific Shipbuilding Company that they are to build at Everett seven oil tankers and six oil storage basins, the work to commence as soon as deliveries of steel can be arranged.

During the last week in April the motorship George Washington of the Norway-Pacific Line arrived at Seattle with 1000 tons of Scandinavian products. This re-establishes direct transportation services between Scandinavian points and the Puget Sound. Two other motor vessels, the Theodore Roosevelt, of 11,000 tons, and the Borgland, of 9000 tons, are to follow the George Washington in this service. The George Washington took on 10,000 tons of flour at the Hammond Mill for Alexandria, Egypt.

A longshoremen's strike was declared at Seattle on May 4 with the object in view of unionizing the Seattle waterfront. The strike lasted ten days and then was declared off and the men told by the officials of the International Longshoremen's Association to return to work on the open shop plan. The Pacific Coast District Convention of the International Longshoremen's Association was convened here during the strike and an investigation carried on by the officials of this union led to the disclosure of the fact that practically 70 per cent of the members of the Seattle Longshoremen's Association are Industrial Workers of the World and this discovery by the officials of the district association had a great deal to do with the speedy settlement of the strike.

It has been announced that the Union Plant of the Bethlehem Shipbuilding Corporation at San Francisco has purchased the new 12,000-ton floating drydock of the Ames Shipbuilding & Drydock Company and that the dock will be towed south in the near future.

Tacoma

DURING the last week in April the Todd Drydock & Construction Corporation put the Shipping Board freighter Padnsay through her paces on a trial run. This steamer made 13½ knots and turned out in every respect very satisfactorily. She was turned over to the Shipping Board and loaded flour from Puget Sound for the Atlantic Coast.

During the same week the Todd yards launched two sister ships, the Pansa and the Pallos. Of these ships the Pansa has already completed her trial runs and is loading lumber at Everett for the east coast of South America. By the time this account has reached our readers, the Pallos will also have been completed and in operation.

The first cargo of flour to be taken in a foreign bottom from Tacoma in several years was being loaded here late in April on the Swedish-American-Mexican Steamship Company's steamer Braeholm. The Braeholm is 427 feet long by 54 feet beam, and in loading this vessel five hatches at one time were served by electric conveyors, a feat never before performed in the port of Tacoma.

On May 10 and 11 the steamship Arabia Maru of the Osaka Shosen Kaisha discharged a record cargo of silk valued at $4,113,353.

Astoria

LUMBER shipments from the Columbia during April were the largest for several months. Twenty-five vessels at the mills in the lower river district loaded a combined cargo of 19,828,578 feet. Twelve vessels during the same time loaded 14,318,292 feet of lumber at the mills in the upper river district, making a total of 34,145,870 feet of lumber leaving the Columbia during the month. Of the thirty-seven vessels, twenty-two were for California.

On May 6 the steamer Eastern Dawn, the Japanese-built freighter of the United States Shipping Board, took on about 2000 tons of flour and, after completing her sea trials, sailed away.

A cargo of 7000 tons of box shooks was assembled during the middle of May at the port docks for shipment to Honolulu.

The congestion at the port docks due to the assembling of 17,000 tons of flour for shipment is now being relieved, as the steamer Eastern Cloud is taking on 5000 tons or 50,000 barrels of flour, and early in June an American Army transport is expected to load 12,000 tons or 120,000 barrels. This, with the shipment of the steamer load of box shooks referred to above, will clear the docks and make room for the assembling of three full cargoes of wheat which are to be shipped from Astoria during June.

Portland

THE plant of the Columbia River Shipbuilding Company, where during the emergency shipbuilding program thirty-two 8800 ton steel steamers were constructed for the Shipping Board, is being dismantled and the material sold.

The wooden ship division of the Emergency Fleet Corporation in Oregon ceased to function on May 1 after having supervised the building of 116 wooden ships. A skeleton organization will remain on the job for a few weeks to clean up odds and ends. Some two million dollars in claims are still outstanding as a result of cancellation of government contracts.

The Guy M. Standifer Construction Corporation, on April 20, launched the Aquarius, the second 9600-ton steel steamer built by them for the Green Star Line. The Arcturus, first of these ships to be launched, was put through a trial run on April 27, making a speed of 13.01 knots and developing 2789 horsepower. After her trial she was loaded with scrap steel at a Portland dock and proceeded to Seattle to take her place in the Puget Sound-Oriental trade. The Aquarius was equally successful on her trials, which were held on May 10 and loaded one-third of her cargo in Portland, consisting of paper and lumber. The third vessel of this fleet, the Argus, was launched on May 5 and is scheduled for delivery on June 10, when she will take a full cargo of 5,000,000 feet of lumber from Portland to North China.

The Japanese-built Shipping Board vessel Eastern Glade, about 9000 tons deadweight, has been assigned to the Pacific Mail Steamship Company for operation on the Baltimore-Portland service and about the middle of May left the Columbia River with a full cargo of flour consigned to Baltimore.

During June and July it is estimated that some 3,000,000 bushels of flour and wheat will be dispatched from Portland and twelve ships have been chartered for this purpose by exporting firms.

Over twenty-five steamers were listed to load cargo in Portland for all ports of the world during the month of May. This is believed to be a record number for the port.

The steel steamer Angeles, first of the Columbia Pacific Shipping Company's North China Line, arrived at Shanghai May 13, twenty-seven days out from Portland. The second steamer of this company, the West Keats, started with 4,000,000 feet of lumber from the mouth of the Columbia on May 17 after a very successful deep-sea trial. She will bring back cottonseed oil and general cargo.

A revival of the old-time grain fleet from coast ports is predicted as soon as grain traffic passes out from under government control. During one week in May, six steamers were chartered at San Francisco to load grain in the Columbia River for the United Kingdom and continental European ports.

Grays Harbor

IN foreign and domestic shipments of lumber by water Grays Harbor ranks third among the North Pacific ports for 1919, being excelled only by Puget Sound and the Columbia River.

Figures on lumber shipments for 1919 follow:

British Columbia: domestic, 6,045,072 feet of lumber; foreign, 102,352,106 feet; total, 108,397,178 feet.

Puget Sound: domestic, 268,695,461 feet; foreign, 146,476,465 feet; total, 415,171,926 feet.

Grays Harbor: domestic, 239,847,241 feet; foreign, 37,449,805 feet; total, 277,297,046 feet.

Willapa Harbor: domestic, 56,050,487 feet; foreign, 2,838,180 feet; total, 58,888,667 feet.

Columbia River: domestic, 288,043,058 feet; foreign, 96,324,867 feet; total, 324,367,925 feet.

Coos Bay: domestic, 169,395,990 feet; foreign, 1,485,630 feet; total, 170,881,620 feet.

Total shipments: domestic, 978,077,309 feet; foreign, 386,927,053 feet; total, 1,365,004,362 feet.

Although Grays Harbor county has yet to pass or reject the port development bond issue of $800,000 for which a special election has been set for June 26, it has been definitely shown that the issue will not fail to carry because of the apathy on the part of its advocates. One hundred and forty men and women, representing every district of Grays Harbor, attended a port development dinner and mass meeting in Aberdeen early in May, heard the port commission's plans outlined and a report of results accomplished by the city of Seattle in its port program, and elected a committee of nine members to serve as a nucleus of an organization to conduct an educational campaign during the weeks leading up to the time of holding the election.

The calling of this special port district election to pass upon the issuance of $800,000 in bonds for a five-year program of inner harbor development, has made a favorable impression in official circles in Washington, and has elicited from Secretary of War Newton D. Baker an expression of admiration for the spirit shown by the harbor communities and their willingness to co-operate with the Federal government. Assurances have been given that the United States dredge Michie will be ordered to return to Grays Harbor for July and August to do further work on the bar.

San Francisco

FROM May 12 to May 15 the attention of all commercial San Francisco was focused on the Seventh National Foreign Trade Convention meeting at the Civic Auditorium. This was by far and away the most important event during the month of May, and probably during the entire commercial history of the city. The convention is thoroughly reviewed in the leading articles of this issue of Pacific Marine Review, and therefore needs nothing more here than passing mention.

The industrial situation in San Francisco shipyards seems to be steadily improving and the operation of the yards on the so-called American plan is undoubtedly an unqualified success.

Much interest is being evidenced on the waterfront in the announcement by the Pacific Steamship Company of its proposed new express passenger steamers, with which it expects to beat the railroad schedule from San Francisco to Seattle. These ships are described fully in an article in another part of this issue. They will undoubtedly be a distinct advance over anything of the kind on the Pacific Ocean.

On April 28 the 9400-ton steel freighter Mohinkis, fourth vessel built at the Pacific Coast Shipbuilding Company's yard for the Shipping Board, left for Honolulu on her maiden voyage with a full cargo of general merchandise. She is being operated by the Matson Navigation Company.

On May 1 at 11 p. m. the Moore Shipbuilding Company launched the steel tanker Vacuum, being built for the Vacuum Oil Company. This is the first vessel to be launched by the Moore Shipbuilding Company for private account. The keel for the tanker was laid on January 7 and it is expected that she will be delivered on or before June 1.

The Moore Shipbuilding Company has laid the keel for one of the new Matson freighters and construction work on these ships will be pushed as rapidly as possible.

The second marine railway built by the Moore Shipbuilding Company was placed in operation on May 7 and had a thorough test in hauling the steamer Orani, a United States Shipping Board 9400-deadweight-ton freighter with 1000 tons of oil in her fuel tanks out of the estuary.

The first section of the floating dock purchased in Seattle by the Moore Shipbuilding Company arrived on May 7 and several of the other sections are en route.

The big Matson liner Maui, after having been renovated at the Union Plant of the Bethlehem Shipbuilding Corporation, took on a full cargo and a full list of passengers and cleared for Honolulu on May 5.

On May 1 California street was treated to a surprise in the announcement of the dissolution of the partnership of Comyn, Mackall & Company, and the incorporation of the W. L. Comyn Company and the Pacific Motorship Company. W. L. Comyn & Company will act as operating agents for the lines of the Pacific Freighters Company, operating thirteen sailing ships on the Pacific, and the motorship lines of the Pacific Motorship Company, which has taken over the motorships of the Chilberg Company of Seattle. Mackall purchased the interests of Comyn in the Raymond Veneer Company, the Western Basket & Barrel Company, the Los Angeles Barrel Company and the Southern California Box Company, and W. L. Comyn retained for W. L. Comyn & Company the agency of the Dominion Mill Company.

On the 10th all the old gossips on the waterfront were set to working over-time by the arrival of the Rolph Navigation Company's ship Annie M. Reid from Ipswich, England, in the remarkable time of seventy-six days via the Panama Canal. Only thirty-nine days were consumed in the voyage up from Panama. This feat compares favorably with those of the best of the old-timers.

It has been announced during the month that the Bethlehem Shipbuilding Corporation contemplates the expenditure of approximately $3,000,000 in immediate improvements to the Union Plant. This expenditure includes the purchase of a new floating drydock from the Ames Shipbuilding & Drydock Company of Seattle, already mentioned in the Seattle notes. The balance of the money will be expended in the extension of the present wharves so as to almost double the berthing accommodations. There will also be improvements in the way of hospital accommodations, employment offices and a paint shop at the Alameda works of the Union Plant.

The Army transport Great Northern has been laid up at Mare Island Navy Yard during the month undergoing repairs costing in the neighborhood of $150,000. This ship is to take a congressional party to the Orient on or about June 15.

Commander James Reed of the construction corps of the United States Navy, who for a number of years past has been stationed at Mare Island in the hull division, has resigned from the naval service and accepted the position of assistant general manager of the Los Angeles Shipbuilding & Drydock Company.

The monthly letter of the Anglo London Paris National Bank of San Francisco for May presents statistics which show the distribution of available tonnage working out of the port of San Francisco, segregated as to their locational services. A summary of these statistics shows that there are eight vessels exclusively engaged in Hawaiian trade under the Matson Navigation Company and aggregating 56,600 tons. In coastwise traffic under four companies there are thirty-nine vessels with an aggregate tonnage of 81,040. This includes the Baltimore service of the Pacific Mail Steamship Company via Panama. In miscellaneous and special service under eleven companies there are eighty-one vessels with a tonnage of 630,801. Engaged in Latin American service there are ten companies operating forty-seven vessels with a tonnage of 261,409. In the Orient trans-Pacific trade the table lists six companies operating forty-four vessels with a tonnage of 412,567 and to Australia and New Zealand three companies operating eleven vessels with a tonnage of 81,200.

The second of the new tugs building at the Stone Shipbuilding Company, Oakland, for the Red Stack Towboat Company was launched on the night of May 12 and christened the Sea Monarch. The first of these four new tugs, the Sea Lion, is now having her machinery installed and will be rushed to completion as quickly as possible. The last two of these four tugs will have been launched during the next sixty days.

Chairman Benson of the United States Shipping Board has announced that the board has accepted the resignation of George Eggers of San Francisco, assistant director of operations, the resignation to be effective August 1. Robert L. Hague, chief of the department of construction, and also of San Francisco, has tendered his resignation to take effect June 15.

During the latter part of April and the early part of May, very rough weather prevailed outside the heads and many ocean-going vessels were delayed thereby

Los Angeles

ACCORDING to data compiled by the Associated Press, nine freighters and two passenger ships with a total tonnage of 65,000 are now operating on the Pacific with Los Angeles as their home port. This compilation includes all ocean-going commercial craft registered at the port of Los Angeles. Five of the freighters are operated by the Los Angeles Pacific Navigation Company in Asiatic trade and four are operated by a local company to the west coast of Mexico and Central America. The two passenger ships are the Yale and Harvard, which will very quickly be installed in the coastwise passenger trade.

On May 20 the Southwestern Shipbuilding Company completed the dock trials of the West Nomentum. The sea trials took place on May 24, and upon acceptance by the Shipping Board she will proceed to Portland to be operated by the Columbia Pacific Shipping Company, carrying lumber for North China.

The steamer West Norranus was launched at the yards of the Southwestern Shipbuilding Company on the night of April 27 and on April 21 keels were laid at the same yard for two 12,000-ton tankers for the Union Oil Company. These tankers will be known as the Montebello and La Placonti.

The residents of the harbor district were treated to a very novel spectacle on the night of Friday, April 30, when the big dreadnoughts of the Pacific Fleet engaged in night target practice assisted by naval hydroplanes.

The total value of commerce passing through the port in February, according to traffic manager Matson of the Harbor Commission, shows an aggregate of more than $13,000,000. Lumber continues to be the great item of import, more than 52,000,000 feet having arrived in February. These figures practically double those for the corresponding month of 1919

The steamer Tjisondari of the Java-China-Japan Line arrived on May 6 from Batavia with 1500 tons of copra cake for Los Angeles. This is the first cargo of this kind to have been received here direct from the East Indies.

The United States Army engineers have announced that the dredger San Pedro will arrive at Los Angeles harbor on June 1 and commence the work of clearing out the main channel and the turning basin to a depth of thirty feet. Considerable agitation has been begun for deepening the channel to thirty-five feet and widening to 1000 feet, but the War Department will do nothing on this project until the city makes an agreement with wharf owners on the east side of the channel protecting the War Department against any damage claims which may arise from the work of the dredges. As soon as this agreement can be effected, the War Department stands ready to do the work

New Admiral Liners

IN many respects the two passenger steamships to be built by the Pacific Steamship Company for its Puget Sound - San Francisco - Los Angeles service will be distinctly in advance of anything heretofore designed for the Pacific coastwise traffic. In general, the plans of the Admiral Line are for vessels possessing several of the characteristics of the Great Northern and Northern Pacific; but the new ships will be much larger and will have improvements that have been perfected since the two Hill vessels were built. As for speed, the Admiral liners will have approximately the same as the Great Northern and Northern Pacific, or twenty-five knots. Each vessel will have accommodations for 572 passengers, all first-cabin.

Eighteen Months for Building

For a year or more the Pacific Steamship Company had considered the construction of two new vessels for the coastwise service; nothing was done, however, until it became evident that the company would be able neither to obtain the Great Northern and Northern Pacific, which will be retained in the United States Army Transport service, nor the Yale and Harvard, formerly operated by the Admiral Line between San Francisco, Los Angeles and San Diego. Now that there is no hope of obtaining either of these two pairs, the company has decided to have vessels built. Construction of the first vessel probably will require eighteen months, from keel-laying to commission, and the company intends to complete one vessel before beginning the second, so that the second may benefit, if possible, from the tests of the first.

A comparison of the new steamships with the Governor, one of the largest vessels operated by the Admiral Line in the coastwise trade, and with the Great Northern, which was built for that trade, will be of interest:

	Length	Beam	Depth
New Vessels	587-6	72	53
Governor	416-9	48	37-4
Great Northern	500	63	50-5

Tests with models are being made with a view to giving the vessels greater beam (eighty feet being desired, if practicable), which would add to the stability and comfort.

A Gyroscopic Stabilizer

Provision is made for equipping the vessels with the latest devices for safety, stability and comfort, among which will be a gyroscopic stabilizer, which is expected to make for increased stability and consequently for the comfort of passengers. Both vessels will have double bottom and many watertight bulkheads.

Oil-fired boilers with turbo-electric drive will be the motive power. The Pacific Steamship Company has designed the vessels to have a maximum speed of twenty-five knots. With such speed, the vessels will make quicker passages between San Francisco and Seattle than are made by the trains. The schedule will be thirty-six hours.

To Cost $4,000,000 Each

The estimated cost of the vessels is $4,000,000 each. The short route, the keen competition that any coastwise steamship meets from the railroads, and the necessity of providing unusual comforts for the passengers, has led the Pacific Steamship Company to design the vessels as "floating hotels." Among the special features with which they will be provided in furtherance of this are: mechanical draft ventilation, elevator service from deck to deck, telephone service from each stateroom, electric fans in each stateroom, unit-heating system, newsstands, barber shops, shoe-shining stands, hair-dressing and manicure rooms, valet and tailoring service, laundry for ship's work as well as passengers', drug store.

The plans of the vessels call for six decks, including a boat deck. The vessels will be furnished with a view to obtaining the effect of quiet elegance. Everything will be of the best quality without being ornate. Numerous conveniences for passengers will be provided in the way of social halls, music rooms, promenades, etc. On the boat deck will be located a tea room, painted in old ivory, and fitted with wicker tables. This room will be open at the after end. On A deck will be an observation hall, a social hall, a large smoking room and sixteen impulse sounding machines will be installed. Submarine special passenger rooms. On this deck there will also be an enclosed promenade, enclosed with heavy plate-glass bronze-framed windows. The social hall and lobby on this deck will be paneled in prima vera, with deck heads paneled in white. The social hall will be fitted with book cases, settees, etc., and will be lighted with large glass windows. On A deck four ensuite rooms will be paneled in polished mahogany; four in prima vera; four in Circassian walnut, and four in birdseye maple, the traveler thus being able to choose almost any paneling to suit his taste. Ensuite rooms will contain two three-quarter white enameled beds, two wardrobes, plush covered settee, dresser and lavatory. Plate-glass mirrors and all their necessary fittings will be installed. Each ensuite room will have an adjoining toilet and shower room, which will be white tiled, full length. The barber shop will be on A deck for the accommodation of passengers. The lobby, passageways and writing room on A deck will be paneled in polished mahogany, with deck head of white paneling. The smoking room on this deck will be finished in quartered oak. At the forward end of the smoking room will be a completely fitted bar of quartered oak.

Glass-Enclosed Promenade

On B deck will be a glass-enclosed promenade, similar to that of A deck, with a smoking room and lobby corresponding to the one on A deck. On the port and starboard side of the deckhouse at the forward end are to be thirty passenger staterooms, fitted with three-quarter lower and single upper berths. At the after end of the deckhouse, arranged on the side are to be fourteen staterooms, containing a double bed and having a toilet and shower room adjoining, and sixteen staterooms containing one single berth and having toilet and shower room attached. At the forward end of the forward boiler casing are to be ten staterooms with one single berth in each. Abaft the after engine-room casing are to be arranged three staterooms with three-quarter lower and single upper berths, and two staterooms with one single berth in each. All staterooms on B deck will be paneled in white cedar, with deck head of white neversplit panels. Berth will have special Pullman-design berth lights, nickel and netting watch pockets, plate-glass mirrors and other conveniences. All rooms will have hot and cold water. The after lobby on B deck will extend right across the vessel, and will be arranged with writing desks, settees and tables. The concert hall on this deck will be paneled in cedar, white ivory finished, with mahogany pilasters. Overhead beams will be neatly cased in dull mahogany, and deckhead paneled in old ivory. The floor will be laid with hardwood. A tastefully-designed stage with dressing rooms on each side will be built at the forward end of the concert hall.

On C deck, staterooms to accommodate 396 passengers, all two in a room, will be provided. They will be paneled in white cedar. Each room will have two single berths, to be fitted the same as those on deck above. The purser's office will be located on this deck, also a telephone exchange connecting with all staterooms. On this deck also will be a newsstand, cigar and confection counter, barber shop, and manicure parlor, office of public stenographer and other offices.

Dining Room Arrangements

The dining saloon, fitted in old ivory, paneled with polished mahogany pilasters, will be located on D deck. The floor will be laid with cork tiling. The pantry and galley will be models for the sanitary preparation and handling of food. Hatches and cargo lifts will be fitted to handle cargo in the most rapid and efficient manner. Sister hatches will be located so that cargo may be handled expeditiously from deck to deck, by means of electric conveyors. All public rooms, lobbies, halls and passageways will be lighted by the indirect system. All passenger staterooms will be lighted by one central fixture, and berth lights and to have one outlet socket arranged to suit electric fan. An elaborate system is provided for the proper heating and ventilation of every part of the ship. An electric vacuum cleaner system will be installed.

Sounding machinery of the Kelvin type and electric

(Continued on page 129)

Photo by Bushnell, S. F.

A. W. Follansbee, Jr., marine secretary of the Fireman's Fund Insurance Company and marine insurance trade advisor at the Seventh National Foreign Trade Convention

Photo by Bushnell, S. F.

William G. Marvin, manager of the legal and insurance departments of the National City Bank of New York, and marine insurance trade advisor at the Seventh National Foreign Trade Convention

Marine Insurance

Recent Developments in Marine Insurance

By Charles F. Howell

LAKE navigation in principle always opens for metal vessels April 15, and for sailing ships May 1. The restriction period for the former runs from November 30, and for the latter from November 15. This year, owing to excessive ice conditions, the technical date has not been the actual one; for, although navigation was possible on the "opening" date from Ohio ports to Lake Michigan ports, there was ice from Buffalo to Erie, and several days had to elapse before boats could get out of Buffalo. Grain is waiting to be moved from the upper Lake ports, and there continues to be a demand for iron ore to come down; but, because of the danger of fuel shortage arising out of the railroad workers' strike, there has been but a limited number of vessels moving from the lower ports. It has been customary to load steamers with grain during the winter and so have them all ready to move south upon the opening of navigation, but this year, owing to the excess of ice in the harbors of Port William, Port Arthur and Duluth, vessels have not been able to get alongside the elevators, and consequently few were prepared April 15 to journey south. The outlook is not good for much of an improvement in underwriting conditions in Great Lake business this year. Hull valuations have been increased from $60 a gross register ton to $70, which will add about ¼ of 1 per cent to the rate; that is, it is equivalent to it. This will make the rate pretty close to 4 per cent. As usual, the Great Lakes Protective Association covers the first 25 per cent of the Lake fleet at 3¼ per cent; particular average claims come under a 3 per cent franchise; and disbursements are covered in the general market. For the past three years the annual underwriting deficit of the G. L. P. A. has been $250,000. Repair costs on the Lakes are likely to be somewhat lower this year, as prominent yards are submitting competitive bids, which of late years have been unknown.

Japan's Classification Society

The Imperial Marine Association, or, in Japanese, Teikoku Kaiji Kyokai, is the name of the new Japanese classification society that is now approaching the completion of its organization. By July 1, if all goes well, it will be in position to begin business, having by that time received the sanction of the Imperial government. Upon the completion of its organization, the association will work in close affiliation with the American Bureau of Shipping, the British Corporation, and the Registro Navale Italiano, each representing the others in its respective countries. The Japanese society is to adopt the regulations of the British Corporation, which are conceded to be superior to those of Lloyd's Register. At the present time, K. Minato, representing the Japanese government, is in this country making a thorough study of the relations of the government to classification societies.

It was an exhilerating moment for those who still have faith that the United States government will be forehanded in the care of its people, when the Shipping Board removed 460 of its vessels (all that it had) from Lloyd's class and put them in the the American Bureau of Shipping. At once a rumor began to circulate to the effect that the bureau was going to take the ships without a survey, which was promptly killed by an official denial from headquarters. The surveys will be made, and they will be made without charge.

Writing Rice

It is being insisted, and properly, that the way certain lines are being written is little short of disguised rate cutting. Rice is an example. The regular clause, which covers rice in a series of fifty bags, awards free of particular average under 10 per cent. It is no unusual thing to see this cut to 3 per cent, with but the slightest increase in the rate. Most of the companies, as a matter of fact, write rice on a series of ten bags; and some, even, on each bag. The franchise appears to cut but little figure. In a ten-bag series, with a franchise calling for a $3 loss in order to make a claim, it scarcely would be an easy job to discover the damage to a bag—30 cents. Some underwriters contend that rice, being a commodity peculiarly subject to damage from fire, water and almost every other kind of influence, never should be written free of particular average. To this the broker replies that this is wrong, and that the shipper is entitled to an option, at a rate. Again, it is frequently insisted that in view of the impossibility of identifying any particular series, fifty bags by fifty, or ten by ten, the average should be adjusted on the whole shipment.

Cotton in Steel Hulls

An elaborate set of governing rules and regulations is under consideration by the engineers of the Cotton Underwriters with regard to the handling of cotton shipments in steel-hull steamships. The proper handling or stowage of clean, dry cotton in well-covered bales, introduces no special inherent hazard to shipping. But, considering the class and condition of the average American bale of cotton, the process and usual manner of handling, during which it is exposed to many common hazards, subsequent to loading on vessels; also the fact that it is a cellulose, organic fiber of an unusually inflammable nature, it is most important that special care and supervision be exercised in the handling and stowage of this commodity. Especially is this true in connection with certain other commodities, which, in combination with cotton, create a positive hazard and danger and under unfavorable conditions may imperil the safety of a vessel. Being an organic substance, cotton is subject to spontaneous heating and ignition when in contact with, or mixed with, certain acids, oils, fats, chemicals and foreign substances. Wet or moisture will not produce spontaneous ignition, though it will damage the fiber to a considerable extent and therefore should be avoided. The fire risk of cotton is greater than of any other fiber; the air in the fibers farthering oxidation, combustion and the spread of flames. Because of this peculiar nature of cotton, it constitutes a most deceptive hazard and risk, and when once ignited it is almost impossible to extinguish the smoldering fire; especially in a packed bale or mass, as in the hold of a vessel. The presence and influence of the air in the fibers is sufficient to support combustion within the bale or mass unnoticed for weeks; the smell of burning and smoke being absorbed by the outer cotton of the bale. In order to reduce the hazard, minimize the damage and safeguard the handling and stowage of cotton, the proposed rules and regulations of the engineers of the Cotton Underwriters have been drafted and are under consideration.

Support American Companies

At the meeting of the Chamber of Commerce of the United States at Atlantic City, an able New York marine underwriter, William H. McGee, had some very timely things to say in connection with the development of marine insurance in this country. He insisted that one reason for the slow development of our insurance companies is the lack of adequate support on the part of American shipowners, merchants and bankers, "who are apparently almost entirely lacking in that interest in home industries which we find in other leading commercial nations." Said he: "It is rare to find an American shipowner or merchant instructing his insurance broker to give any preference whatever to American institutions, irrespective of like terms, etc., whereas the London Corn Trade Association and the Liverpool Cotton Exchange, to take only two familiar examples, prescribe in their standard forms of contract that the marine insurance shall be placed with British companies. In other lines of business an American marine underwriter is constantly meeting situations

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FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

where his assured point to such requirements as reasons why a policy already placed must be canceled, or why the merchant cannot place his insurance with his neighbor, friend or relative. British merchants are always fostering home banking, shipping and insurance institutions, and wisely so. I have yet to find one case where any American cotton exchange, coffee exchange, board of trade, produce exchange or similar organization expresses the slightest interest whatever in American banks, American ships or American insurance—fire or marine. When any preference has been expressed it has seemed as if the preference was influenced by those not interested in American institutions. The Englishman is a great booster of British institutions, and rightly so, but apparently American shipowners and American merchants are concerned entirely with today's savings of a few dollars and cents in the cost of insurance, to effect which savings he is very little concerned over the development and expansion of markets at home."

Coal Coverage

There is a surprising difference of opinion among marine underwriters as to the wisdom of writing coal; some prefer not to insure it at any rate, considering it a heavy cargo and hard on a vessel and fearing the spontaneous combustion hazard; some are veritably hungry for coal cargoes by steamers, writing them at general cargo rates covering the ordinary policy perils and loss from spontaneous combustion, however arising. On one point, however, there is a unanimity of opinion, and that is that coal in wooden vessels, especially sailing vessels, for long voyages should not be written without careful investigation of the conditions surrounding each particular risk. Contrary to a rather general belief, coal is not a heavy cargo, nor is it a hard cargo on a vessel. It stows in from forty to forty-seven feet, depending upon the type; and any cargo stowing in forty or more feet cannot be said to be a heavy cargo, although, of course, the fact of a cargo not being heavy does not preclude it from being hard on a vessel. But coal does not stow as a dead load, like bagged flour, cement or nitrate, but permits of the required flexibility. Being a dirty cargo, it is generally carried by a poor class of vessel—and that is a feature which must be taken into consideration by the underwriter. Under prevailing conditions, as regards loading, coal may be shot into a steamer and, if the vessel is sailing with reasonable dispatch, carried around the world with little, if any, danger of spontaneous combustion. The delays occasioned in loading and sailing during the war, together with the extended voyages through equatorial waters, were responsible for the fires in the coal cargoes of sailing vessels bound to the River Plate, which proved so disastrous to many underwriters in the New York market. Vessels would load and lie in the harbor for weeks, with improper ventilation, resulting in heating, and this, with the lengthy voyage and delays at port of discharge, caused spontaneous combustion. Again, it is more difficult to carry cargo dry in a wooden vessel, and coal, if wet, is more subject to heating than when dry, thus influencing the value of the risk.

MARINE INSURANCE AT THE CONVENTION

MR. WILLIAM G. MARVIN, in charge of the legal and insurance departments of the National City Bank of New York, and Mr. A. W. Follansbee, Jr., marine secretary of the Fireman's Fund Insurance Company, were appointed as trade advisors in connection with marine insurance at the Seventh National Foreign Trade Convention held at San Francisco in May.

Mr. Follansbee says:

"I was really astonished at the magnitude of the whole undertaking. When I accepted my appointment as trade advisor I must confess that I did not appreciate what a serious obligation I had undertaken. The biggest men in every industry in the country were represented at this convention. They worked from ten o'clock in the morning until late in the afternoon and again attended conferences at night. I can assure you it was no junketing trip. Every possible angle of trade expansion was discussed by recognized experts in their particular branches, and many plans were laid before the convention which had as their purpose the educating of the people to the requirements of foreign trade.

"Mr. Hendon Chubb, of Chubb & Son, New York, delivered a most excellent address upon marine insurance, which was very carefully listened to by a very large audience. I took particular interest in Mr. Marvin's advice to merchants, in connection with arranging their marine insurance through reputable brokers and with reputable companies, in order to satisfy the requirements of the banks. Altogether, I put in an extremely enlightening week at this convention."

Pacific Steamship Company's booth at Foreign Trade Convention

INSURANCE COMPANY
Freights and Disbursements
TREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
230 BYRNE BUILDING
LOS ANGELES

F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

ND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

FREIGHT REPORT

SINCE our last circular, several United States Shipping Board vessels have been chartered to load wheat and /or flour from Portland to the United Kingdom at $26 a ton, with the option of Continent between Bordeaux and Hamburg at $29 a ton.

We have to report the first charter for August/September loading, that of the French sailer Pierre Antonie, which used to be a regular trader from San Francisco to the United Kingdom. She was chartered by Strauss & Company at 145/- a ton, and we hear today that another Frenchman has been chartered for barley for August/September at 150/- a ton, which shows a steady tone. As soon as the barley crop is made, we expect to see further chartering for new crop loading.

The schooner Zampa was chartered by Rothschild & Company for copra from the South Seas at $17, and the R. R. Hind at $16 was taken at Atkins, Kroll & Company for the same business, and the schooner Bertie Minor, on private terms, for copra by Burns-Philp Company.

The steamer Las Vegas is reported as chartered for coal from Australia to Honolulu. The schooner Ella A was fixed through London to carry coal from Newcastle, Australia, to a nitrate port at $16.50, option of Callao at $18. The schooner Forest Friend was chartered at $9.50 for coal from Newcastle to Honolulu, also through London. The schooner William H. Smith was chartered at 85/- coal to a nitrate port, and the schooner Kate G. Pedersen chartered at $17 coal to a nitrate port by Andrew Weir & Company. The steamer Grace Dollar chartered to carry a cargo of coal from Virginia to Tiburon, by the United States Navy. The motorboat Benowa chartered by W. L. Comyn & Company, Inc., at 70/- for coal from Durban, Africa, to Buenos Aires.

The schooner Eccla was chartered by W. L. Comyn & Company, Inc., from Balfour, Guthrie & Company, for lumber from Puget Sound to Sydney at $35, and the steamer Agron was taken by Hind, Rolph & Company to the same port at $35, and the schooner Elinor H at $35, Sydney, by J. J. Moore & Company.

The steel barkentine Alta was chartered at $57.50 from British Columbia to South Africa by the Ocean Lumber Company. The steamer Adria was chartered at $56 to two ports South Africa, by Findlay, Durham & Brodie, British Columbia. The Russell Haviside was chartered for owners' account at $55 one port, $57.50 two ports, Africa.

The Ocean Lumber Company chartered steamer Margaret Coughlan at $45 for ties to the United Kingdom.

The Vacuum Oil Company chartered Henriette at 72½ cents per case to Suva and/or Noumea.

The only sale we can report is that of the American steamer Henry T. Scott, bought by F. Linderman for $400,000.

We quote the market closing steady at above quotations.

PAGE BROTHERS, Brokers.

THE FUTURE OF SHIPBUILDING IN GERMANY

THE future of German shipbuilding and the world's merchant marine is discussed in detail in the Bremen Volksblatt. A comparison of the tonnage figures of 1914 and 1919 shows clearly the rapid advancement of the United States and Japan in shipbuilding during the war. British merchant ships decreased and those of Germany practically disappeared from the seas. The following figures demonstrate this: of the 45,404,000 gross register tons of the year 1914, 21,200,000 belonged to England, i. e., 46.6 per cent; 5,134,720 belonged to Germany, or 11.3 per cent; 2,026,000 to the United States, or 4.5 per cent; and 1,708,000 to Japan, or 3.7 per cent. The figures of 1919 show a considerably changed picture. Of the world's steamer fleet of 47,897,000 gross register tons, only 16,345,000 belonged to Great Britain, or 34 per cent; 9,773,000 to the United States, or 20.4 per cent; 2,335,000 to Japan, or 4.9 per cent; and only 1,620,000, or 3.4 per cent, belonged to Germany.

Little Competition Expected

The extent to which America put money into ships, especially during May and June, 1919, shows plainly that it is planning an enormously increased peace production. The total sum invested in shipping undertakings in the United States during the war amounted to $533,000,000, whereas the total investment in the German shipping business and shipyards during 1913 was only 783,600,000 marks; that is, about $186,000,000 (at peace rate of exchange). When one compares the German with the American figures, the writer says, it seems rather impossible that German shipyards will ever be in a position to reenter the world's ship market with any serious competition.

If shipbuilding goes on normally, one should soon be able to reckon with a world tonnage of about 58,900,000 tons. This tonnage, however, still falls short of the world's actual need by 11,000,000 tons. This lack, the writer calculates, will be supplied in about three to four years, and then a general building stagnation will take place, which will be disastrous to many smaller ship yards. It is likely, however, that some of the war-built boats will have to be replaced. Germany, the writer believes, will not be able to participate in this general building up of the world's fleets; the shipbuilding countries of the future will be the United States and England; Europe will buy its ships in England, and East Asia will buy in America and Japan.

Germany's Future as a Shipbuilder

Germany never built for foreign countries to any considerable extent, as its own demand was sufficient to keep its yards fully occupied. In 1913, for example, Germany built 378,000 tons, of which only 23,000 tons were built for foreigners; in this same year Germany bought for itself 25,000 tons of shipping built abroad. But, as now all means of oversea trade have been withdrawn from Germany, it might well take up building for foreign countries; it would find for every ton (above the 200,000 tons it has to deliver to the Allies) eager customers, especially in South America. Here opens a great field of industry for Germany. The cessation of German warship building should also leave its yard more free for merchant ships. On the other hand, the loss of the iron and steel works in Alsace-Lorraine weigh heavily against a rapid recovery in shipbuilding. The war brought no special change in the construction of ships, so no difficulties would arise from this source.

Photo by Bushnell, S. F.

HAROLD M. SAWYER

The firm of Sawyer & Cluff, admiralty attorneys, opened offices in the Mills Building, San Francisco, on January 1, 1920. Harold M. Sawyer, senior member of this firm, was born in Troy, New York, on June 2, 1882. He graduated from Yale in 1903, taking his M. A. degree at the same university in 1906 for work done at Berlin and receiving his L.L.B. from the Harvard Law School in 1907. He practiced admiralty law in the offices of Robinson, Biddle & Benedict. Messrs. Sawyer and Cluff are specialists in admiralty and general maritime practice, including marine insurance and the various legal phases of importing and exporting. Pacific Marine Review is arranging to carry each month a legal department which will be under the supervision of Mr. Harold M. Sawyer.

Notes of an Endurance Run

IN the April number of Pacific Marine Review was an article on the equipment of the 9400-ton steel cargo-carrier Havilah, built by the Union Construction Company; supplementing this article there follow a few notes on the endurance run of the Naugus, Emergency Fleet Corporation's hull No. 1023. This ship was built by the Moore Shipbuilding Company and is of the same type as all of the other 9400-ton cargo vessels built by this company for the Emergency Fleet Corporation.

The U. S. S. B. Steamer Naugus

Six-Hour Dock Trial

These vessels are given first a six-hour dock trial with engines operating at the full speed of 90 r. p. m. After inspection of gears, turbines and other machinery used during this trial, the vessel took the necessary amount of ballast and was operated around San Francisco Bay for a period of six hours further to try out the machinery.

During the course of this six-hour run there was certain compass adjusting done, as well as operating the vessel at different speeds over the measured mile course off California City. During the entire period of this continuous run observations were taken by Fleet Corporation inspectors to determine the fitness of the vessel for cargo carrying. Immediately upon the Naugus having been approved by the inspecting officials, she was put into service, going to South Vallejo, where she took on a cargo of 7477 long tons of flour.

During the time of the bay trial, the vessel was drawing about 13½ to 14 feet of water. Consequently, during the light draft trial, a large portion of the blades of the propeller was above water and the continuous six-hour run under these conditions was a severe tryout and was especially hard on the driving machinery.

Parsons Marine Turbines

The Naugus is equipped with Parsons compound type marine turbines operating at 3600 r. p. m. under boiler pressure of 200 pounds. The reduction to 90 r. p. m. of the propeller shaft is accomplished through Falk double-reduction type herringbone gears. The Falk company has standardized a unit to be used in connection with the Parsons type compound marine turbines, furnished by the W. & A. Fletcher Company, which were installed in the Naugus. Large numbers of this particular type of installation have been supplied to the Fleet Corporation for ships built on both the Atlantic and Pacific Coasts and the records made by them, when in actual service under cargo-carrying conditions to various ports of the world, have proved the good judgment of the Emergency Fleet Corporation in selecting a power unit that is simple and easy to operate and the up-keep cost of which, as shown by actual operation of vessels, has proved to be very small.

Lightship to Point Reyes

As soon as the full cargo was received by the Naugus she immediately was sent to San Francisco, where the Fleet Corporation inspectors again assembled on board and the vessel put to sea for her twelve-hour endurance run. Generally these vessels make a number of runs over the measured-mile course within the bay at full speed, one-half speed and one-third speed with full cargo on board in order to determine the slip of the propeller and certain other necessary information. Upon completing the standardization runs over the measured mile they go at once to sea, where they must be operated for a period of twelve hours continuously at a propeller speed of 90 r. p. m.

The usual course for these endurance runs is from the lightship to Point Reyes. By making the trip to Point Reyes and back twice, the largest part of twelve hours is occupied and in addition the vessel has the advantage of wind and weather one way and the disadvantage of wind and weather the other way, thus permitting the observers to get good average results.

In the case of the Naugus the weather conditions were especially bad. The seas were very high and the wind was estimated at about a sixty-mile gale, thus making this particular endurance run an especially severe one. The fitness of this type of vessel and the character of work upon it can best be described by the fact that after completion of the endurance run the Naugus entered San Francisco harbor, completed her standardization runs over the measured mile and after the inspectors came ashore proceeded at once to sea, bound to New York.

NEW ADMIRAL LINERS

(Continued from page 122)

signal apparatus, patent electrically-operated fog whistle signal system, electric fire-alarm system and other safety devices will be installed.

There will be a special baggage room, where passengers may have access to their trunks at all times. In connection with the baggage room there will be a parcel checking room for the checking of hand baggage and small packages.

Inasmuch as many travelers take their automobiles with them when making a vacation or business trip, provision has been made for a garage, which will hold approximately sixty cars. These cars will be taken into the vessels through side ports, obviating the present method of hoisting them on deck with the use of auto slings.

The vessels, although primarily for passenger traffic, will be arranged for the quick handling of some 2000 tons of cargo—perishables, express and package freight. Refrigerated chambers will be provided for perishable fruits and vegetables.

Special attention has been given to the quarters of the crews. They will have their own part of the ship, entirely separate from the accommodations which will be occupied by passengers. Their quarters will provide for special dining rooms for the different departments.

The Admiral Line, being essentially a Pacific Coast organization, inclines toward the construction of these vessels in Pacific Coast yards, although construction costs will be considered and it may be that the job will be given to some Eastern yard. Should they build on the east coast, the maiden voyage probably will be an excursion from New York City to Los Angeles, San Francisco and Seattle via the Panama Canal.

NEW MANUFACTURER'S AGENCY

HECKERT L. PARKER, E. S. I. E., has disposed of his interests in the Conneaut Metal Works Company, Conneaut, Ohio, and has opened a manufacturer's agency at 111 New Montgomery street, San Francisco. Mr. Parker represents the Seidler-Miner marine electrical equipment, Faraday and De Veau electrical signaling apparatus and Conneaut plastic metallic packing lines in the Pacific States.

Mr. Parker has had wide experience in marine electrical work, having served as a member of the committee on electrical specifications in charge of the electrical work on the Leviathan, which is being reconditioned, and was the manufacturers' representative appointed to work out the ornamental electrical fixture and illumination features with the naval architects and electrical engineers of the private yards who are now building the new 535 and 502 passenger vessels of the United States Shipping Board.

Mr. Parker is a pioneer in advocating and making standardized watertight electric lighting and wiring devices, being closely connected with the equipment designed for the Navy and Shipping Board in 1917 by the Conneaut Metal Works and the Bryant Electric Company.

Honolulu

NOT only is Honolulu harbor becoming rapidly inadequate as far as area is concerned and dock space, but dredging soon will be necessry to provide additional depth at the upper end for the big liners of the Toyo Kisen Kaisha and the Canadian-Australasian Royal Mail Line. The Tenyo Maru, Shinyo Maru and Siberia Maru of the T. K. K., draw more than thirty-one feet of water when heavily loaded, as does the Royal Mail liner Niagara, and for the past six months these ships have been stirring up the mut at Pier 7. The harbor board is now planning for necessary dredging in this part of the harbor.

In a report to the harbor commission, Captain W. R. Foster, harbormaster, announces that during the first three months of 1920 a total of 1,131,000 tons of shipping entered the harbor. There were 203 vessels to enter during the quarter, both steam and sail, not including war vessels. The report by months showed: January, 64 vessels, 416,052 tons; February, 69 vessels, 388,634 tons; March, 60 vessels, 326,828 tons.

On arrival of the steamer Mercer in June, the International Freighting Corporation of Philadelphia will enter the Honolulu field as a freight-carrying line. The company has inaugurated a route between Philadelphia, Yokohama, Hongkong and Kobe via Honolulu.

Borings have been completed on the old Allen & Robinson waterfront lumber site to enable the board of harbor commissioners to prepare estimates as to the cost of the new dock to be constructed there. The property belongs to the territory, having been acquired from the lumber firm by purchase with funds provided by the last legislature. Although no founds are available for the construction of the dock, it is expected that money will be provided by the next session of the legislature. The new pier will be known as Pier 11 and will be similar in construction to Piers 8, 9 and 10, which are principally of concrete. When Pier 11 is completed and the harbor alongside of it dredged to the regulation depth of thirty-five feet, the pier virtually will be an extension of Pier 10, giving a length of 1100 feet.

Hawaiians Salvaging Cargo from a Schooner wrecked on the reef

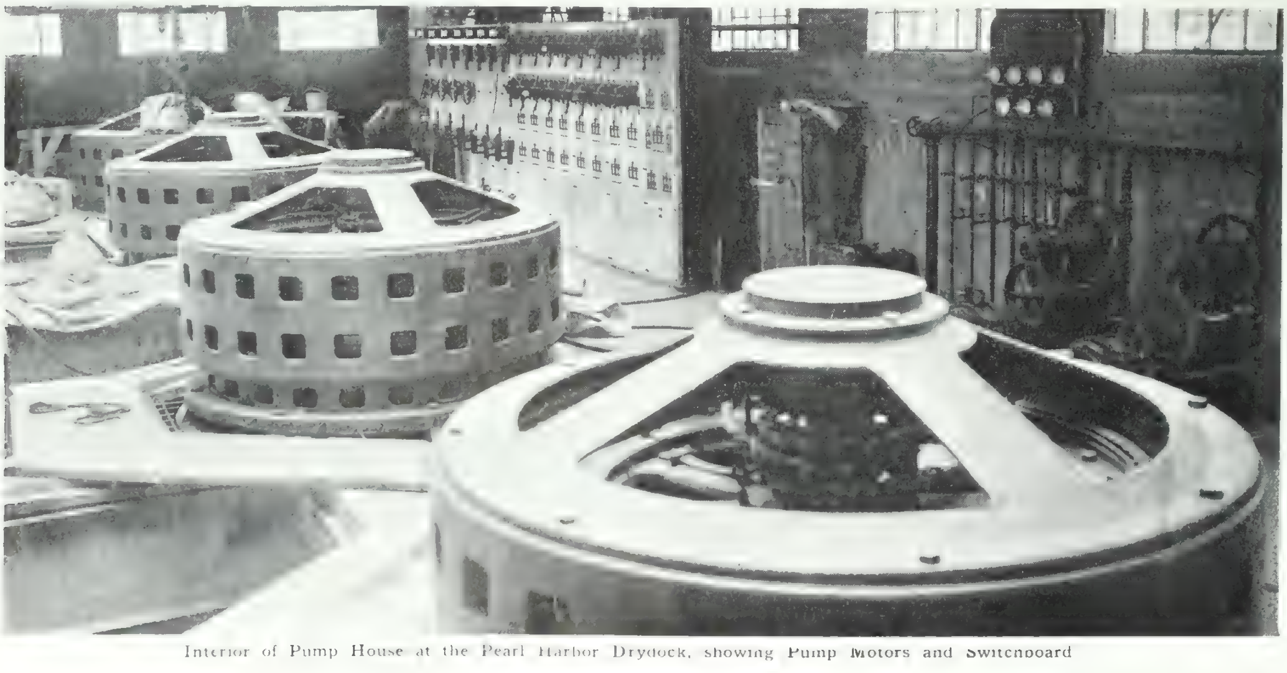
Honolulu felt the mainland switchmen's strike considerably. The Matson steamers were hardly half loaded, while the through liners to the Orient also were running light. The Lurline arrived April 21 with hardly a cargo of merchandise.

Enter Philippine Field

Two Honolulu shipbuilding and iron works companies are establishing yards in the Philippines. The Honolulu Iron Works already has completed a merger with the Eearnshaw Shipways of Manila, and now Catton, Neill & Company of this city is reaching out for a Manila location. Representatives of this company returned from the Philippines in April and reported that a tract of land, about 100 acres, had been secured on the Manila waterfront on which the company plans the establishment of an iron works and shipyards. This property is in what is known as the North Harbor, just beyond the Tondo district. There is a railroad terminal in this district and Catton, Neill & Company representatives describe it as particularly adaptable for their purpose. The merger of the Honolulu Iron Works and the Earnshaw company gives the Honolulu concern the majority of stock in the newly-formed Manila corporation.

An important change has been made in Matson schedules, providing a side route from Honolulu to Kauai. The schedule commenced May 15, when the Lurline departed from San Francisco, arriving at Honolulu a week later. On Tuesday, May 25, she departed for Port Allen, Kauai, arriving there the following morning. She returned to Honolulu May 28, making a stay at Kauai of two days. The new route has been extensively advertised by the Matson company on the coast and in New York, and many tourists have already booked for the new scenic trip in Hawaii.

Customs receipts at Honolulu for the first quarter of 1920 totaled $243,258.53 as against $185,220.93 for the same period in 1919, making an increase of $58,037.60. The report as issued by Malcolm A. Franklin, collector of the port, shows that, although January, 1919, was ahead of the same month this year in customs receipts, February of 1920 had collections totaling $120,707.73 as against $69,792.11 for February, 1919.


Interior of Pump House at the Pearl Harbor Drydock, showing Pump Motors and Switchboard

PACIFIC MACHINERY

The Internal Grinder

By E. N. Moor, Jr.

PRODUCING smooth, accurate holes, true to size, no matter whether the material be hard or soft, is a difficult problem when quantity production of machine parts is wanted. Boring and reaming as a process to accomplish this result are all right for certain classes of work, but when extreme accuracy and production are wanted, grinding is the most satisfactory process.

The Heald Machine Company, of Worcester, Massachusetts, manufacturer of grinding machinery and magnetic chucks, makes a line of internal grinders which are suited to a varied line of grinding operations. These tools have been carefully developed and their design improved to make them as rigid as possible, also to give the operator a machine that will be handy and one on which speeds and feeds may be quickly changed to cut down the idle time on the tool.

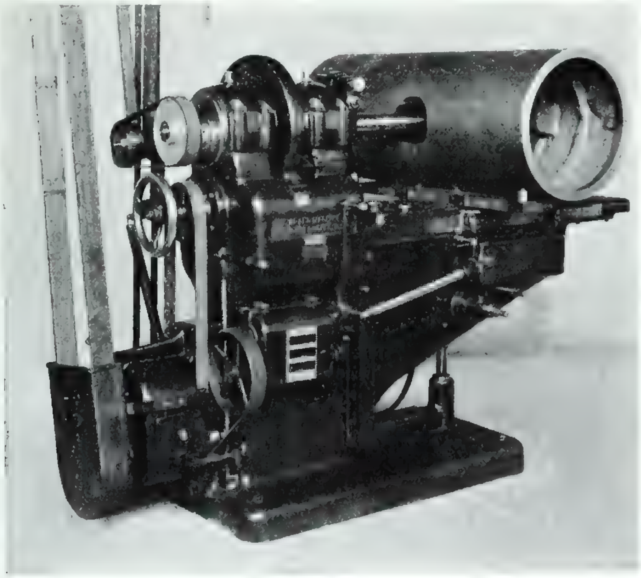


Fig. 1

Made in Two Types

These internal grinders are made in two types, one on which the work is held stationary on the table, the other on which it is held in a chuck or any suitable fixture and revolved with the machine spindle. The first-mentioned tool is intended for work that could not be revolved readily, and the second for small parts that can be swung easily.

Figure 1 shows the first type of machine grinding the wrist pin hole in an oil engine piston. This piston is 18 inches in diameter by 4½ feet long and weighs 1800 pounds. The pin holes were ground to a limit of .0001 of an inch and the alignment of the two holes when produced by this method of course was perfect. The holes can be produced more quickly by this method and to closer limits than is possible if the parts are bored and reamed. This same grinding operation on a smaller piston is shown in Figure 2. In this case the work can be revolved and this job, therefore, is done on the second type of machine. Ths piston is held in a fixture fastened and centered on the face-plate of the grinder. The casting with the reamed hole is located by inserting the plug which lies on the table through the holes in the fixture and the wrist pin holes in the piston. The lid is then clamped down and the plug is withdrawn. The hole in this case was 1 inch long by 1 inch diameter and .008 inch of stock was removed. The production on this job was three minutes a piston, and the job was held to very close

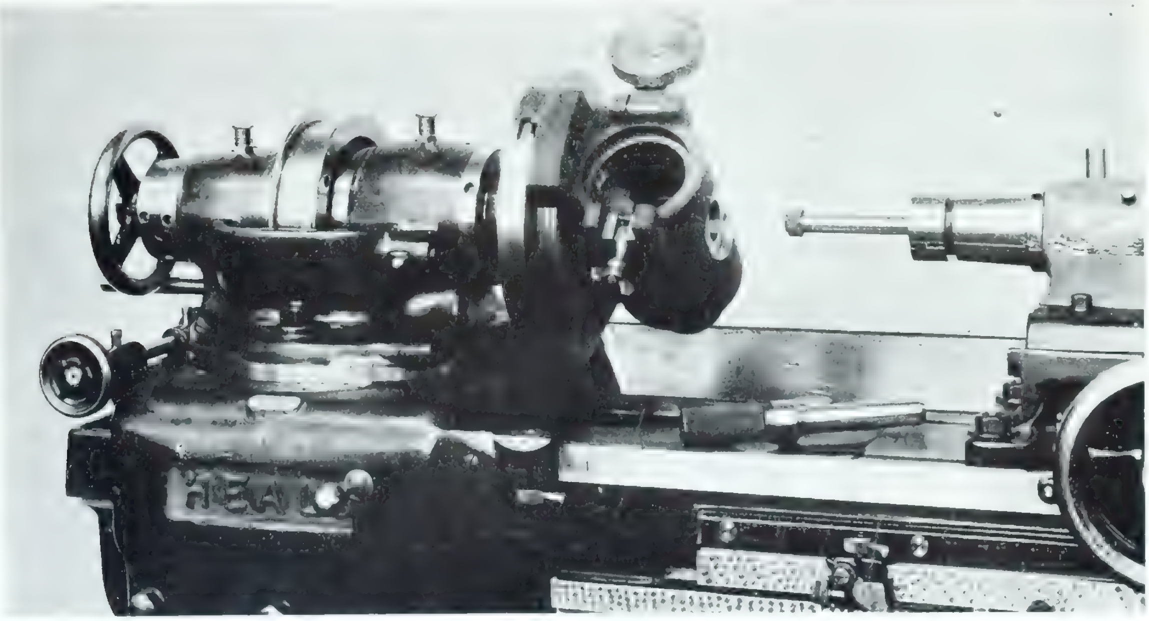


Fig. 2

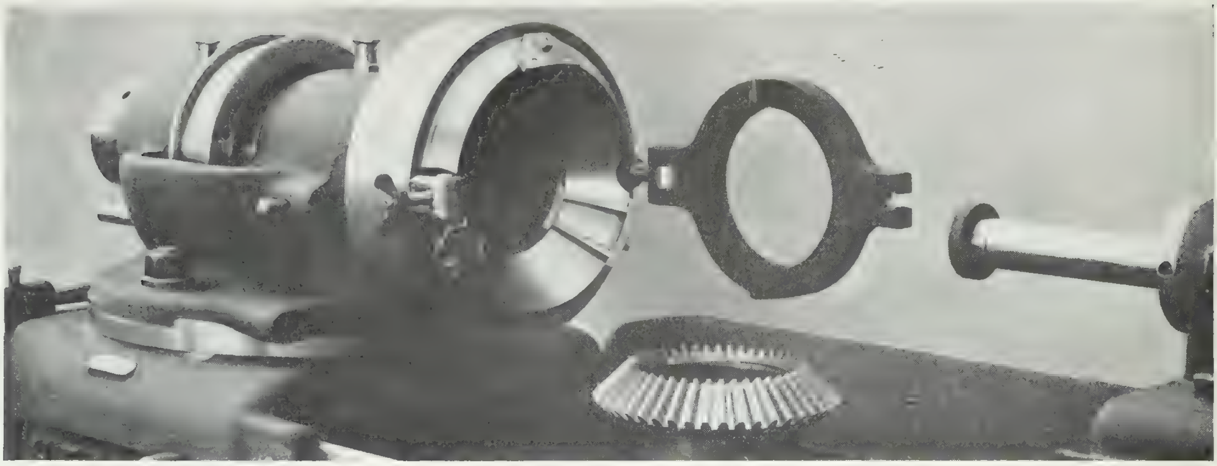


Fig. 4

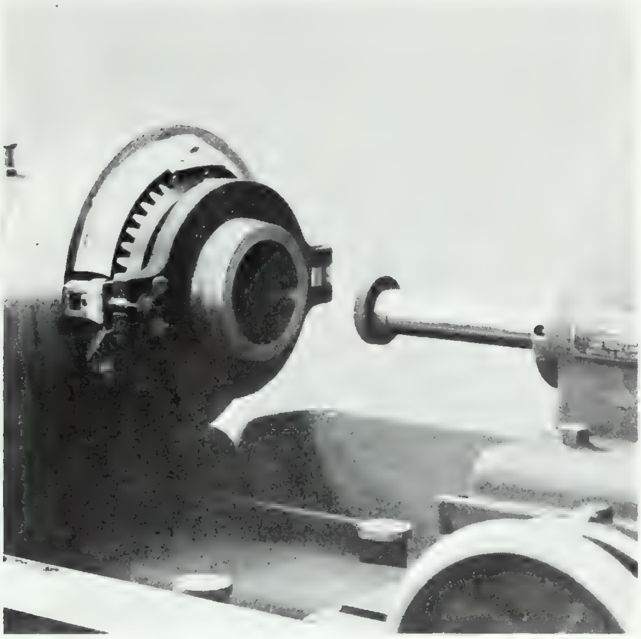


Fig. 3

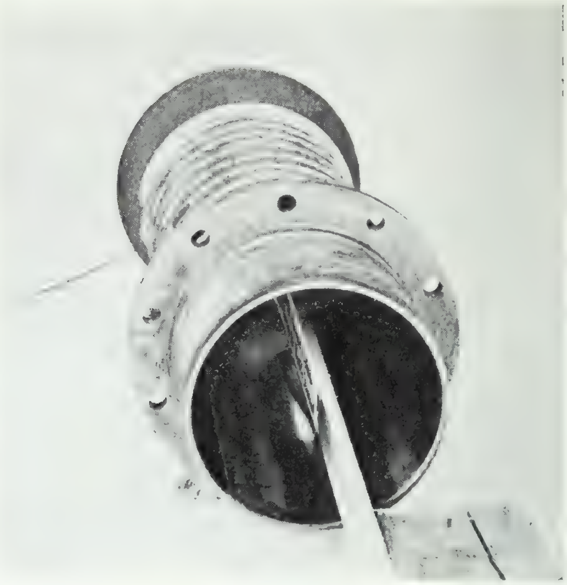


Fig. 6

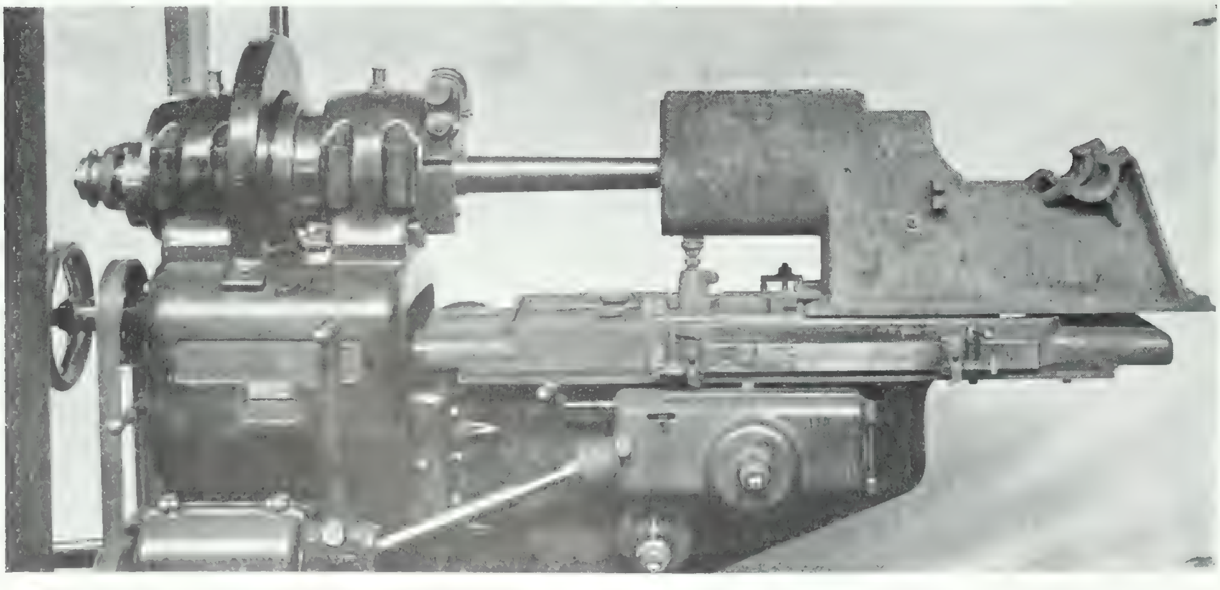


Fig. 5

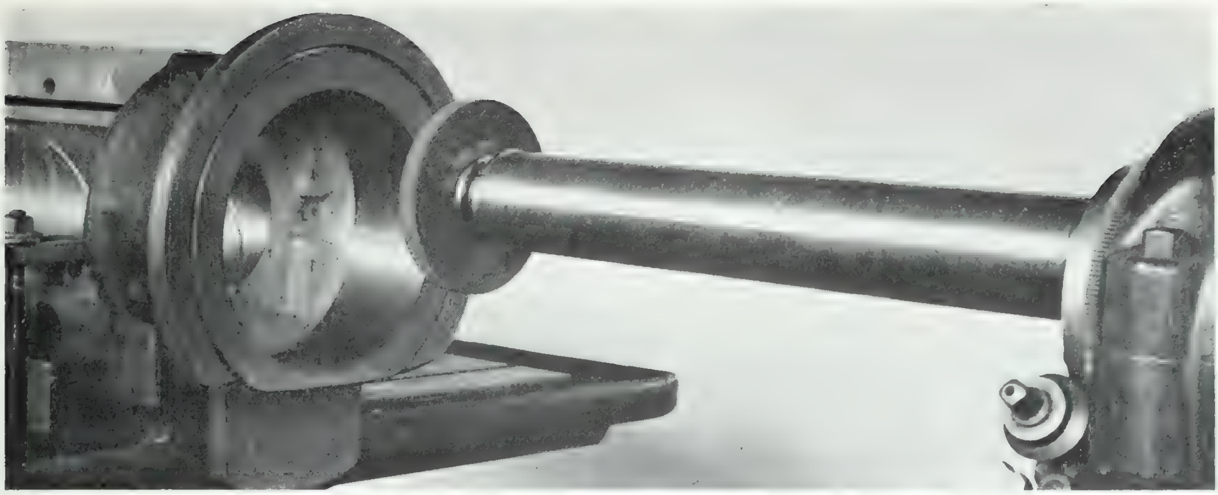


Fig. 7

limits of accuracy. It will be noted that the work is clamped from the end, which eliminates any chance of the casting being distorted.

Work Centered for Grinding

Figures 3 and 4 show another interesting internal-grinding operation. It will be noted that the work is centered for grinding in relation to the pitch-line on the hardened and ground locating pins and is clamped in this position by a yoke, which bears at two points only and allows the gear to adjust itself for center in the fixture. Spur gears may be ground by this method by using a draw-in fixture and centering the gear on pins with a contact on the pitch line.

For grinding gas engine cylinders that cannot be revolved, the Heald cylinder grinder can be used to the best advantage. Holes can be produced true to size quickly, irrespective of the hardness of the metal and a finish obtained that surpasses reaming or boring. Figure 5 gives an idea of this class of work handled on the Heald machine. A very good example of finish that can be obtained is shown by the reflection in Figure 6.

Difficult by Other Means

Figure 7 illustrates a very unusual job finished by grinding. The surfaces must be concentric, and as the smaller bore is partially cut away this would be a very difficult job to finish by any other means.

Figure 8 gives another example of the varied use to which a cylinder-grinder may be put. The job in this case is a locomotive side-link and the machine is used for grinding the hardened steel bushings in place. This tool also was used to regrind worn bushings for fitting over-size pins.

Finishing cylindrical surfaces by grinding is a very satisfactory and economical means of producing smooth and accurate holes. The grinder will produce holes at less cost on certain classes of work than the process of reaming or boring when the cost of reamer maintenance is considered.

HERBERTS ANNOUNCE NEW SERVICE

THE Herberts Machinery & Supply Company, with sales offices and stock in San Francisco and Los Angeles, has announced that Vernon C. Wear has come out from the factory of the Foster Machine Company and will be associated with the Herberts organization to make a specialty of demonstrating the Foster turret lathes and screw machines.

Mr. Wear will follow closely every Foster machine installation and machine shop executives will welcome a man of Mr. Wear's ability in getting maximum results from this high grade line.

Herberts Machinery & Supply Company is maintaining a representative stock of the Foster equipment, having at the present time on the floor Foster machines in sizes 7, 5, 1 and 0.

H. S. B. W.—COCHRANE INCORPORATION

THE Harrison Safety Boiler Works, founded in 1863, has for many years been carried on as a co-partnership by Jos. S. Lovering Wharton, William S. Hallowell and John C. Jones. On January 2, 1920, this copartnership was incorporated under the laws of the State of Pennsylvania with a perpetual charter and under the name of the H. S. B. W.-Cochrane Corporation. This corporation offers the services of its engineering, manufacturing and selling organization in the solution of problems relating to the profitable utilization of exhaust steam and the heating, metering and softening of water. Their specialties include the following: Cochrane feed water heaters, Cochrane steam and oil separators, Sorge-Cochrane hot process water softeners, Cochrane V-Notch meters and metering heaters, Cochrane flow meters, Cochrane marine heaters, Cochrane precision meters, Cochrane weighing meters, Cochrane multiport drainers, Cochrane multiport valves and Creasey ice breakers. The organization is composed of the following officers and board of directors: Joseph S. Lovering Wharton, President; John C. Jones, vice-president and general manager; William S. Hallowell, secretary and treasurer; Horace E. Sibson, general sales manager; and Axel B. Wallem, general works manager.

SKANDIA OFFICES MOVED

H. S. Johannsen, Eastern representative of the Skandia Pacific Oil Engine Company, has just moved his headquarters from the Hudson Terminal Building to a new office at 25 West Forty-third street, New York City.

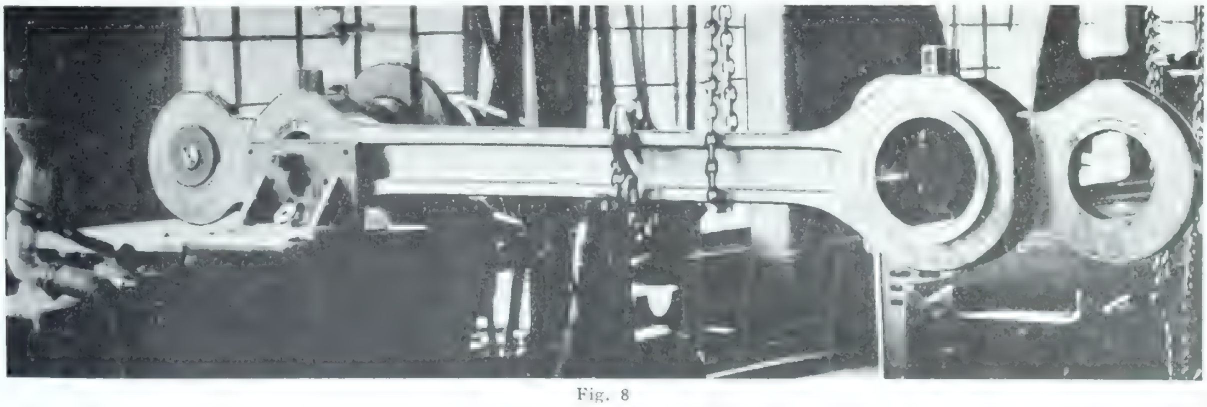


Fig. 8

Electricity vs. Fuel for Heating Rivets

By F. C. Cheston

THE very excellent article by Letson Balliet, in the April issue of Pacific Marine Review, if read by the various hull superintendents and general managers, would confirm in their minds the opinion that they have held for a long time: that the heating of rivets costs more than it should; and that something radical should be done not only to correct this excessive cost of heating, but also the excessive loss of rivets.

Unfortunately, Mr. Balliet has not investigated the latest developments in heating of rivets by electricity. Although it is true that the earlier forms of electric rivet heaters failed to meet the commercial requirements, and were not able to heat miscellaneous diameters and lengths, an electric rivet heater has been used since 1912 and was put on the market in the fall of 1919, that will heat successfully any type or size of rivet, from one-quarter inch in diameter up to two inches, and of any length; and it will give practically any hourly requirements for bull riveters or hammer gangs at approximately 60 to 80 per cent saving in fuel cost. This saving, of course, is contingent on the rate at which alternating current can be purchased; but these percentages will hold true where current can be purchased or made at less than two cents a kilowatt hour. Recent tests in various Eastern shipbuilding and steel plants show that 6½ pounds of rivets can be heated in one kilowatt hour; or, in terms of money, this means for ½ cent in most sections of the Pacific Coast, and from 1 to 1½ cents generally throughout the country.

Comparative Costs Given

For the sake of comparison, I am repeating here the table of costs drawn up by Mr. Balliet, inserting, however, an additional column for electrically heating:

Comparative Costs of Rivet Heating Forges with Various Fuels

	Oil	Coke	Gas	Elec'y
Fuel cost delivered at the plant, per burner	$ 1.32	$ 0.99	$ 1.12	None
Intra yard distribution of fuel (labor only)	.62	.81	None	None
Auto truck or wagon, hauling fuel (operation only)	.20	.36	None	None
Motor power compressed air (air metered at forge))	1.42	.60	None	None
Fuel boxes and attendance, delivery, etc.	None	.15	None	None
Forge or furnace upkeep and repair, and replacement	.86	.11	.16	None
Clean up of ashes, oil waste, burned rivets, etc.	2.10	.52	.03	None
Getting and delivery of kindling for fires	None	.30	None	None
Rivet gang's lost time starting fires (at $2.56 an hour)	.64	1.28	.32	None
Burned, oxidized or scaled rivets	7.00	1.40	.14	None
Destroyed coke sacks (burned, cut or lost)	None	.30	None	None
Operation gas plant distribution system	None	None	.08	None
Auto truck and labor hauling ashes to dump	None	.06	None	None
Time of ship cranes handling coke and coke trays	None	.07	None	None
Time of ship cranes handling ashes and ash barrels	None	.09	None	None
Labor time picking bolts, nuts, rivets, etc., from ashes	None	.05	None	None
Paint barrels, rope handles for handling ashes	None	.02	None	None
Lost bolts, nuts, rivets, reamers, etc., in ashes	None	?	None	None
Lost time cleaning fires, rekindling, etc. (¼ hour)	None	.64	None	None
	$14.16	$ 7.75	$ 1.85	None

Five hundred pounds of any size rivets can be heated electrically in 80 kilowatt hours. On the Pacific Coast, with electric current at ½ cent a kilowatt hour, this means 40 cents, but as the average price paid throughout the East, where large quantities of electricity are purchased or manufactured by the various shipyards, seems to be 1¼ cents, we properly can take $1 as the electric cost for heating 500 pounds of rivets in 80 kilowatt hours.

Fuel Oil Costs Increase

Before entering into a more detailed description of heating rivets electrically, or of the benefits derived from an electric heater, I would like first to compare the various figures given by Mr. Balliet in his table, which are assumed to be those on the Pacific Coast, with those on the Atlantic Coast. Fuel oil he figures at 4 cents a gallon; today in St. Louis it is 11 cents to 12 cents and in the East, 14 cents to 16 cents, except, of course, on old contracts. This means that 33 gallons of oil, a forge, would cost $4.62, in place of his $1.32.

Although no definite statement is made as to the number of pounds heated in an oil furnace, his article indicates that 33 gallons would heat 1000 pounds of rivets; whereas, if an accurate test is made of the number of pounds heated against the number of gallons of fuel oil required, it will be found that 33 gallons of fuel oil does not heat much in excess of 500 pounds, and in many plants not over 300 pounds. Figuring on ¾-inch x 2½-inch rivets as the average used in a shipyard, which are .41 pound each, this would be approximately 1000 to 1200 rivets.

His cost for intra-yard distribution and hauling of fuel is excessive over most Eastern costs; as a general rule, the tank car empties by gravity into the storage-tank, and thence the oil is pumped through pipes to the various furnaces.

Experience of the East

His air cost is approximately that found in a large number of the Eastern plants; his cost for forge and furnace upkeep and repair is high, according to many Eastern figures. His cleaning-up cost is considerably higher than Eastern figures. Time lost by the rivet gang is practically the same as in the East, although the Eastern figures are considerably higher during the winter in any plant where a large number of heaters are used under one roof.

The cost of burned or scaled rivets is accurate, but very few general managers will confess to this amount.

So, when the increased price of fuel oil is considered, the cost of running an oil heater eight hours will, according to Eastern figures, average close to $14 a day. But I feel sure this figure represents only the heating of about 500 pounds of rivets.

The price of coke in the East is not $18, but $9 a ton. This makes the coke fuel cost 50 cents for eight hours of heating. The handling charges for the coke as well as for the ashes are close to Eastern figures, and the cost of air approximately the same.

The cost of burned or scaled rivets would, in the writer's judgment, run more closely to $2 or $2.50 than to $1.40; so that the total coke cost, according to Eastern figures, would approximate $8.25 for 400 pounds of rivets heated by coke.

An analysis of the gas cost indicates quite clearly that Mr. Balliet is figuring gas at 40c a 1000 cubic feet. There are very few places in the East where gas is sold at this rate. In Detroit, during the war, it was 30 cents; today it is 75 cents. It requires 400 to 450 cubic feet of gas to heat 100 pounds of rivets; and if we assume that 500 pounds is the daily average of an eight-hour shift, at 75 cents a 1000 cubic feet the cost is $1.50. Several plants in the East that have kept close tabs on the furnace upkeep and replacement, figure the same for gas heaters as for oil heaters, at the rate of 4 cents a 100 pounds of rivets heated.

The loss of burned or scaled rivets is reduced considerably, averaging about 3 per cent, so that the figures for heating by gas in the East will compare favorably with those on the Pacific Coast, averaging about $2.25 an eight-hour day.

It is interesting to compare Mr. Balliet's article of 500 to 1000 pounds of rivets heated in a day of eight hours, with another article that appeared in the April issue of Pacific Marine Review under the heading "Good Riveting Records" at the Schaw-Batcher shipyards. I repeat here the comparison for the month of January, 1919, and the month of January, 1920, by the hammer-gang and on the bull riveters:

January, 1919—Without Bull Machine

Total rivets driven	570,213
Total hours consumed	24,984½
Total eight-hour gangs	3,123
Average rivets per day	23,759
Average gangs per day	130
Average rivets per gang	183

With Bull Machine

Total rivets driven	632,615
Total hours consumed	25,268
Total eight-hour gangs	3,158
Average rivets per day	26,359
Average gangs per day	131½
Average rivets per gang	200

January, 1920—Without Bull Machine

Total rivets driven	189,630
Total hours consumed	5,954½
Total eight-hour gangs	744
Average rivets per day	8,291
Average gangs per day	32
Average rivets per gang	254

With Bull Machine

Total rivets driven	203,371
Total hours consumed	6,002
Total eight-hour gangs	750
Average rivets per day	8,654
Average gangs per day	32
Average rivets per gang	271

It will be noticed that the hammer-gangs in 1919 drove on an average 183 rivets in eight hours, or 23 rivets an hour; while on the bull machine they drove 200 rivets in eight hours, or 25 rivets an hour. In January, 1920, the hammer-gang averaged 254 rivets in eight hours, or about 32 an hour; while the bull machines drove 271 rivets in eight hours, or 34 an hour.

Rapid Increase Made

This record bears out very favorably with that of an Eastern yard, which began some months ago to weed out the inefficient hammer-gangs, and to increase the hourly average. January's record was 30 an hour; February's record was 36 an hour; the last week in March they had increased to 42 an hour; and in April they had increased to 49 an hour.

This record is cited to show that although the foregoing tables of costs are for a daily output of 400 or more pounds of rivets, yet in very few plants in the country are these outputs driven; but the costs remain the same, thereby increasing the cost a 100 pounds driven greatly beyond what it should be; and this is the strongest argument in favor of an electric heater, which is not a heated chamber, but which, in thirty seconds, will heat a rivet ready for use by passing the current through the rivet, having it ready the instant it is needed by the hammer-gang, and with an electric cost, as stated before, of 7½ to 30 cents a 100 pounds of any size rivets, depending upon whether the kilowatt hour cost is ½ cent or 2 cents.

No Rivets Oxidized

Further, the electric rivet-heater eliminates all of the items of expense given in the foregoing table, except the first item: fuel cost. Neither is there any air required, thereby eliminating entirely oxidized rivets; for, in accordance with Mr. Balliet's statement, rivets do not oxidize when less than 5 cubic feet of air is used. The heating is controlled by a regular knife-switch; consequently, rivets are heated just as required, with no loss of fuel. It is almost impossible to consider the use of gas on ship ways or dry docks, as a gas heater is not portable. The electric heater, however, can follow the workmen; all that is needed is extension wire from the power line.

If a gas heater can effect a saving of $6 a day in vessel hulls over coke heaters, electric heaters will save even more; and electric heaters likewise eliminate the serious objection there is to gas heaters; namely, the danger of fire, as well as that of intense heat.

PORTLAND BOILERS IN CHINA

In the November, 1919, number of Pacific Marine Review there was published an illustration showing the loading of twelve boilers from the Willamette Iron & Steel Works on the steamship Grace Dollar for shipment to Shanghai. The discharge of this shipment was completed at Shanghai on December 30 and we are publishing herewith pictures of the boilers being discharged at the Kiangnan Dock & Engineering Works at Shanghai. These boilers were of a Scotch marine type 15 feet 3 inches in diameter by 11 feet 6 inches long. They were designed and constructed for a working pressure of 200 pounds and each boiler weighs 65 tons. They are for installation in steel vessels being built by the Kiangnan Dock & Engineering Company for the Emergency Fleet Corporation of the United States Shipping Board.

Unloading shipment of boilers from the Willamette Iron & Steel Works, Portland, at the Kiangnan Dock & Engineering Works, Shanghai. Above boilers in yard at the Shanghai works. Below 75-ton shearlegs lifting boiler from the hold of the Grace Dollar.

Vertical Turret Lathes

THE Pacific Gear & Tool Works, consistent with their policy of equipping their plant only with the highest grade of machine tools, have recently installed a 42-inch Bullard vertical turret lathe. This production tool will be used for boring and turning the large size gear blanks. The Bullard equipment was selected by Pacific Gear & Tool Works on account of great table speed, which includes twelve changes, ranging from 3.3 to 56 revolutions a minute, and greater rigidity and convenience of this type of turning tool.

The vertical boring and turning mill, for work of greater size and weight, is claimed superior to the face lathe in both volume and quality of output. This result reflects directly the greater rigidity and convenience of the type as well as the fact that "it is easier to lay a piece down than to hang it up." In recent years this type of equipment has been developed remarkably and its use extended in many ways.

Adopting a policy of specialization, many manufacturers of shop equipment have concentrated their efforts on the development of a certain type. They have studied closely the requirements of the work to be performed and, by analysis of conditions surrounding the use of their machines, brought their design to a point of broad usefulness truly abreast of the times.

Adaptability, dependability and productability are the elements of successful machine design.

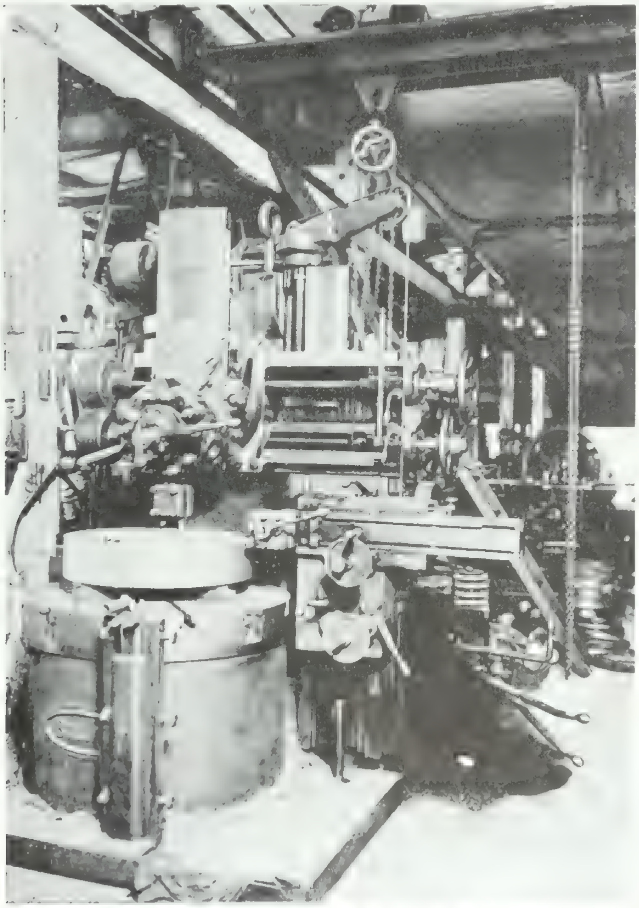
To be adaptable, a machine must be universal to a high degree, yet easily controlled and operated; its requirements in the way of tools must be simple in order that the supplementary expense may be kept low and also that the time required for changing from one class of work to another may be minimized—"cutting time only is productive."

The Bullard vertical turret lathe is equipped with two tool-carrying turret heads, one main and one side, both of which are universal in their movement and adjustment throughout the entire range of the machine, thus simplifying the tool equipment required for a wide range and variety of work.

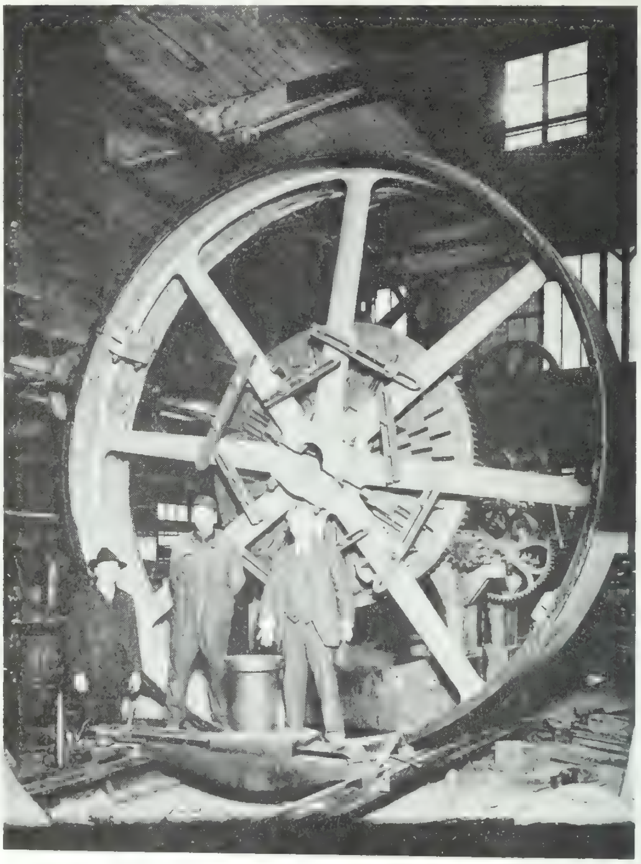
By means of accurately graduated scales and micrometer dials, and adjustable observation stops mounted thereon, tools are readily set and sizes obtained and maintained.

Rigidly constructed, with bearings amply proportioned and with specially selected material of maximum shock and wear-resisting qualities used throughout the gears in both driving and feed trains; lubricated continuously and automatically with filtered oil; safety devices incorporated in feed mechanism and all operative levers interlocked—this tool marks a new era in machine design and is one in which implicit confidence may be placed by both manager and operator.

Widely adaptable and extremely durable, the Bullard vertical turret lathe may be kept in continuous operation. Excess power is provided in the drive, and the physical effort required of the operator reduced by power manipulation of heavy moving parts. Centralized control is perfect control, and in this machine all levers and operating handles are, without complication, so arranged as to be within convenient reach from one position.



Forty-two inch Bullard vertical turret lathe in the shop of the Pacific Gear & Tool Works, San Francisco



Cast iron fly wheel, 14 foot diameter 36 inch base, in one of the lathes at Vulcan Iron Works, San Francisco

LARGE FLY WHEEL

THE illustration shows a fourteen-foot diameter cast iron fly wheel with a thirty-six-inch face on one of the big lathes at the Vulcan Iron Works, San Francisco. The machine operations on this immense wheel includes boring the hub to a ten-inch diameter and turning and facing the wheel.

The pattern for this wheel was made at the Vulcan plant and the casting was poured in the Vulcan foundry. This casting weighed eight tons and will be used on one of the dual type horizontal ice making machines. This ice-making machine will have a capacity of 200 tons a day.

The Vulcan ice-making equipment has been recognized for its high standard of design and workmanship and the great demand for Vulcan ice-making equipment is keeping this plant sped up to a high production basis.

Machine Tool Markets in China

A. G. Bohannon

MR. A. G. BOHANNON, whose portrait appears herewith, recently sailed to the Orient in the interests of the Axelson Machine Company.

Axelson Machine Company has enjoyed a very good export business and plans are now made to extend trade relations throughout the Orient. Mr. Bohannon will visit the Hawaiian Islands, China, Japan, the Philippines and the other countries of the Far East. He will then go on to Australia, India and eventually plans to return by the way of Europe after circling the world.

Potential markets for future exports of American machine tools are opening all through the Orient in very many ways. When China established her so-called middle schools, which are equivalent to our high schools, there was initiated in practically all of them a system of technical training and many American experts were engaged in this teaching work. Lack of funds has prevented in a large measure the equipping of these schools with modern machine tools and they have used makeshift equipment, often made by the students themselves, or cheap tools from Japan. Wherever a good American machine tool found its way into the equipment of these schools it immediately became an object lesson and a nucleus for orders for similar tools to equip other schools or for Chinese factories. The young men who are graduating from the technical courses in these middle schools are the men who will be the future foremen and superintendents in Chinese machine shops so that it would certainly appear to be a paying proposition for American machine tool manufacturers to cultivate these schools and offer them some inducement to equip themselves with tools of American make. The writer has heard recently of one instance where the offer of a few American lathes at half price to one of these schools even before the delivery of the lathes and simply on the catalogue specifications brought to the American tool maker an order for some $15,000 worth of his product, which order will, of course, open up the way for very much larger business in the future.

The Axelson Machine Company is, therefore, to be congratulated upon their foresight in sending out Mr. Bohannon as a trade ambassador who will be able to demonstrate in the Orient the excellence of this California product and whose good offices will undoubtedly result in a better understanding and a larger volume of business for the Axelson Machine Company in the future.

Measuring Petroleum

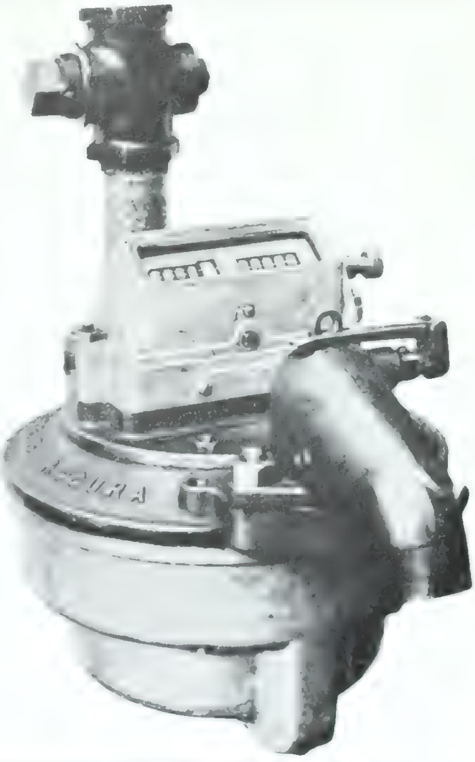
IN the distribution and marketing of petroleum and its distillates there has been a very great deal of dissatisfaction on account of the failure of measuring systems to check up at various points in the distribution system. Mr. Hosmer L. Blum of San Francisco, California, after several years of study devoted to this subject, has recently developed a new meter for petroleum distillates which has demonstrated in its use a remarkable degree of accuracy under very trying conditions.

In appearance this device, as will be seen from the illustration, resembles the regular type of water meter and is applied in very much the same way. It is, however, very different in its internal construction, being of the positive displacement, cylinder and piston type. The fluid supply to and from the multiple cylinders is controlled by a single floating valve rotating about an external axis and directly operated by the movement of the piston. The fluid in passing through impinges upon a very considerable area and this fact assures positive operation even at extremely low pressures. The measuring cylinders, six in number, are of large capacity, thereby reducing the speed of the mechanism and the wear on the parts to a minimum.

An external adjustment is provided which by a slight turn to the right or left positively increases or decreases the displacement of the measuring cylinders. This adjustment, which may be sealed by the Bureau of Weights and Measures, insures absolute accuracy.

A number of interesting tests have been made under different conditions. In one of these the meter was mounted on a gasoline tank truck, as shown in the illustration, and subjected to the severe jolting of the truck over the rough city streets for a period of three months. The head of gasoline on the truck varied from five feet to one foot. The same meter was then removed and placed on a pipe line under a head of thirty feet, where it was tested for a considerable period of time. During this test both on the pipe line and the truck, the meter maintained an average accuracy of 99.8 per cent.

A gasoline truck equipped with Blum meter for testing purposes



Close-up view of the Blum meter manufactured by the Petroleum Meters Company

Modern Equipment Reduces Handling Costs

THE portable type belt conveyor for general handling of materials in bulk or package is equipment which the industrial world is fast learning to appreciate as a great labor saver.

The handling of materials in quantity for comparatively short distances is an expensive problem unless mechanical conveyors are used. The present labor shortage makes wheelbarrow methods and extravagances of human efforts practically impossible.

Although portable conveyors have been used for handling bulk materials under various conditions for many years, such machines have been heavy, crude affairs and heretofore no serious study has been given to the proper design and manufacture of these conveyors, or to the development of their logical markets. Portable conveyors not only have to meet the serious wear incident to the handling of heavy materials, but must also be really portable.

The Smith, Booth, Usher Company of San Francisco and Los Angeles are headquarters for the B-G portable belt conveyors and they have been very successful in meeting unusual handling problems. For unloading and loading cars, piling coal and other bulk material and also for piling boxes and bags in warehouses and other handling jobs the portable belt conveyors have been very successful.

Economies secured depend of course upon the governing conditions. In unloading cars where material must be shoveled to the conveyor, one-half the labor cost is usually saved. Where materials can be delivered by gravity into the conveyor hopper a saving of 75 per cent to 90 per cent of the handling cost may be made. Other factors than labor cost are also affected. A conveyor will frequently pay for itself by eliminating demurrage charges and sometimes by increasing the available storage capacity of shed or track space. In handling lump coal the breakage is largely eliminated and this frequently means a large saving. Also it is a well-known fact that a laborer will shovel more material to a moving machine than he will to an open bin. The conveyor sets a pace which actually speeds up the shoveler in his work.

The Smith, Booth, Usher Company also handle the B-G self-feeding bucket loaders. The distinguishing feature of the B-G self-feeding bucket loader is the rotating double disc feeder at the base of the elevator. The feeder does the work of one or two men and gives the machine a range that is otherwise impossible. It enables the machine to dig to a width of five feet rather than to the bucket width, and the operator consequently has no difficulty in keeping the loader continuously up to the capacity

The digging or feeding device consists of a pair of horizontal discs, set almost flat on the ground, but with a slight pitch toward the pile. The rotation of the two discs carries the material to the center where it is picked up by the bucket digging from the smooth surface of the discs.

Barber-Green portable belt conveyor loading freight cars

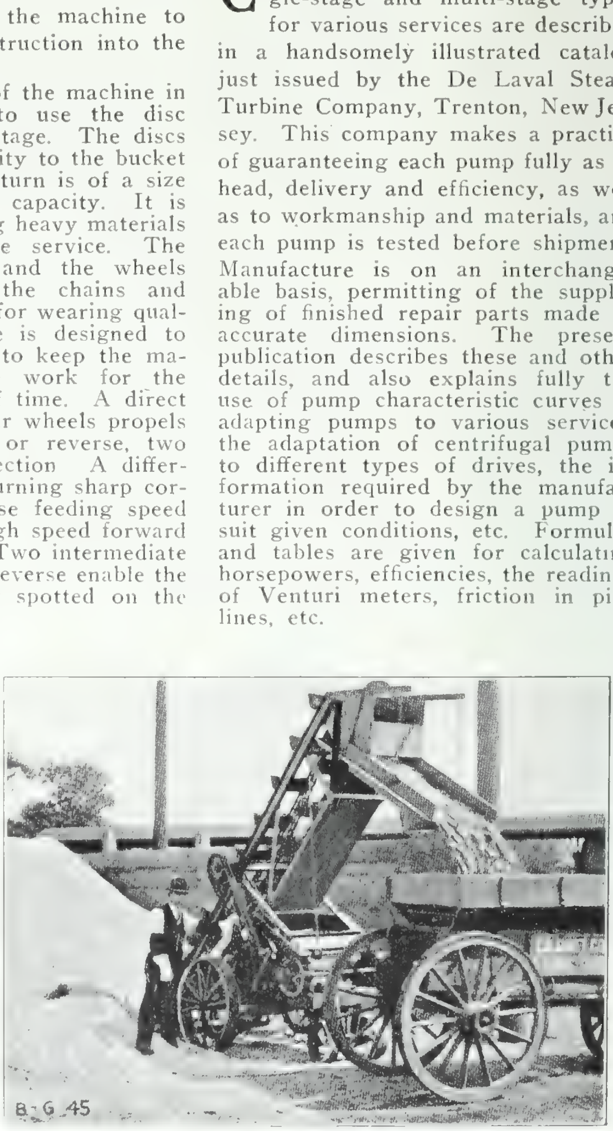
The wide digging face of this loader enables it to handle a large quantity of material with very little movement and it also enables the machine to advance without obstruction into the pile.

The construction of the machine in general enables it to use the disc feeder to best advantage. The discs deliver a large capacity to the bucket elevator and this in turn is of a size consistent with this capacity. It is designed for handling heavy materials and for very severe service. The frame construction and the wheels embody strength; the chains and buckets are selected for wearing qualities; and the drive is designed to enable the operator to keep the machine at productive work for the maximum amount of time. A direct gear drive to the rear wheels propels the loader forward or reverse, two speeds in either direction A differential provides for turning sharp corners. A slow reverse feeding speed is provided and a high speed forward for road traveling. Two intermediate speeds forward and reverse enable the loader to be readily spotted on the job.

NEW DE LAVAL PUBLICATION

CENTRIFUGAL pumps of the single-stage and multi-stage types for various services are described in a handsomely illustrated catalog just issued by the De Laval Steam Turbine Company, Trenton, New Jersey. This company makes a practice of guaranteeing each pump fully as to head, delivery and efficiency, as well as to workmanship and materials, and each pump is tested before shipment. Manufacture is on an interchangeable basis, permitting of the supplying of finished repair parts made to accurate dimensions. The present publication describes these and other details, and also explains fully the use of pump characteristic curves in adapting pumps to various services, the adaptation of centrifugal pumps to different types of drives, the information required by the manufacturer in order to design a pump to suit given conditions, etc. Formulae and tables are given for calculating horsepowers, efficiencies, the readings of Venturi meters, friction in pipe lines, etc.

Barber-Green self-feeding bucket loader at work loading a wagon. Rotating double disc-feeder at base of elevator gives machine a range of five feet before moving into pile of material to be loaded.



Marine Electric Company

A LARGE and varied business is conducted by the Marine Electric Company, 195 Fremont Street, San Francisco, chief among which are the manufacture of Meco marine watertight fittings and fixtures; distribution of electrical supplies; marine engineering contracting; armature winding, and specializing in motor and generator supplies. Most of the work of the Marine Electric Company is for steamship corporations and large industrial plants, many of which have been patrons of the company for eighteen years.

The Marine Electric Company was established in 1886. Its first place of business was at First and Natoma streets, San Francisco, whence it removed to First and Stevenson streets and again to 36 East street, where it was situated when the fire of 1906 forced another removal to First and Howard streets. From this place the company removed to its present location.

Nineteen years ago the company began its first manufacture of fixtures and fittings. It made the first complete installation of wireless outfits on the Pacific Coast, on the United States Army transports Logan, Thomas, Sheridan, Sherman, Buford and Crook. Of late, the Marine Electric Company has installed a number of Meco Morse lights with special watertight key on the vessels of the United States Shipping Board. In every respect these installations have been very satisfactory. Steamship companies require a different service from that given most customers, and for this service the Marine Electric Company maintains a fleet of trucks, the drivers of which are familiar with electrical lines and Meco products and always are ready to assist if the opportunity presents itself.

The Marine Electric Company's manufacturing department is the largest on the coast and is equipped with all modern appliances and machinery to enable the company to attain its large production. The repair department and electrical, armature and machinery shops also are fully equipped, assuring the best results in the minimum time.

In the illustrations are shown some of the Meco products.

In Figure 1 is the Meco telltale board. The government and insurance companies require all vessels using electric running lights from sunset to sunrise for safety in navigation to be equipped with an improved telltale board. This board is usually located in the pilot house and so arranged that a visible warning or signal is given should any of the electric lamps, within the running lights, burn out. Most running lights are equipped with a spare lamp in order to avoid the inconvenience of replacing same while under way, which is very difficult during rough weather. The Meco telltale board is equipped with two-way indicating snap switches so that the spare lamp which is within the running light may be thrown into the circuit. This feature enables a vessel to display the proper signal at all times. This is very important and necessary for the safety of navigation. The indication is by lights, which can be replaced at a minute's notice by any deck officer who may be on watch should they burn out. These lamps on the Meco board are of the no-voltage type and are made in two sizes, to burn in series with Meco 40 and 100 watt lamps. This board can be made of either marine slate or marble and with as many indicating lights as the ship may require.

Figure 2 shows the Meco watertight hand portable. The Meco hand portable is especially designed for marine use and is rigidly built throughout. Aside from its watertight quality and its reliability in all weather it is useful wherever safety demands a temporary light with assurance of protection against ignition or inflammable gases and liquids. Guard rings and body are made of cast brass. The handle is of hard wood and has a dull rubberoid enamel finish. This portable is equipped with a watertight stuffing cap at the cable end, thereby exerting a pressure on the cable which acts as a waterproof gland and eliminates any tension from the connecting end of the wire.

The Meco marine watertight and vaporproof fixture, through their long use and satisfaction given, have become pre-eminent among the maritime industries. Many of the large industries, as railroad companies, lumber mills, canneries, ice companies, laundries and hotels have found the advantages in using these fixtures. Many are used in the oil fields, mines and in the ice boxes of the large hotels. These fixtures eliminate the many hazards of fires and explosion.

The Meco combination fixture is shown in Figure 3. This fixture is made of brass and can be had with as many bosses, up to four, as required, or so arranged that the bosses are at a right angle.

Figure 4 is the Meco box-type fixture. This fixture is so arranged that the junction boxes, conduit and wiring can be installed and fixtures attached after the main wiring installation is completed. This fixture is attached to the box by means of a gasket and four screws.

All Meco fixtures are interchangeable with globes and guards of five, six, seven and eight inches. This flexibility of application is of great advantage in the selection in any particular installation. All Meco fixtures are furnished complete, including the necessary gaskets and receptacle.

The Marine Electric Company has had a wide experience in the laying out and manufacturing of marine fixtures and watertight fittings. The engineering department welcomes correspondence relating to products of this nature and always is ready to help or assist any company or person who may be interested in the application and selection of marine fixtures or fittings.

The wants and requirements of the various industries, who use motor and generator brushes are studied by the Marine Electric Co. In order to properly facilitate the meeting of these requirements, it was decided some time ago that a high-grade carbon and electrographic carbon would be the only carbon the company would handle. The engineers recognize that the commutator and collector rings are the heart of the motors and generators. They were quick to see the advantages in this carbon and electrographic carbon and being able to meet their requirements, regardless of size, dimension or pigtail, have acquired a production which has necessitated that the Marine Electric Company install additional machinery to meet this demand. The carbon department is equipped with all the latest machinery and appliances, including the necessary plating vats and generators to give the Meco superior brushes the finish that all Meco products bear. The brushes will be known as Meco R-5 electrographic brushes and Meco C-3 carbon brushes.

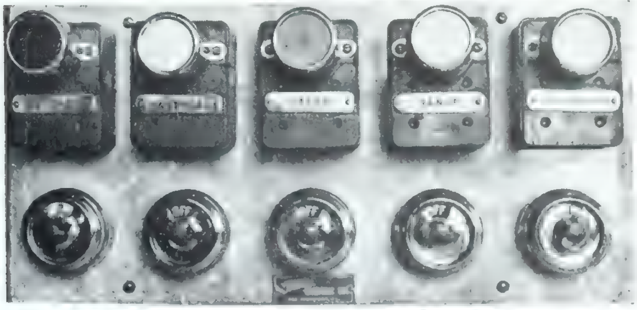


Figure 1.—The Marine Electric Company's telltale board, which gives a visible signal when the ship's running lights are burned out

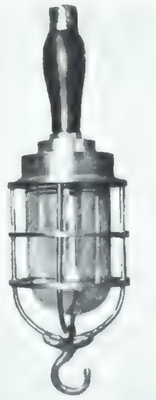


Figure 2

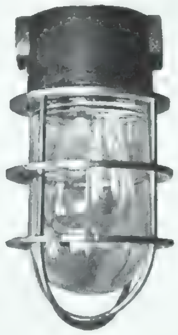


Figure 3

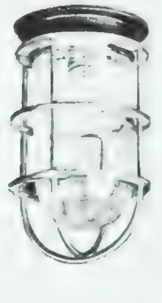


Figure 4

The Meco R-5 grade is composed of 80 per cent graphite compressed to a strength of 4800 pounds a square inch. The average graphite brush is loosely compressed and causes considerable blackening and depositing on the commutator and wears away quite readily. The Meco R-5 brush has a scleroscope hardness of 48 and a commutator speed of 6500 peripheral feet per minute. The hardness of a brush does not necessarily signify abrasiveness or cutting quality, but should be termed as the resisting strength of the brush in all cases. The carrying capacity of this brush is 60 amperes, resistance ohms a cubic inch .0011.

Grade Meco C-3 carbon brush has a medium co-efficient of friction. It has a commutator speed of 4000 peripheral feet a minute; is composed of 50 per cent graphite; is compressed to a strength of 4000 pounds a square inch, which enables it to have a scleroscope hardness of 50; and has a carrying capacity of 40 amperes, resistance, ohms a cubic inch, .0014.

The elevator, controller and crane contacts are made of a special carbon best suited for this purpose. A complete stock of these items is carried on hand and can be obtained either direct from the Marine Electric Company or through the electrical jobbers. The trademark "Meco" should be mentioned when ordering, that the customers will have the assurance of receiving Meco brushes.

Lucien Helm is the sole owner of the company and is very well known and esteemed by maritime men. Mr. Helm started as an apprentice, having acquired the practical knowledge of the business, which is a valuable asset.

C. W. Goodwin is the general manager. Through his ability and personality he has brought the organization up to its present high standard.

Harry I. Zemansky, who was purchasing agent, has been appointed to the position of sales manager. Mr. Zemansky was connected with the electrical business for a number of years prior to the war. During the war he was in the engineering department of the United States Navy and had sea service, which has enabled him to be familiar and well informed with the conditions and requirements of the maritime industries and the proper selection and application of the various electrical material, fixtures and fittings that are required aboard a vessel. After the war he associated himself with the Marine Electric Company.

Marine Auxiliary Machinery. Catalogue "P" of the McNab Company, Bridgeport, Connecticut. Seventeen pages with many illustrations describing steam-driven ash hoists, anchor windlasses, cargo winches, steering gears and hydraulic steering telemotors with accessories and fittings manufactured by the McNab Company of Bridgeport, Connecticut

Marine Sound Signal Apparatus. Catalogue "R" of the McNab Company, Bridgeport, Connecticut. Fourteen pages describing steam whistles and controls of the steam whistles and fog bells manufactured by the McNab Company of Bridgeport, Connecticut.

Cafeteria for Westinghouse Employes

Interior of Westinghouse Cafeteria

On April 6, when the largest industrial eating place in the world was officially opened by the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pennsylvania, evidence was given of what the larger manufacturers of today are doing in the way of providing for the comforts of their employes. This new cafeteria, which is a three-story reinforced concrete and brick building, 236 feet by 100 feet, has a seating capacity on the first two floors alone of nearly 2600 persons. In addition, on the third floor is a dining room with a capacity of 500 and an auditorium with a seating capacity of 1000.

One of the main features is the fact that there are no steps in the main part of the building. Gradual inclines or ramps are used exclusively in order to facilitate moving the diners from floor to floor.

The first and second floors are devoted to cafeteria service, a section being reserved for women employes of the company. By means of the auditorium on the third floor a suitable meeting place for the various employes' associations and organizations is obtained. The auditorium is equipped with a stage 26 feet by 18 feet, complete with foot-lights, stage settings, and a convenient dressing room. A motor-driven motion picture machine of the very latest type is installed in an asbestos booth in the rear of the auditorium, and will be used in connection with various lectures, entertainments and other gatherings held under the auspices of the company, or some of its employes' organizations.

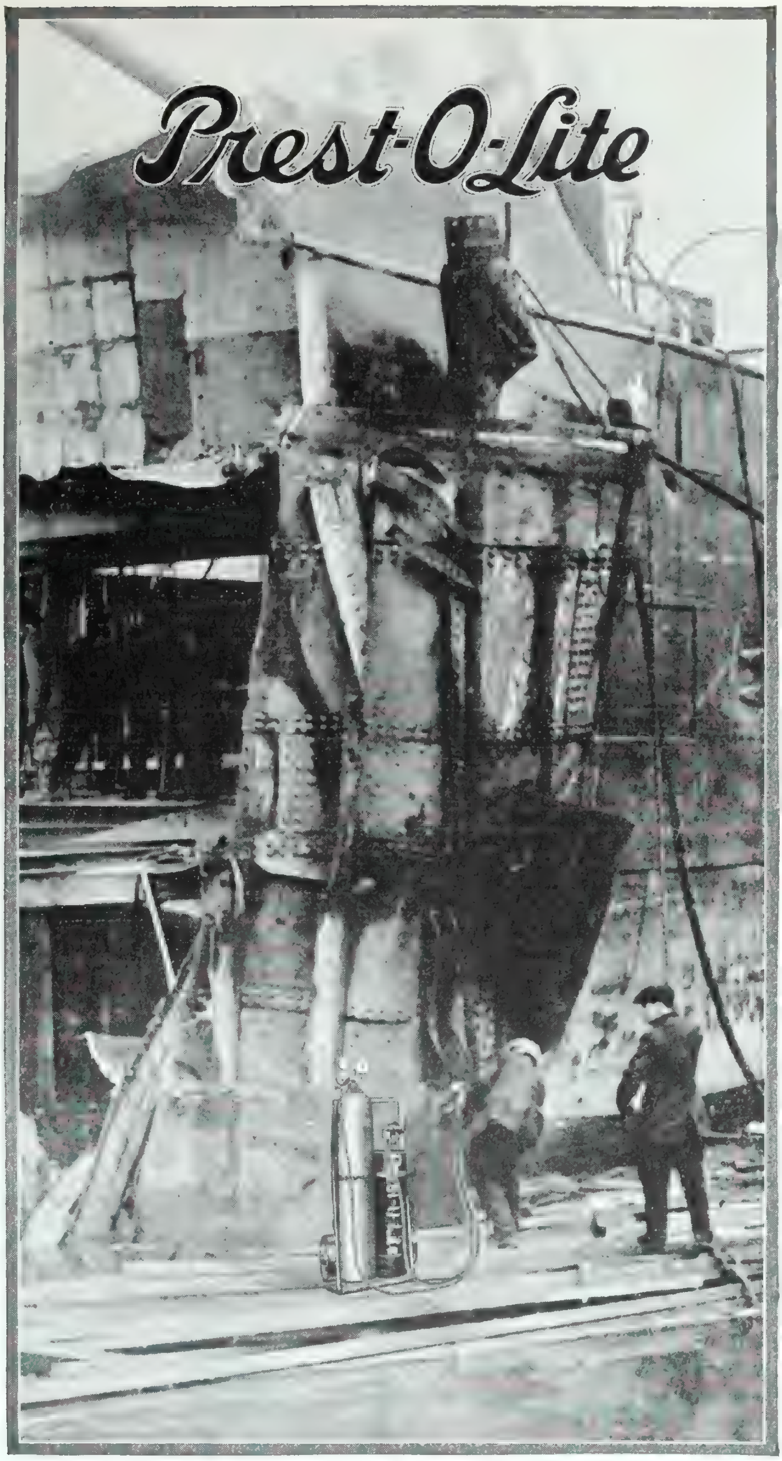
The cafeteria is equipped with the most modern labor saving conveniences that are obtainable. On the first and second floors are eight service counters, sixteen coffee urns, milk freezers with a capacity of forty gallons each, and sanitary drinking fountains.

Soiled dishes are carried from the first and third floors to the second floor, where two large motor-driven dish washers are installed, which wash and dry the dishes.

A portion of the first floor adjacent to the cafeteria is fitted up with a motor-driven washing machine, mangles, steam dryer for the purpose of washing and drying linens, motor-driven ice cream freezer with a capacity of ten gallons and an ice-making machine with a capacity of 2000 pounds every twelve hours. The ice manufactured is to be used for the purpose of packing ice cream, cooling butter, making iced tea, lemonade, etc. There is also an ice cream storage artificially cooled.

All food will be cooked on the third floor and will be supplied to the cafeterias by sub-conveyors. The kitchen is equipped with every possible method of convenience, including large gas ranges as well as double unit combination gas and coal ranges, steam meat roaster, steam service table, potato peeler which peels forty pounds of potatoes in less than two minutes, bread cutter, potato masher, all motor driven, and a coffee urn for dining room service. The steam-heated kettles with a capacity of sixty gallons each are used to make soup. Also, electrically-heated pie baker with a capacity of sixty-five pies in fifteen or twenty minutes, one large refrigerator for cooling meats and two smaller ones to cool vegetables and dairy products. All the refrigerators throughout the plant are cooled by brine pipes.

Marine Efficiency Devices. Catalogue "S" of the McNab Company, Bridgeport, Connecticut. Twenty-five pages describing Salt Detectors for feed water for marine boilers; Combustion Indicators for stack uptakes; Frigidometers, instruments primarily intended for the detection of proximity of large bodies of ice at sea; McNab-Vickers Stern Tube Appliances; and Hopkinson-Thring Torsion Meters.



PREST-O-LITE THE PORTABLE

IT matters not *where* the welding and cutting job is, Prest-O-Lite is available. The ship repair work shown here is but one example of Prest-O-Lite portability. Afloat—ashore—anywhere—everywhere.

Prest-O-Lite
DISSOLVED ACETYLENE

THE UNIVERSAL GAS
WITH THE
UNIVERSAL SERVICE

is the choice of thousands upon thousands of welders who from long experience have learned that this gas produces perfect welds and cuts.

Our forty plants and warehouses have ample capacity to fill every demand. Write for details of our Nationwide Service Plan.

THE PREST-O-LITE COMPANY, Inc.
General Offices, 30 East 42nd St., New York
Kohl Building
San Francisco

In Canada,
The Prest-O-Lite Co., of Canada, Ltd.
Toronto

Union Oil Uses Enterprise Engines

THE manufacturers of the Enterprise engine in San Francisco are finding a great increase in the demand for their engines, and since the removal of the plant from South San Francisco and with the added facilities the Enterprise engine is being placed on a production basis which is planned to take care of the requirements for these popular engines.

The Union Oil Company has given high recognition to the Enterprise engine by installing two 85 horsepower engines in the motor barge Kern. The engines on the Kern were installed to replace Diesel engines which proved unsatisfactory. The motor barge Kern is a twin-screw steel vessel of 222 gross tons, with length of 129 feet 2 inches, beam 28 feet and depth of 6 feet. With the installation of the Enterprise engines this vessel is now making eleven miles an hour under full load. She was built by the Moore Shipbuilding Company in 1915 and is used by the Union Oil Company to transport oil from Oleum to San Francisco. The Kern is equipped with fourteen cargo tanks which have a combined capacity of 84,844 gallons. The pumping is done with three 4-inch Kinney pumps, which are belt-driven from countershaft. The pumping power is supplied by a 20-horsepower two-cylinder gas engine.

A representative of Pacific Marine Review recently inspected the Kern and found the little vessel in extremely shipshape condition. Captain Clarence Fulton and Chief Engineer J. K. Castle are to be commended for the fine condition of the engine room and in fact everything on the vessel.

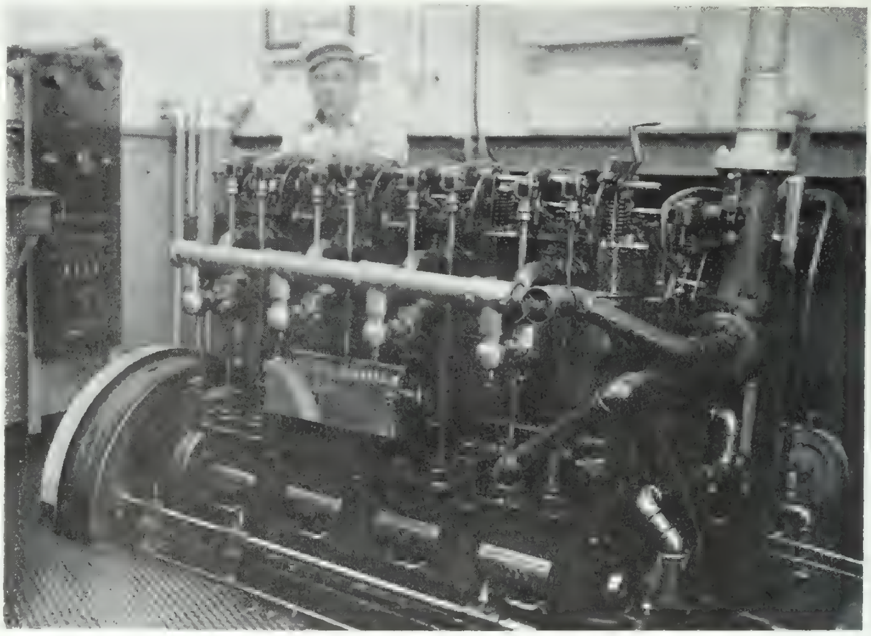
Another Union Oil Company job is the installation of the two 45-horsepower Enterprise engines on the twin screw oil barge Piru. The Union Oil Company has just recently ordered an 8-horsepower Enterprise hoist.

Some of the recent orders which have been received for Enterprise engines include one 3-cylinder 40-horsepower Enterprise engine to be shipped to Honolulu for government work. Other orders include two Enterprise engines to be shipped to Greece. From Wrangel, Alaska, there has been received an order for a 35-horsepower engine to be equipped with 1¾-inch Ensign kerosene fuel converter. Of late, an ever increasing number of Enterprise engines are being equipped with the Ensign fuel converter which makes the engine operator independent of the present shortage of gasoline or distillate for fuel. With the new type of fuel converter the engine may be operated with gasoline, kerosene, distillate, or any light fuel.

The Seattle district is making big demands for Enterprise engines. One of the recent shipments to that district included one 45-horsepower and one 60-horsepower engine equipped with the Ensign fuel converter.

That the Enterprise factory is now on a production basis is evidenced by the fact that they are shipping over thirty engines a month. This is a particularly good showing owing to the fact that their sizes vary anywhere from 6 horsepower to 85 horsepower.

Oil-barge Kern, powered with Enterprise engine



Eighty-five-horsepower starboard engine of Kern, and Chief Engineer J. K. Castle

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HOW TO APPLY MARINE GLUE

HOW to apply marine glue to deck and hull seams is told in a booklet entitled "Marine Glue," recently issued by L. W. Ferdinand & Company, 152 Kneeland street, Boston. Booklets containing complete information will be sent on request. The booklet says in part:

Do not attempt to heat all the marine glue you expect to use at once. Heat only what is necessary for immediate use and as soon as it is half used out of the kettle, add fresh glue, keeping it stirred frequently. It should be used as soon as it is melted and not allowed to stand in the kettle. Continued boiling hardens and injures the glue.

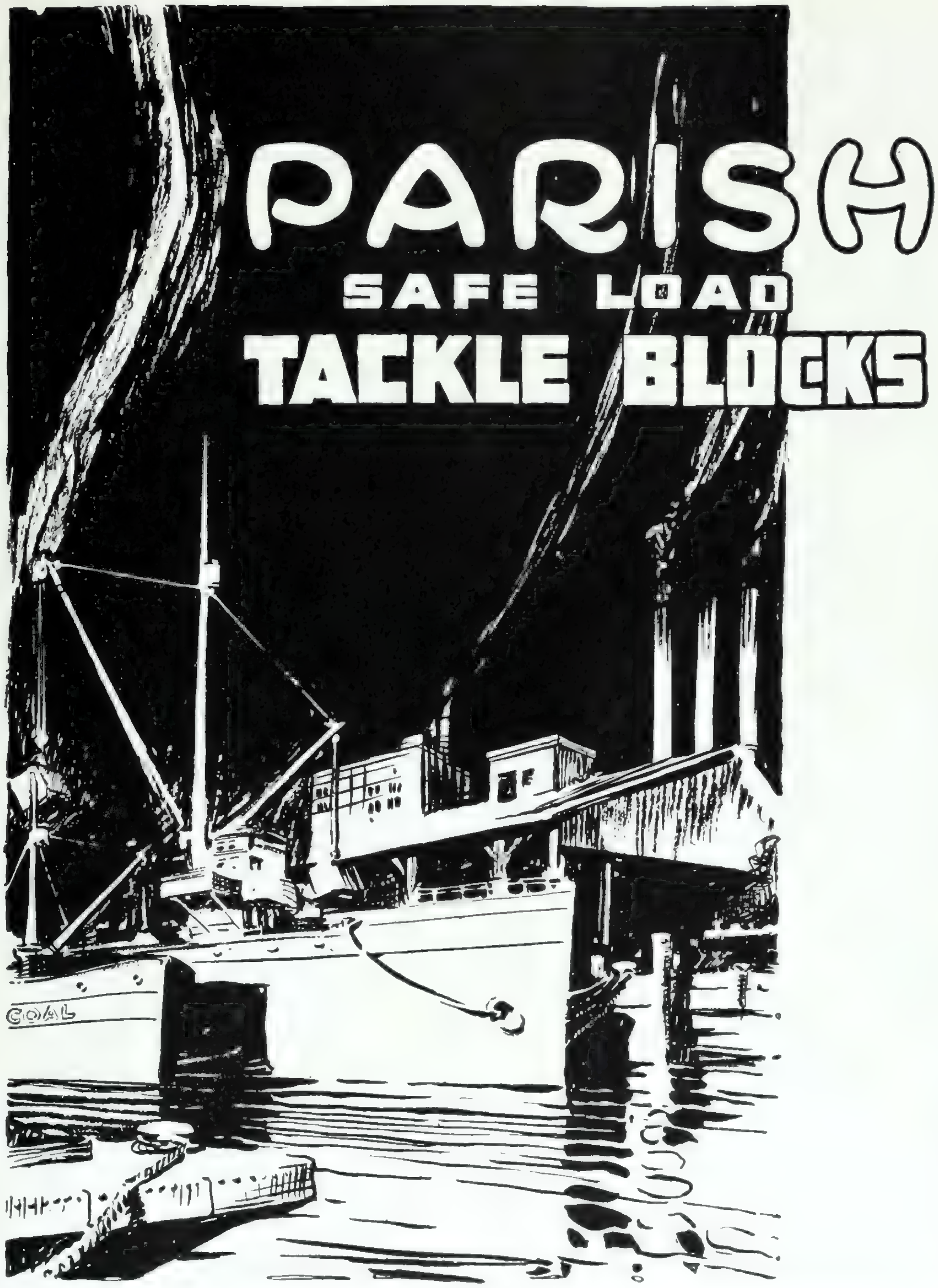
Almost without exception, unsatisfactory results in using this material ere occasioned by faulty application and are produced entirely by two causes.

First, if either the oakum or cotton caulking of the seam is damp when the glue is applied, as soon as the sun shines on the deck, the heat will turn this moisture into steam which will force the glue up over the edge of the seam.

Second, in paying the seam the ladle should be held at least an inch above the deck—if the ladle is drawn on or close to the seam a quantity of air will be enveloped and cannot escape before the glue becomes set. This will cause air bubbles, which in hot weather will also force the glue up over the edge of the seam, leaving it hollow and unsound. The seams must be absolutely dry and clean before the glue is run into them.

If applied to old work, the old material should be dug out perfectly clean. Whatever adheres to the sides of the seam should be removed with a rase knife.

Thinnings should be used sparingly and in the same manner as a carpenter adds a little water to the animal glue when it becomes too hard and brittle.



Designed so that each part has its proper proportion of strength to resist the stresses resulting from the loads.

Built for a definite working load on the basis of scientifically determined data. A correctly proportioned block for every load with an ample margin of safety.

Stamped with its Safe Load in clear, distinct figures - a guarantee of safety - a check against the load.

PARISH TACKLE BLOCKS are the only blocks built to a known standard of strength. How these standards are determined is explained in a reprint which will be forwarded upon request with Safe Load Charts and complete catalogue.

PARISH SUPPLY & MFG. CO.
2860 Quinn Street
CHICAGO

Doran Brothers Foundry Company

DORAN Brothers Foundry Company of Seattle devote their facilities exclusively to production of large manganese bronze castings. Their specialty has been propeller blades and solid propeller wheels.

Our illustration shows one of the large propeller wheels made for the G. M. Standifer Construction Corporation. Their casting weighed 17,820 pounds and is one of five which were ordered for the 9600-ton Green Star Line ships being built at the Vancouver shipyard. Three of these ships have been launched, namely, the Arcturus, Aquarius and Argus, and will be used in the Puget Sound Oriental trade.

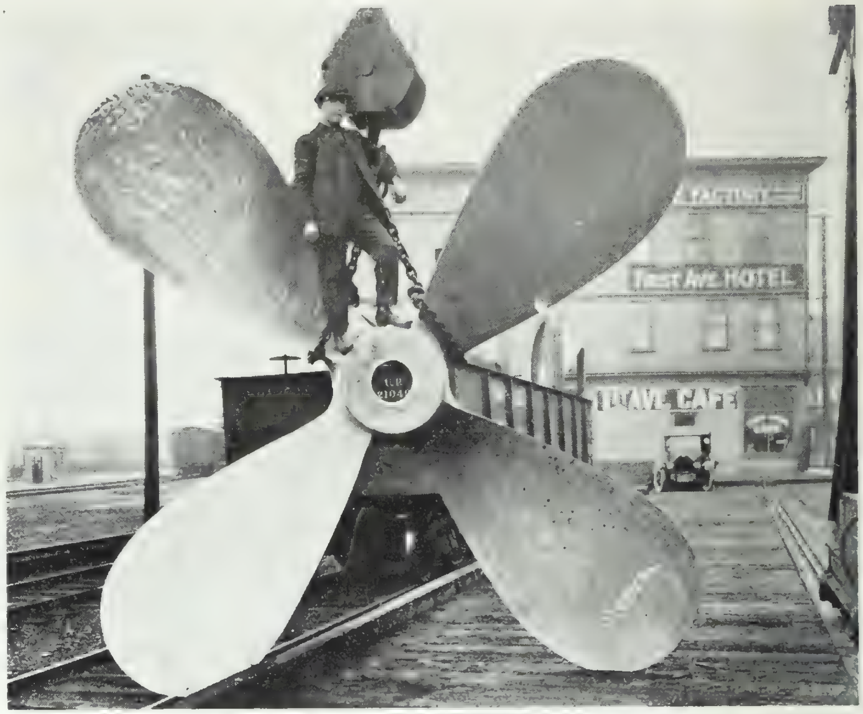
Doran Brothers Foundry Company are turning out over 300,000 pounds of heavy manganese casting a month and they have been very successful in the matter of high-grade castings delivered at a high production rate. The speed with which they are able to supply castings of this nature is probably due to the fact that they have perfected a method which enables them to use the mold over and over again without remaking. This saves a great amount of time and unnecessary expense in breaking up and renewing the molds. The mold in which the five propeller wheels were cast was made in a very ingeniously designed flask which was built by these foundry men. This flask is made up of four members which are made of cast iron and adjustable to any size wheel—i. e., these cast iron boxes may be adjusted to permit any diameter of wheel and therefore obviate the necessity of making up a special flask for each job.

NEW BENJAMIN CATALOG

Catalog No. 22, first edition, April, 1920, has been issued by the Benjamin Electric Manufacturing Company, New York, Chicago and San Francisco. The catalog is complete and is well printed and illustrated. The different schedules are: 1, wireless clusters, plug clusters; 2, industrial lighting equipment; 3, wiring devices; 3H, attachment plugs; 4, fixture and fixture parts; 6, industrial signals; 8, panel boards.

Descriptions and list prices of material shown in this catalog supersede all listings and descriptions of Benjamin material shown in former catalogs, bulletins and circulars. Prices applying to material formerly listed and not appearing in this catalog are withdrawn.

"The Logic of the Dean." A 20-page booklet issued by the William B. Pierce Company of Buffalo, New York, discussing the evils of scale in boiler tubes and describing the Dean boiler tube cleaner. The Dean cleaner is very well adapted to all classes of boiler tubes, being operated in such a way that its vibration shatters the lining of scale, shakes it loose from the tube and flakes the coat off the outside of the tube. The Dean boiler cleaner is distributed in San Francisco by Eccles & Smith Company, who will be glad to furnish copies of this booklet to interested parties.



Manganese Bronze Propeller Cast by Doran Brothers Foundry Company for G. M. Standifer Construction Corporation

PALMETTO STEAM PACKING

STEAM vessels calling at Pacific Coast ports in the last few years have brought with them heavy demands for Palmetto steam packing. This packing is used very extensively in the East. It is made of long-fiber asbestos, each strand of which is lubricated separately, and the construction of the packing is such that it will stand the highest pressures, as well as superheat.

Although there has been an unusual demand for this packing of late, the packing is not new on the Pacific Coast; it is in use by many large corporations, such as the Standard Oil Company, Associated Oil Company, General Petroleum Corporation, etc., as well as lumber mills, sugar refineries and industries in general.

The H. N. Cook Belting Company, 401 Howard street, San Francisco, is agent for this packing and has been handling it for a great many years. Company officials state that in all the years (about twenty) in which they have been handling this packing, they have not had a complaint on a single pound of it; in fact, they have had nothing but praise for it. Besides being used in the packing of large glands, it is also made in smaller sizes, which can be used in packing globe valves, blow-off cocks, injectors, etc. It remains soft and keeps the stem lubricated, making it easy to open and close the valves. The manufacturers are very desirous that comparative tests be made. It has been found that by packing one side of the steam end of a duplex pump with Palmetto packing, and the other side with the next best packing, both working stroke for stroke against the same steam pressure, it has been necessary to renew the other packing several times, while the original Palmetto packing has given no trouble and remains steam tight.

THE BERWICK ELECTRIC RIVET HEATER

THE American Car & Foundry Company has recently issued a new catalogue covering the Berwick electric rivet heater.

The subject of electric heaters is attracting considerable attention and this little booklet contains much useful information on that topic. The Berwick heater was originally designed as shop equipment for the American Car & Foundry Company and more than fifty have been in constant use there during the past six years. Actual operation developed many economies and conveniences in the use of electricity for rivet heating and the American Car & Foundry Company is now placing on the market the results in the shape of ten standard types and sizes designed to meet special requirements.

In actual practice with skilled operators, the proportion of burned and scaled rivets has been reduced with this heater to less than one-half of one per cent, while the operating cost is stated to be from 20 to 70 per cent less than the cost of heating by fuel oil, coke, coal or gas. The current consumption is approximately 20 kilowatt hours per 100 pounds of rivets heated.

Elimination of smoke, gas, dirt and intense heat is another very important feature of the Berwick heater, and particularly in the hulls of vessels the elimination of delay in starting is a very great advantage, the electric heater providing hot rivets within thirty seconds after starting.

Copies of the new Berwick catalogue can be secured by addressing the American Car & Foundry Company, 165 Broadway, New York.

FOR SALE

SHIPS NAVIGATION EQUIPMENT

10 Magnetic Sets.

2 Conning Tower Type Ship's Binnacles.

2 Torpedo Boat Type Ship's Binnacles.

10 Right Hand, Single Dial, Engine Room Transmitters.

11 Left Hand, Single Dial, Engine Room Transmitters.

30 16-inch Engine Room Indicators.

Also all of the patterns, jigs, dies and tools and a quantity of unfinished material for the production of these instruments.

All of the above in strict accordance with Navy specifications.

Photos and prices on application. Correspondence solicited.

JOS. MAYER, INC.
81 Marion Street, P. O. Box 447
Seattle, Washington

W. T. Cleverdon

Average Adjuster

FOR SALE

Sch. **"PAWNEE"**—80′ x 16′ 9″ x 6′ 2″, composite construction, copper sheathed, fine lines. Suitable for installing power for trader, fisher or tender. Price **$5,000.**

Gas Tender **"WOTOC"**—65′ x 11′ x 5′. Heavy oak construction—cabin aft, large hatch; heavy mast and boom; 2 sails; 50 H. P. 4-cyl. gas engine. Price **$7,500.**

Triple Expansion

MARINE ENGINE

Ex S. S. "Bear"
31—50—84 x 54
About 4500 Horsepower

Large Donkey Boiler, Cargo Winches, Anchor Windlass, Welin Davits, Marine Pumps and Large Line of Marine Equipment

PORTER WRECKING CO.
805 FIFE BUILDING, SAN FRANCISCO

Short Cuts to Better Insurance Service

Prompt payment

It is a point of special service with this company to pay all claims promptly. In common with other good companies we are as anxious to mail the check and get the matter settled as the assured is to receive the payment.

But the delay, if any, is seldom caused by the insurance company. The most frequent cause of delayed payment is that claims are presented which are improperly made out.

It is the aim of this company not only to pay all claims promptly, but also to assist you in making out a trouble-proof claim.

As an aid in making out claims we have issued a booklet:

"To Obtain Prompt Settlement of Losses."

It summarizes the exact procedure involved in making out a claim that will prove trouble-proof. It states point by point the steps to be taken and names the documents to accompany the claim. This booklet will save you time in making out your claims and enable the insurance company to make the promptest possible settlement.

We shall take pleasure in mailing you a copy. Write our Service Department.

We give service and information to all interested.
We accept risks only through licensed brokers.

The Washington Marine Insurance Co., of New York

MARINE AND AUTOMOBILE
INSURANCE

HOME OFFICE: 51 BEAVER STREET, NEW YORK

C. H. WILLIAMSON,
Pacific Coast Agent,
322 California Street, San Francisco, Cal.

Marine Supply Company Carries S. & N. Packing

MSHIP CO.
USE THESE STAIRS TO THE CANADIAN PACIFIC TICKET OFFICE AND BAGGAGE ROOM.
ARIN
SHIP CHA
DINING ROOM AND LUNCH COUNTER
MARINE SUPPLY CO.
SELBY SMELTING AND LEAD COMPANY
RY, LAUNCH & ENGINEERS SUPPLIES

Seattle headquarters of Marine Supply Company

THE Marine Supply Company of Seattle have recently made sales arrangements with the manufacturers of Stephenson & Nichols semi-metallic packing and have a very complete stock of this packing in various sizes.

During Mr. Stephenson's visit to Seattle recently, Mr. Potts of the Marine Supply Company was quick to realize the advantages of the Stephenson & Nichols semi-metallic packing as the logical material for packing steam valve stems, piston rods, air compressors, turbines, etc.

For the past eight years Stephenson & Nichols packing has been used successfully by the largest oil companies, power plants and steamship companies and a great many piston rods are still in operation after being packed several years with the original Stephenson & Nichols packing. One of the hardest tests for Stephenson & Nichols packing may be found in the cold operation of centrifugal pumps. Stephenson & Nichols semi-metallic packing has been entirely successful in preventing leaks without friction.

Steam engineers will welcome the news of this selling arrangement of the Marine Supply Company and will now be able to obtain their requirements on the Seattle waterfront from this popular engineers' supply house.

AERIAL RAILWAY OF INDUSTRY

"THE Aerial Railway of Industry" is the title of a new publication issued by the Shepard Electric Crane & Hoist Company, Montour Falls, New York. By the "aerial railway of industry" is meant the Shepard electric monorail hoist, the track of which is an I-beam, set at any desired height above the ground.

The Shepard monorail hoist "is manufactured in a wide range of capacities and forms," says the booklet. "It can be supplied for the handling of any product. For coal, fertilizer, crushed stone, gravel, sand, lime—material which is commonly received in gondola cars and stored in bins—a Shepard monorail hoist with a grab bucket will not only do the loading or unloading but will rapidly convey it to any part of the plant or yards. In a foundry, where the lifting of huge crucibles calls for speed and precision, the monorail hoist, operating on a Shepard electric crane, gives instant accessibility to any portion of the building."

Photographs of the Shepard equipment, in use at brass mills, steel mill, heating-equipment plant, metal-refineries plant, storeroom and lumber yard, in addition to sketches and dimensions of hoists, add much to the interest and appearance of the pamphlet.

The Shepard Electric Crane & Hoist Company has branch offices at New York, Baltimore, Philadelphia, Cleveland, Pittsburgh, Chicago, Boston and San Francisco.

HADFIELD-PENFIELD STEEL COMPANY

SHIPBUILDING interests are directly interested in a financial arrangement which has just been completed and through which ship-deck machinery of the most modern design is assured. The deal has been made between Sir Robert Hadfield, world-wide famous as a steel magnate, of Sheffield, England, and the American Clay Machinery Company of Bucyrus, Ohio.

Through this arrangement the Hadfield interests become associated with the American Clay Machinery Company with a much increased capital and much larger range in manufacturing. The new organization will be known as the Hadfield-Penfield Steel Company with general offices and works at Bucyrus, Ohio.

The American Clay Machinery Company's "Built Right—Run Right" line of auxiliary deck equipment was a product of the war, the American Clay Machinery Company having brought out this line of machinery to help in the mad rush to equip Uncle Sam for a winning fight. As has been the custom of the American Clay Machinery Company, it went thoroughly into the deck equipment line before designing this new line and as a consequence their machines at once received popular approval and favor because of their superiority.

The alliance with the Hadfield interests will add much strength to the American Clay Machinery Company and will bring to it a wealth of knowledge in steel production and the manufacture of steel products.

Sir Robert Hadfield has a worldwide reputation in the manufacture of steel and its products. Manganese steel is one of the many inventions given to the steel world by him, for which invention and others he has been knighted by the British government and many awards, medals, distinctions and honors have been accorded him by various societies and institutions.

The desire of Sir Robert Hadfield to extend his business in America and the desire of Mr. R. C. Penfield, president and principal owner of the American Clay Machinery Company, to secure for America the great experience and valuable rights and patents of Hadfield's Limited, resulted in an arrangement between the American Clay Machinery Company and Sir Robert Hadfield for the manufacture of steel here in the United States under the Hadfield special processes. Under this arrangement, Hadfield's Limited will become heavily interested financially in the new company, its interests largely exceeding the million dollar mark, the American Clay Machinery Company retaining a majority interest in the new company.

The old name would not fit the enlarged field of the new company and the coupling of the two names so well known in manufacturing fields of the two nations will give a prestige to the new company that can scarcely be over-estimated and it is predicted that the new Hadfield-Penfield Steel Company will gain unusual prominence because of the scope and excellence of its products.

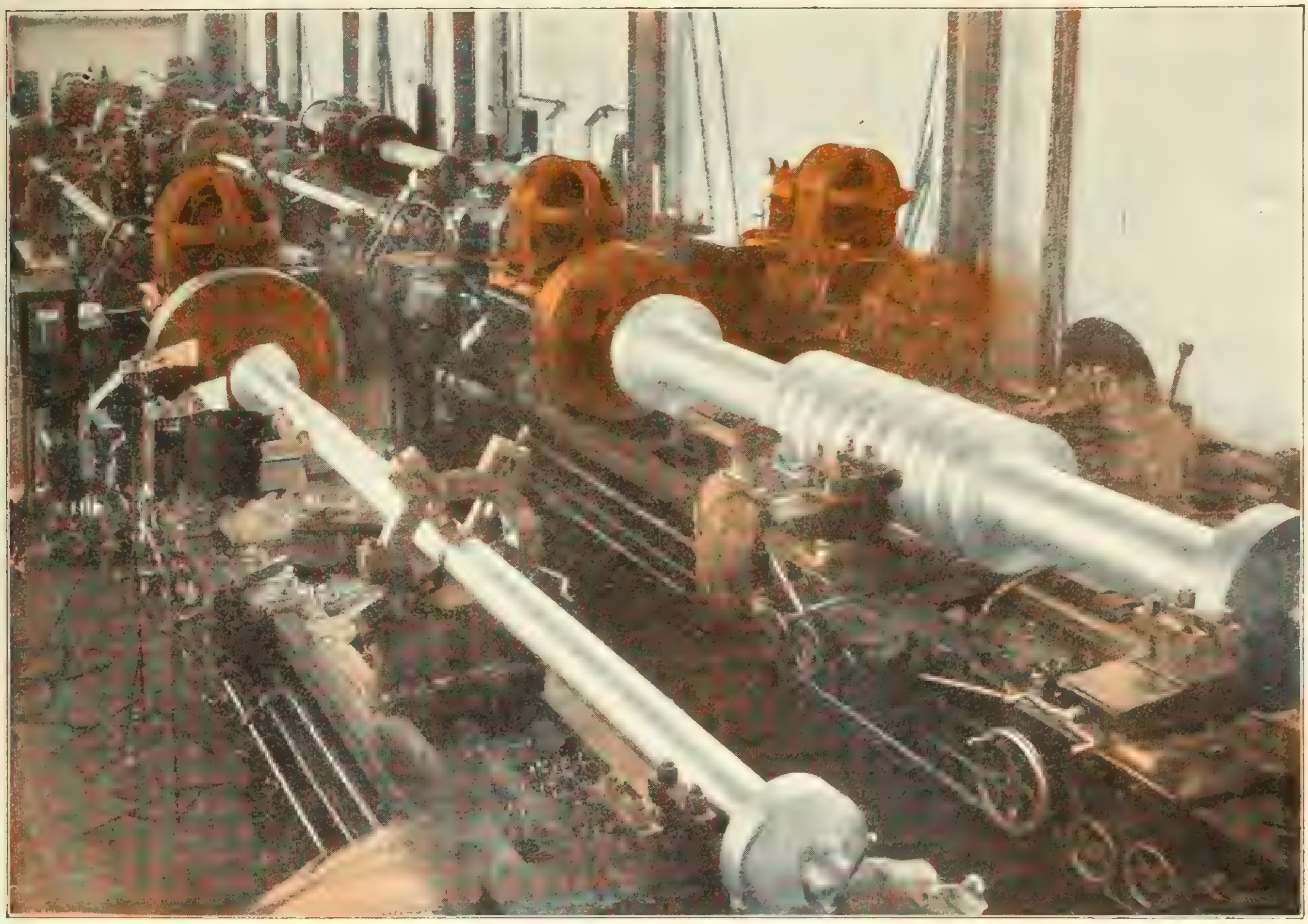
The new company means not only new lines and activities of manufacture, but also a material extension and betterment of old lines heretofore manufactured, including:

Ship deck equipment, fuel oil engines, industrial locomotives, steam shovels, cement making machinery, clay working machinery, bakery and flour mill machinery, steel castings, etc.

The American Clay Machinery Company will be the dominant factor in the new organization and will seek to duplicate in the United States the great work of the Hadfield Company in Sheffield.

Mr. H. D. Van Doorn, who is the manager of the ship deck equipment department of the American Clay Machinery Company, will continue with the new company in the same capacity, being located at 516 Liberty Building, Philadelphia.

CAMDEN



AN ABUNDANCE of Equipment, Operated with Experienced Skill, Makes

CAMDEN FORGINGS

GOOD TO USE

The purchase precedes the use and the inquiry the purchase.
So take with us the first step, namely, *send us the inquiry.*

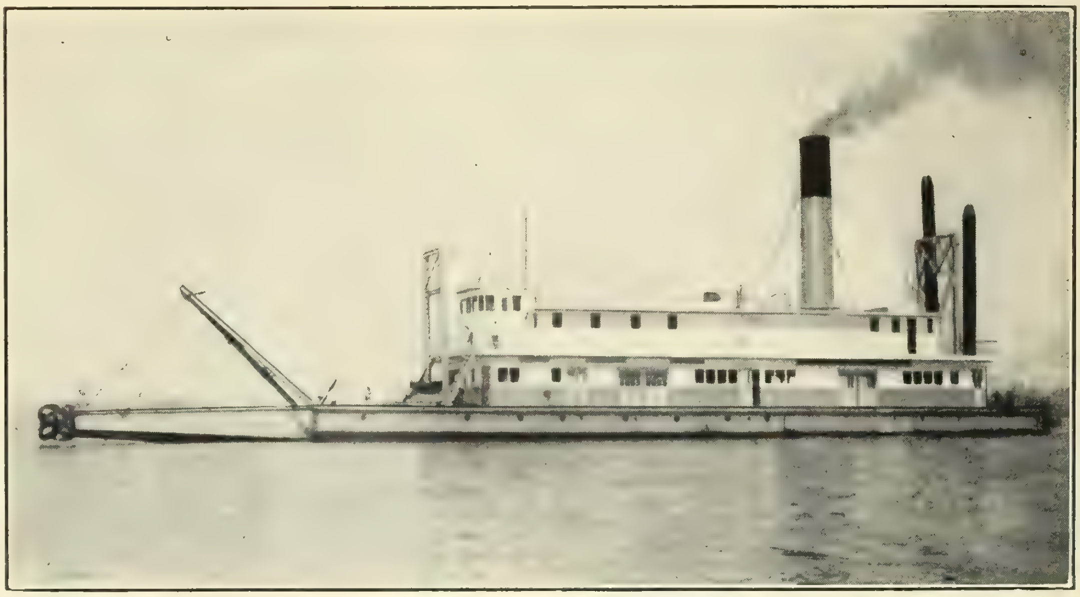
BUYERS' MEMO

- High and Low Carbon Bars
- Press Columns and Rams
- Pull Back Cylinders
- Water Cylinders
- Valve Bodies
- Plungers
- Weldless Steel Rings
- Lathe Spindles, solid and hollow bored
- Long Feed Screws
- Power Press Crank Shafts
- Cam Shafts
- Eccentric Shafts
- Crusher Shafts
- Gear and Pinion Blanks
- Locomotives
  - Side and Main Rods
  - Crank Pins
  - Axles
  - Rod Straps
  - Piston Rods
  - Guides
  - Parts of frame, both in iron and steel
- Hammered Iron Bars for locomotive repairs
- Marine Shafts
- Marine Connecting and Eccentric Rods
- Rolls
  - Bending
  - Feed
  - Straightening
  - *Embossing*
- Large Wrenches
- Saw Arbors
- Steam Engine Forgings
- Pump Crank Shafts
- Generator Shafts
- Pump Connecting Rods
- Large Nuts
- Turbine Shafts
- Mill Shafting
- Trolley Car Axles
- Electric Motor Axles
- Any forging to your print and specifications, in either iron or steel

CAMDEN FORGE CO.
CAMDEN, N. J., U. S. A.

ELLICOTT MACHINE CORPORATION

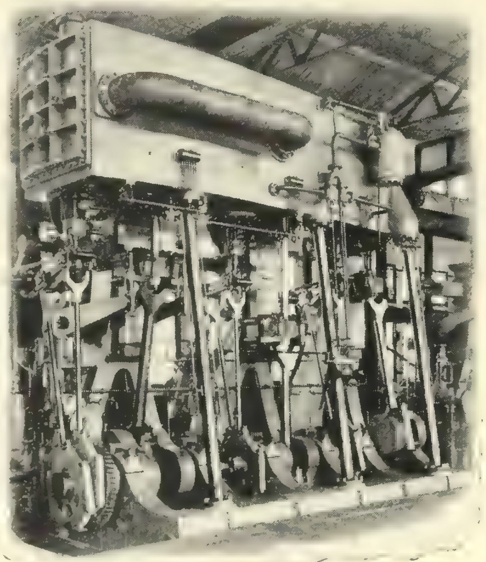
ESTABLISHED 1885



High Powered Pipe Line Dredge

Hydraulic Dredges

That will handle any material (except ledge rock) to any height, to any distance, in any quantity. Early deliveries can be made on complete dredges of the type illustrated knocked down and boxed for ocean shipment.

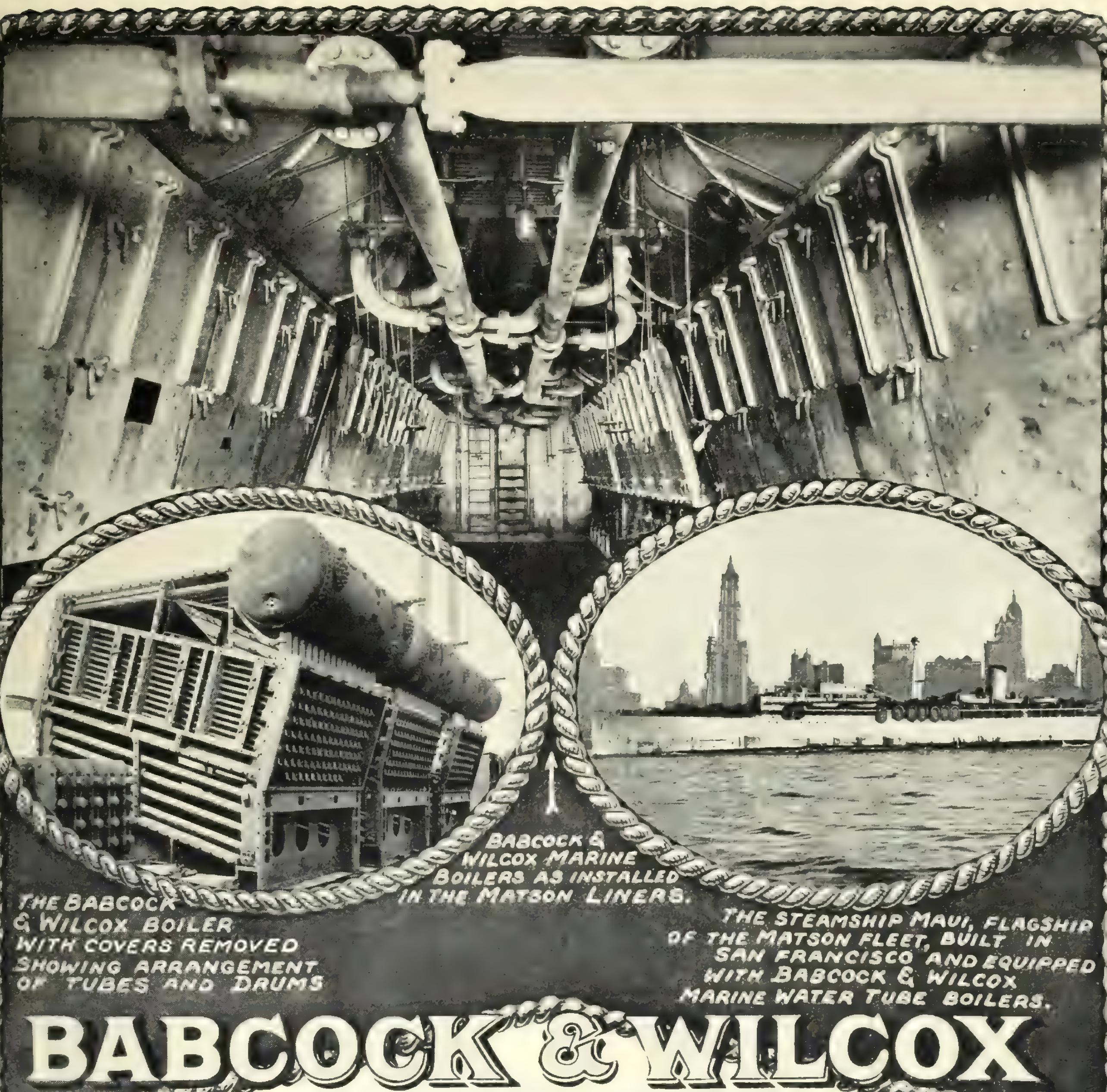


Marine Engines

We can give reasonable prices and prompt deliveries on 1600 H. P., 1800 H. P. and 2000 Horse Power Propelling Engines and solicit inquiries for other sizes from 200 Horse Power up, including condensers, shafting, stern tubes and propellers.

CENTRIFUGAL PUMPS — PUMPING ENGINES

Plant and General Offices: — **1111 BUSH ST., BALTIMORE, MD.**



THE BABCOCK & WILCOX BOILER WITH COVERS REMOVED SHOWING ARRANGEMENT OF TUBES AND DRUMS

BABCOCK & WILCOX MARINE BOILERS AS INSTALLED IN THE MATSON LINERS.

THE STEAMSHIP MAUI, FLAGSHIP OF THE MATSON FLEET, BUILT IN SAN FRANCISCO AND EQUIPPED WITH BABCOCK & WILCOX MARINE WATER TUBE BOILERS.

BABCOCK & WILCOX

MARINE WATER TUBE BOILERS

We have boilers installed in the merchant service on the Pacific Coast in 1897, in active service today. Twelve successive orders from one company; 7 from another; 6 from a third; 4 from two others, and 3 from six others.

These boilers hold the record for economy, capacity and endurance in the Navies of the World.

They have shown the same characteristics in the Merchant Marine. Babcock & Wilcox Boilers and Superheaters in one vessel are saving more than 15 per cent over Scotch boilers in sister vessels.

Babcock & Wilcox Boilers have all essential parts heavier than corresponding parts in Scotch boilers, giving greater security against corrosion. They are lighter, safer, easier to clean and to operate than Scotch boilers, and much more efficient.

THE BABCOCK & WILCOX CO.

New York
San Francisco

CHAS. C. MOORE
Pacific Coast Manager

Sheldon Building, First St., cor. Market
SAN FRANCISCO, CAL.

OF GREAT IMPORTANCE TO
—SHIP OWNERS &
—SHIP OPERATORS

is the

Floating Machine and Repair Shop

of the Pacific Marine Iron Works

Realizing the necessity for something that would enable vessels to undergo needed repairs while loading or unloading their cargoes, the Pacific Marine Iron Works has constructed and placed in operation this Floating Machine and Repair Shop. In a word it is the latest and most valuable facility available to vessels operating out of Portland and the entire Columbia River district.

This shop has a fully equipped machine shop sufficient to handle any engine or repair work; a complete boiler repair equipment with air compressors and air tools; electric and oxyacetylene welding and cutting equipment; a complete blacksmithing equipment and all tools necessary to take care of outside repair work in a thorough and expedient manner.

The particular advantage of this Floating equipment is that it can be moored along side of vessels for the purpose of attending to repairs or installation while vessels are loading or discharging cargoes anywhere on the Columbia River from Astoria up. Ship owners and operators will realize its importance from every standpoint, especially in the matter of economy and quick dispatch.

The shop is a valuable auxiliary to the extensive engine and boiler building plant of the Pacific Marine Iron Works, which is advantageously located on Portland's water front.

We have established a number of records on rush repair work both for the Fleet Corporation and for private owners.

INTERIOR VIEW OF FLOATING MACHINE AND REPAIR SHOP

PACIFIC MARINE IRON WORKS

ENGINEERS, BOILER MAKERS, MACHINISTS
MANUFACTURERS of BALLIN WATERTUBE BOILERS

PORTLAND - - - OREGON

Marine Engine For Sale

Ex—U. S. S. "FARRAGUT"

4 Cylinder, Triple Expansion 20"x29"x30"x30"
18" Stroke, Weight 35,000 lbs.

This is an ideal engine for fast

FERRY BOAT RIVER STEAMER YACHT
On 200-lb. Steam Pressure at 250 R. P. M. will develop 1300 I. H. P.

This is the finest reciprocating engine ever built. It has been completely overhauled in our shops and is in A No. 1 condition.

We also have for sale from U.S.S. "FARRAGUT"

"STEERING ENGINE"
"DYNAMO ENGINE"
"WINDLASS"

Prices on Application

Los Angeles Shipbuilding and Dry Dock Co.
San Pedro, California

PURCHASING AGENTS

FOR EXPORT ONLY

TWELVE years of successful purchasing experience for Railways, Shipyards, Mills and Mercantile Houses.

American and Oriental commercial and bank references.

We also quote C. I. F. prices

GUY T. SLAUGHTER & CO.

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All Standard Codes Used

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Scott's 10th Edition
Bentley

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Independent Steamship Lines

Managers Shawmut Steamship Co.

MODERN STEEL STEAMERS
UNDER THE AMERICAN FLAG

Monthly Sailings to the Straits Settlements and Dutch East Indies

FORTNIGHTLY DEPARTURES TO NORTH AFRICA, EGYPT, LEVANT AND RED SEA PORTS
MADEIRA, CANARY ISLANDS AND MOROCCO

LOADING AND DISCHARGING BERTHS
Pier 7, N. R., New York City and Pier "C" Clifton, Staten Island, N. Y.
General Offices: 48 FRONT ST., Tel. Broad 5161

Columbia Steel Company

Pittsburg, California
Steel Foundry and Rolling Mill

Portland, Oregon
Steel Foundry

STEEL CASTINGS
up to
60,000 pounds each

Carbon
Alloy
Manganese

ROLLED STEEL BARS
Round-Square
Reinforcing
Rivet

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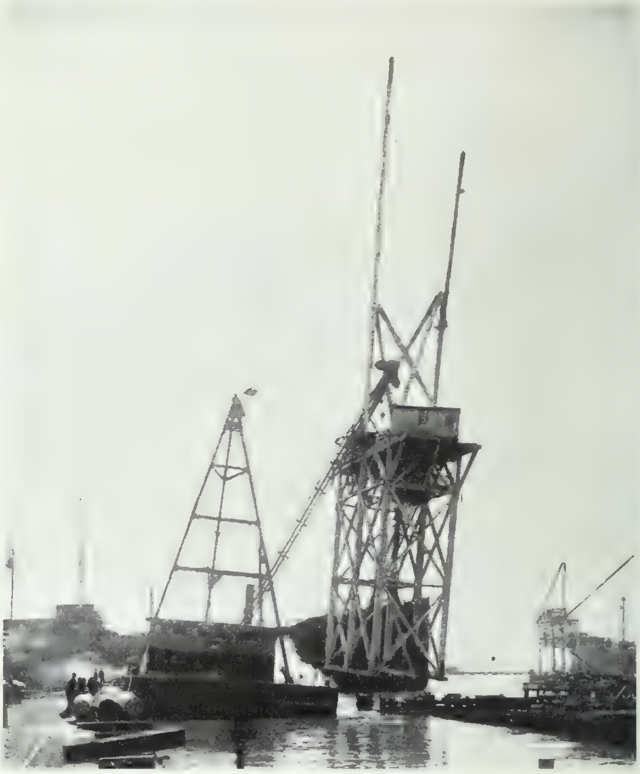
Unusual Feats of Derrick Barge

How the building tower was secured by barge



Barge lifting 65-ton building tower

THERE always is a problem in launching a vessel at the yard of the Moore Shipbuilding Company, Oakland, because of the narrowness of the Oakland estuary. Heretofore, the Moore engineers have been successful in holding vessels, but, at the launching of the oil-tanker Vacuum, May 1, the vessel, which was unusually heavy by reason of her machinery having been placed in her, so that speedy delivery could be made, broke away from her stops, crossed the estuary and ran her stern fifty feet or so onto the mud. She was not damaged, however.

Six tugs attempted to float her that night, and failed; again, the next morning, six tugs, aided by two locomotive cranes, could not move the vessel. Each of the cranes was fifteen-ton, and the tugs were of 1100 horsepower, two being aft, two amidships and two forward.

At midnight, May 2, the new derrick barge of the Crowley Launch & Tugboat Company was moored at the Moore dock; her topping lift and heavy lift line were run to the Vacuum; and, on a falling tide, the vessel was floated in ten minutes. It was estimated that the pull was equivalent to a 300-ton lift. The lines were one-inch plow steel, Roebling-made, and each was run out 600 feet to the ship.

Another unusual work was done with the barge in the moving of three building towers at the Moore yard. These towers were moved from a building way to make room for a drydock; each weighed sixty-five tons and was sixty feet high overall. To move them on shore would have required two weeks for each, the distance being about one-half mile; but the Crowley barge moved one a day, at a cost about one-half that of moving them on land.

A BUSY PORT OF CALL AT THE CONVENTION

The exhibit of Pacific Marine Review, The National Magazine of Shipping, at the Seventh National Foreign Trade Convention, San Francisco. This booth was headquarters of shipping men from all parts of the world. The display of the beautifully colored covers of the magazine was a novel feature of the exhibit.

CONSOLIDATION OF TOOL MANUFACTURERS

SPECIAL meetings of the stockholders of J. H. Williams & Company at Brooklyn, New York, and of the Whitman & Barnes Manufacturing Company at Akron, Ohio, were called for April 2 for the dents, made subject to the approval of the stockholders, for the merging of the Chicago, Illinois, and St. Catherine, Ontario, plants of the Whitman & Barnes Manufacturing Company with J. H. Williams & Company.

This plan in detail will contemplate the operation by J. H. Williams & Company of drop forging and drop forged tool plants at Brooklyn, New York, Buffalo, New York, and West Pullman, Chicago, Illinois, in the United States, and at St. Catherine, Ontario, in Canada, which is located close to Buffalo, and the business will be operated by the individuals now connected with these plants.

The plans of J. H. Williams & Company, under this arrangement, call for a considerably extended business and for the service of all their customers in the location most convenient to them.

The Whitman & Barnes Manufacturing Company's Chicago plant includes the new forge shop, 100 feet by 500 feet, and power house, which has just been built by Messrs. Stone & Webster at a cost, including complete equipment, of $1,250,000.

The Whitman & Barnes Manufacturing Company will continue its business of making twist drills, reamers and collateral lines on an extended scale at Akron, Ohio, and further details in regard to both of these companies will be available later.

NEW NAME IN OXY-ACETYLENE FIELD

THE Oxweld Acetylene Company of Newark, New Jersey, and Chicago, has recently extended its manufacture of oxy-acetylene apparatus and equipment to include "Eveready" welding and cutting outfits.

"Eveready" is the new name in the oxy-acetylene field, but the apparatus is not new, excepting for certain refinements of design, having been extensively used in the metal-working trades for several years under the name of "Prest-O-Lite" apparatus.

The new name was adopted by the Oxweld Company to suggest the ready convenience, adaptability and general-purpose uses of the equipment. The apparatus is designed to use exclusively with compressed acetylene in cylinders, thus providing the welder and cutter a compact and complete portable outfit.

Eveready outfits and supplies are moderately priced and are sold through distributors direct to the retail trade.

ON THE CARE OF WIRE ROPE

"Practical Information on the Use and Care of Wire Rope" is the title of a booklet issued by A. Leschen & Sons' Rope Company, St. Louis, manufacturer of the Hercules and other brands of wire rope. Beginning with storage, the booklet advises as to the proper care of rope, under such headings as uncoiling and unreeling, kinks and kinking, lubrication, fitting rope to conditions, safety factors, stresses, reverse bends, drums and sheaves, bending stresses, fleet angle, binding the ends of rope, how to cut wire rope, determination of the presence of acids or alkalis, how to splice wire rope, and many others. There are many illustrations, those on the splicing of rope being unusually complete.

PAGE BOOKLET ISSUED

The Page Steel & Wire Company has just published a very complete pamphlet describing fully the electrical and physical properties of American ingot iron wire. This is the first complete publication of these data and the result of many tests made during the past two years under the supervision of the Electrical Testing Laboratory, New York, and Franke F. Fowle, consulting electrical engineer for this company.

This booklet is very interesting and will be mailed to any one desiring a copy upon request to the Page Steel & Wire Company, 30 Church street, New York.

STRATTON STEAM SEPARATORS

STRATTON steam separators, manufactured by the Griscom-Russell Company, 90 West street, New York, are described in Bulletin 1140. After detailing the reasons why steam separators are necessary (principal among which are the reduction of steam power by water in the steam and the liability of the engine to damage because of excess of moisture), the booklet goes on to describe the Stratton separator:

The Stratton steam separator uses centrifugal force to separate entrained water from steam. As the steam and water enter the separator, they pass through a helical path formed about a central cylinder. The high velocity of the incoming steam and water causes the entire mass to swirl as it passes from the helical channel into the main body of the separator. Water is several hundred times heavier than the steam, and, therefore, it does not follow the turn so easily, but is thrown out of the whirling current of steam by centrifugal force. The helical patch is so proportioned that large or small quantities of water swing out of the curving steam current, meet the wall at an angle without the slightest spatter or splash, and follow close to the wall until the receiver space is reached, at which point the swirling motion of the water is checked by proper baffles, so that drainage may be easily accomplished.

The Stratton steam separator, therefore, effects a complete removal of the moisture with a minimum loss in steam pressure. The pressure loss is very slight because the path of the steam through the separator is smooth and there are no short sharp corners or restricted openings or baffle plates. This fact permits steam to pass through the Stratton separator at a velocity of 6000 to 8000 feet per minute with excellent results as regards separation and pressure loss. It is readily apparent that the greater the velocity of steam, the greater the centrifugal action, and, therefore, the greater the separating tendency.

C-O ENGINE CATALOG

FAIRBANKS, MORSE & COMPANY have issued Catalog 125C on C-O oil engines. A general description of these engines is supplemented by many illustrations, among which are two engravings of each of the following sizes, both port and starboard sides being shown: 30 horsepower, 45, 60, 75, 100, 150, 200, 300. Space is given to explaining the special features, principles of operation, construction details, and to giving the principal dimensions of the different types.

Following these data, the catalog reproduces photographs of several vessels powered with C-O engines. Geographically, these vessels range all over the world, and their types differ quite widely. The engine-rooms of several of these vessels, with C-O engines installed, are shown.

MOORE OIL-BURNING SYSTEM

THE Moore Shipbuilding Company's mechanical oil burning system is the theme of an interesting and well illustrated pamphlet issued by the Oakland shipbuilding yard. Both types of furnace fronts are described fully—those for Scotch and watertube boilers; and illustrations include: interior of the Moore machine shop, general view of a ship under construction; different vessels built by the Moore yard; a diagram showing the oil-burning front of a Scotch boiler; another of the arrangement of the Moore system; a general plan of the Moore yard; a diagram of the oil-burning front of a watertube boiler; arrangement of the system for watertube boilers; typical arrangement on a vessel; besides engravings of parts of the system.

Tables of data on fuel oils, rules for ascertaining the evaporation of water to the pound of oil, and the amounts of oil atomized by different tips, complete the book.

The engineer, as well as the man who wishes to add to his general information, will discover that the pamphlet repays study.

CONCERNING PROPELLERS

A handsome booklet on "a scientific service for the betterment of the operating efficiency of power-driven vessels" has been issued by Charles S. Linch, Inc., consulting marine engineers and propeller specialists, 8 Bridge street, New York City. The booklet is beautifully illustrated and will be of special interest to ship operators who believe that their vessels are capable of better performance than has been had from their present propeller equipment. Copies may be obtained by addressing Charles S. Linch, Inc., 8 Bridge street, New York City.

Marine Interior Communication Appliances. Catalogue "Q" of the McNab Company. Twenty-eight pages describing Mechanical and Pneumatic Revolution Counters; Mechanical Logometers; Electric Helm Indicators; Pneumatic Direction Indicators; and Mechanical Engine Room Telegraphs and Fittings.

The above four McNab catalogues present a very comprehensive line of engine room auxiliaries and deck machinery and should be on the desk of every traffic manager.

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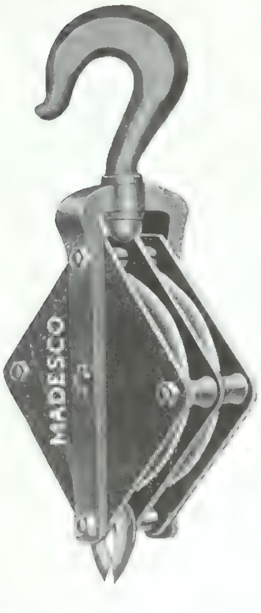

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1 Bolinder engine, 8 B. H. P., Model B-111, Type R-5, with extras and spare parts.

Above engines are now in bonded warehouse at San Francisco, subject to immediate delivery.

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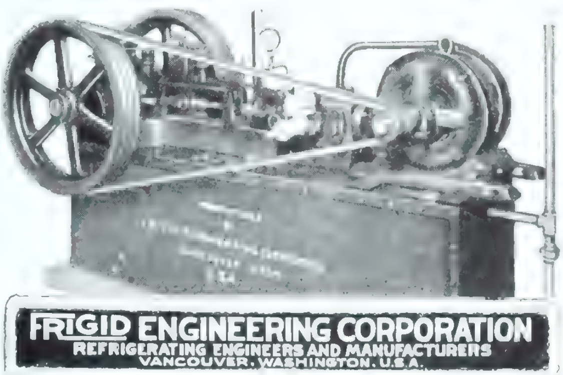
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This organization comprises an experienced staff of Civil, Mechanical and Electrical Engineers, specializing in complete industrial plants, production efficiency and modern harbor improvements.

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Sale by Tender

offers are invited for the Sale of the

American Oil Tank Steamer "NORTHWESTERN"

as she now lies in her damaged condition in the Neches River at Port Neches, Texas.

The "Northwestern" is 2207 gross tons register and is fitted up for carrying oil in bulk, with the necessary bulkheads, pumping gear, etc.

Approximate dimensions, length 242 feet, beam 42.2 feet and depth 23.2 feet.

Built in 1901. Triple Expansion Engines. Cylinders 20 inch, 33 inch and 54 inch by 40 inch stroke, 2 Scotch boilers. 175 Boiler Pressure.

Intending purchasers must satisfy themselves as to the condition of the vessel, permission to examine her may be obtained from Mr. Thomas Cornick, Agent, The Texas Company, Port Arthur, Texas.

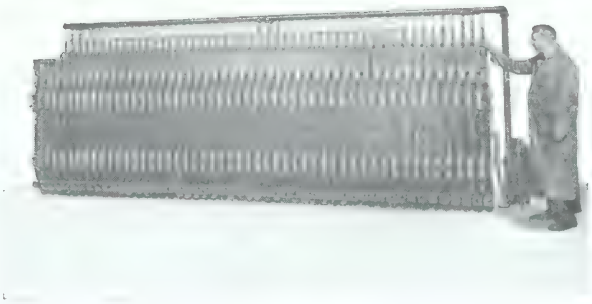
All offers must be accompanied by a certified check for 25% of the bid. The successful bidder to take charge of the vessel upon confirmation, by letter, of acceptance of his offer, at which time the balance of purchase money is to be paid.

Owners reserve the right to reject any or all bids. Sealed tenders to be handed in or mailed so that they will reach the undersigned, at or before noon, on June 21, 1920, at which time and date they will be opened.

Tender to be addressed to HENRY BLACK, Principal Surveyor

London Salvage Association, 68 Broad St., New York

Envelope to be marked "re tender Northwestern"



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A Unique Adaption in the Use of Portable Electric Drills

AN interesting photograph and drawing have recently come to our notice showing a very novel device in the plan of the Sterling Engine Company, Buffalo, New York.

The work consists in the drilling of diagonal oil holes in the cranks of four-cycle marine engines.

The photo shows the machines devised for this purpose and built in the Sterling works, permitting of the use of standard Van Dorn portable electric drills.

The table, or bed, is of cast iron planed and provided with a longitudinal slot in which the two V-blocks slide, their centers being on a line with the drill spindles. The two vertical members support the rail, on which are two carriages carrying the slides for the electric drills. The slides are arranged so that they will swivel in either direction. At the left-hand end of the table is a similar head for drilling the central oil hole A, Figure 2. The heads on the rail are used for the diagonal holes B in the crank webs.

Van Dorn portable electric drills are particularly well adapted for all kinds of general production purposes and quick repair work as size for size they are the most powerful portable electric drills on the market.

The motor is hand-built in the plant of the Van Dorn Electric Tool Company, Cleveland, Ohio, on the same principle as the street car motor, but in miniature form, to meet the same kind of varying load conditions.

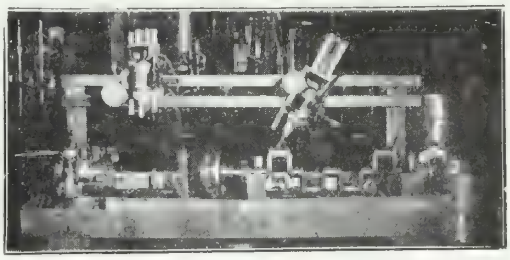


Fig. 1

Fig. 2

SEA CAPTAIN SIGNALS RESCUERS WITH FLASHLIGHT

CAPTAIN Albert B. Randall, master of the United States transport Powhatan, which was disabled in a severe storm 200 miles off Halifax, reports that without the electric hand flashlights which he carried as a part of his equipment, the work of relieving the condition of his vessel after the rescue ships arrived would have been immeasurably more difficult than it was.

The dynamos were put out of commission when the fire-room was flooded and in consequence the lighting system was useless. There was only enough current from storage batteries to use the wireless for emergency, and when relief came and there was great necessity for communication with the ships, Captain Randall in the emergency turned to the store of Eveready Daylos that he carried.

He flashed messages in the Morse code and received replies in the same manner. His officers, who were also equipped with Evereadys, not only kept up constant communication but were able to find their way about the ship without difficulty.

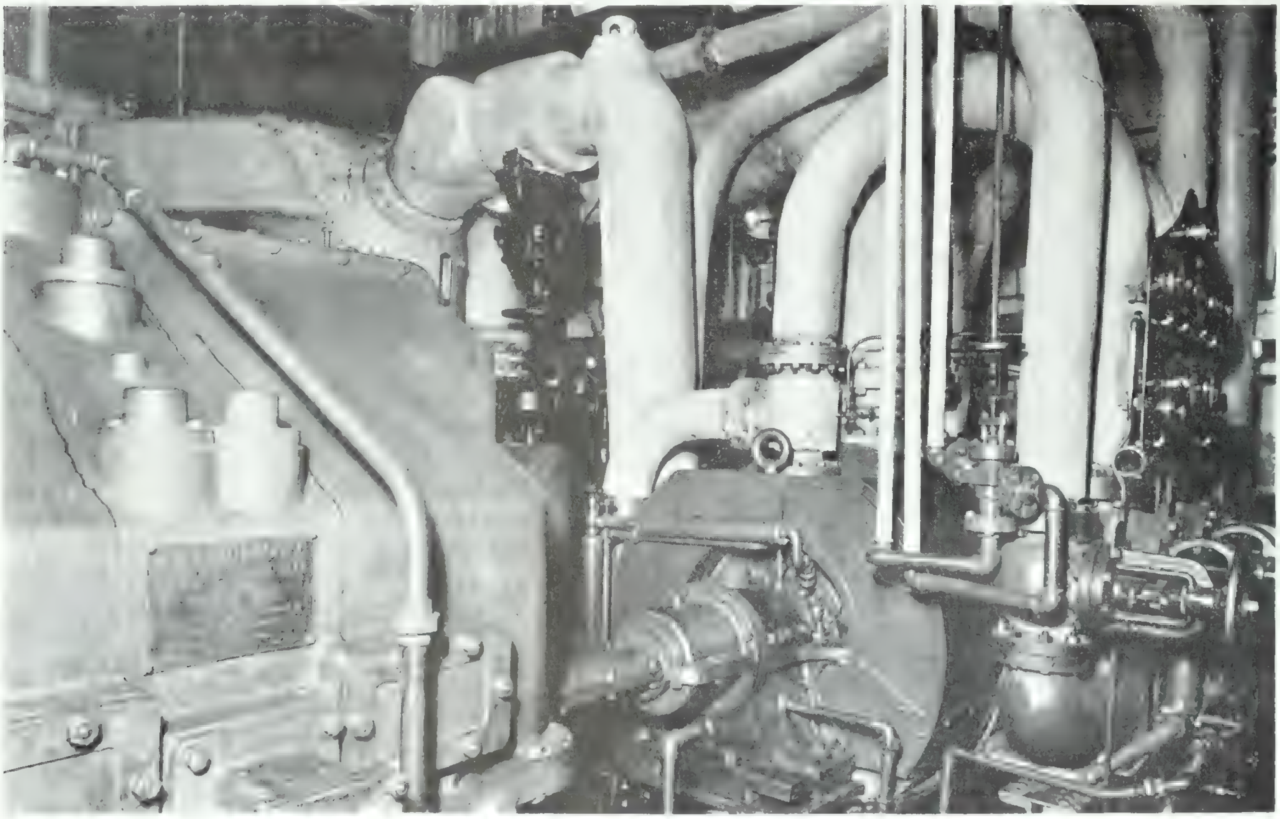
AN INTERESTING LAUNCHING

AT 2:30 o'clock in the afternoon of Friday, April 16, a 9000-deadweight-ton freighter, the Halfmoon, was launched at the Newburg shipyards on the Hudson River.

It is said that this vessel took the water at almost the identical spot at which that doughty Dutch navigator, Henry Hudson, sailing up the river in his Halfmoon, decided that he was in a river and not in a northwest passage or short-cut to India.

The signal for launching the ship was sent from the booth of the Newburg shipyard on the main floor of the National Marine Exposition at the Grand Central Palace, New York, and this signal was given by Thomas Boyle, a 92-year-old mariner, who is said to be oldest sailer in the American merchant marine.

The Halfmoon slid into the waters of the river in perfect style, the ways having been lubricated with Keystone launching grease. She was sponsored by Mrs. F. Delano Hitch of Newburg and is the eleventh freighter built by the Newburg shipyards for the United States Shipping Board.



Westinghouse steam turbine and reduction gear in engine room of Shipping Board freighter

Book Reviews and Trade Literature

Brown's Signalling. Published by James Brown & Son, Glasgow, Scotland. One hundred and thirty pages; illustrated profusely with half-tones and diagrams. Price 5/- net.

This manual, which is attractively bound in pasteboard covers, sets forth a simple method of learning the international coding and other forms of signalling, and is especially prepared for those desiring to pass the British Board of Trade examinations. It contains the allied signal manual and explains Marconi's system of wireless telegraphy, and is a very handy work of reference with regard to marine signals of all sorts.

Bank and Public Holidays Throughout the World for 1920. Published by the Guaranty Trust Company of New York.

A neat booklet of 173 pages, bound in buckrum, containing a perpetual calendar and a calendar for 1920, showing the legal bank and public holidays for every country in the world and for all the states in the Union.

The matter of legal holidays in various countries is of considerable interest to foreign traders and overseas' shippers, and as the legalized holidays in foreign countries and in our own states are under continuous process of change, these annual calendars of the Guaranty Trust Company are finding a wide use.

The tendency was very marked last year to suppress all minor holidays and give official recognition only to those of national importance. This has been particularly true in the Latin American republics, where many of the religious holidays have been abolished.

The Guaranty Trust Company will be glad to furnish copies of this book to interested parties upon application.

Johnson's Steam Vessels of the Atlantic, Gulf and Pacific Coasts for 1920. Two hundred eighty-eight pages, convenient size, with leather binding. Published by Eads Johnson, M. E., Inc., 115 Broadway, New York City. Price $7.50 net.

This convenient register of American ships contains a 70-page index in which every vessel officially numbered by the Bureau of Navigation is listed by name and referred to its owning company. This index also covers changes of name. The register portion of the book runs to 245 pages and covers every ship owning and operating company in the United States in three divisions: the first covering the Atlantic Coast, the second covering the Gulf Coast, and the third covering the Pacific Coast. The information covered includes the name and address of the owning company, the name of the vessel, where built, her dimensions, tonnage, and propelling machinery.

This volume forms a very handy reference book for office and pocket use, as a sort of supplementary volume to the register of the American Bureau of Shipping.

C-H Marine Control Apparatus. A handsomely illustrated 15-page booklet published by the Cutler-Hammer Manufacturing Company of Milwaukee and New York, describing their electrical apparatus for use on board ship. Few laymen realize how largely electricity is becoming a factor in minor operations on ship board. The catalogue cites a battleship of the United States Navy, for instance, where there are approximately 225 motor and controller equipments used and the sizes range from 1 horsepower to 175 horsepower. The Cutler-Hammer Manufacturing Company is represented on the Pacific Coast by H. B. Squires Company of San Francisco.

Better Electric Lighting on the Farm. Bulletin No. 18 of the Benjamin Electric Manufacturing Company, Chicago. A very finely illustrated 16-page booklet, describing electric fixtures and fittings especially adapted for farm use.

STOP BAFFLE PLATE TROUBLE

If the baffle plates and other brick work in your furnaces are being damaged by an uneven flow of oil to the burners, you need

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The illustration shows type of KINNEY ROTATING PLUNGER PUMP installed on the U.S.S. New Mexico. This same type will be installed on the Battleships Tennessee, California, West Virginia, Washington, Colorado and Maryland; also Battle Cruisers Nos. 45 and 49 and over half a hundred Submarines.

Cargo pumps of 3,000 gallons capacity each per minute are building for Tank Ship No. 16.

If it's Good Enough for Uncle Sam, you should be interested.

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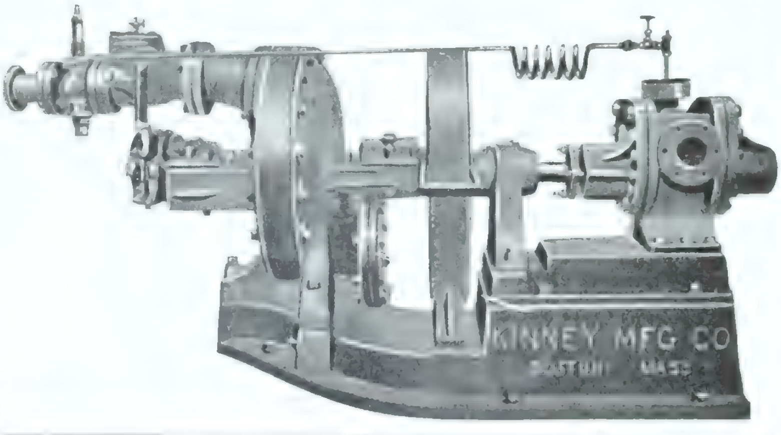

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MARINE AND STATIONARY ENGINES

Operates on Kerosene (Coal Oil), Gasoline or Distillate

The motor barge "Kern," built by Moore Shipbuilding Company, is used in the Union Oil Company's service for transporting oil from Oleum to San Francisco.

The "Kern" is a twin screw steel vessel of 222 gross tons, with length of 129′ 2″, beam 28′ and depth of 6′ and is powered with two 85 h. p. Enterprise engines. The "Kern" is equipped with fourteen cargo tanks with a combined capacity of 84,844 gallons. This vessel is in constant commission by the Union Oil Company and her engines give continuous good service.

A "repeat order" from the Union Oil Company includes a set of Enterprise engines for the twin screw oil barge "Piru."

Enterprise engines have not only sprung into sudden popularity in Pacific waters but have recently been shipped by the Seattle agent to Turkey, Greece and other foreign countries, thus showing the world-wide demand which has sprung up as a result of the merits of this engine in less than a year's time. No other engine can show so remarkable and rapid accession to universal approval and repeat orders that are coming in already from earlier purchasers show that this approval has been well merited.

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SOUTHERN CALIFORNIA: R. A. GAERTNER, Enterprise Service Station at Draw Bridge, San Pedro, California

Pacific Marine Review

JULY
1921

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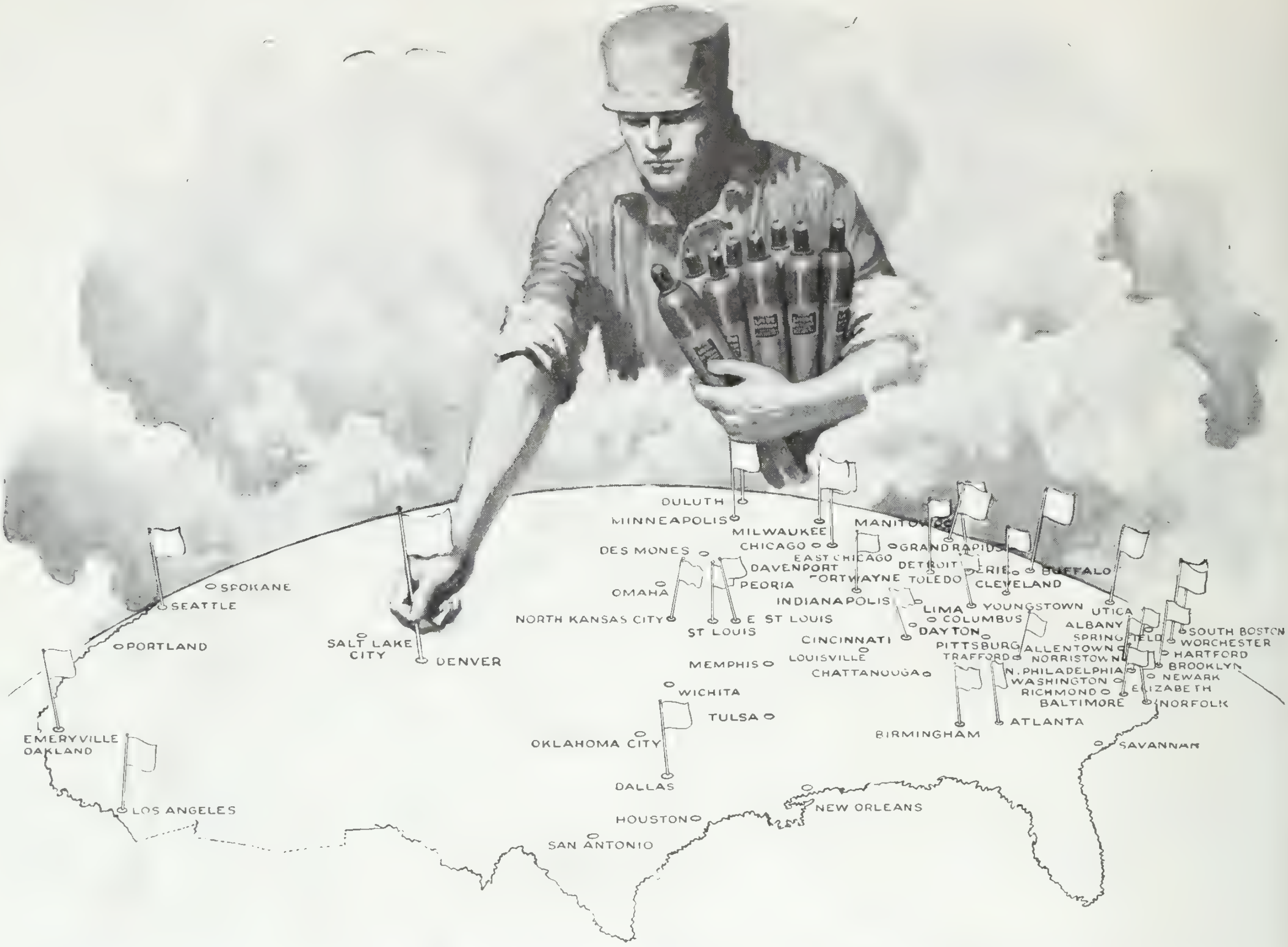

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Should the Distributing Station which regularly supplies you with Linde Oxygen disappear today—deliveries would continue as promptly as ever. Nothing can interrupt a service so broadly planned, so effectively organized.

Linde deliveries may be depended upon absolutely. They are as reliable as the uniformly high purity of Linde Oxygen.

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Pacific Marine Review

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From San Francisco to Japan, China, Philippines and Far East

S. S. Siberia Maru, 20,000 tons, 18 knots—sails July
S. S. Shinyo Maru, 22,000 tons, 21 knots—sails July 26
S. S. Persia Maru, 9,000 tons, 15 knots—sails August 10
S. S. Korea Maru, 20,000 tons, 18 knots—sails August 21

South American Line

Between Japan, Honolulu, San Francisco, West Coast Ports, Mexico, Central and South America to Valparaiso, Chile

[illegible]

S. S. Kiyo Maru, [illegible] August 22, 1920

SAN FRANCISCO OFFICE
625 Market Street Phone Sutter 3900

New York Office, 165 Broadway
HEAD OFFICE, TOKYO, JAPAN

Pacific Marine Review

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Pacific Mail—Under the American Flag Around the World

By A. H. Cathcart

THE Pacific Mail Steamship Company's flag has been so long and so prominently before travelers and shippers to the Orient that it has become associated in the minds of most with this service, and few know that as originally planned it was to be a mere coasting line. The Pacific Mail Steamship Company was established not for foreign trade, but to carry the mails from New York to Oregon, via the Isthmus of Panama, and California was to be merely a port of call.

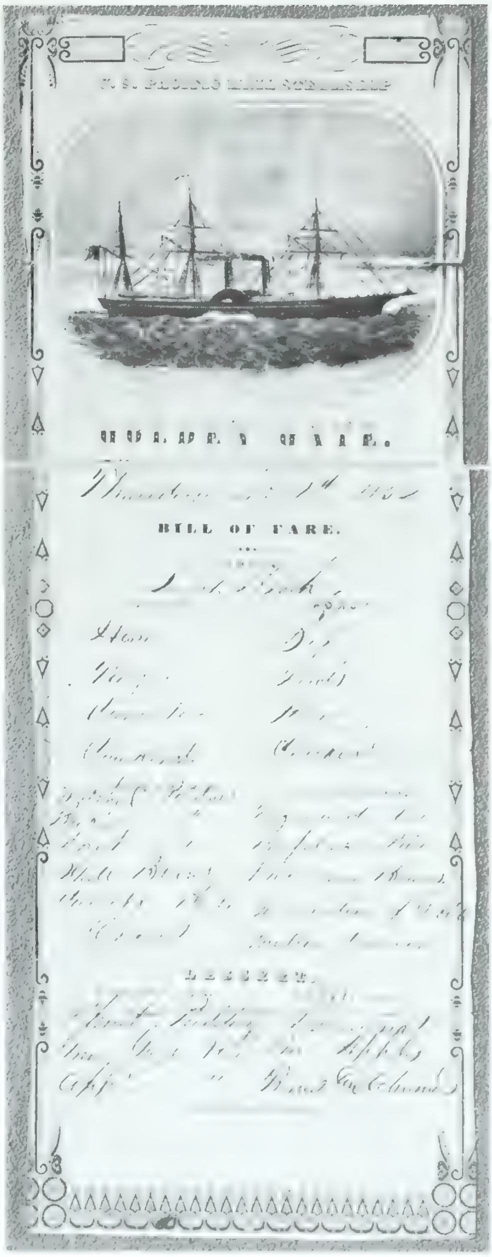
A Sack of Gold Dust

Alfred Robinson, a native of Massachusetts who came to California in 1829, on the American ship Brookline, and who had remained as agent for Bryant & Sturgis of Boston, returned east in 1843, carrying with him a sack of gold dust from the ranch of Abel Stearns of Los Angeles. Among the friends of Mr. Robinson in the East was William H. Aspinwall of New York, who listening to Mr. Robinson's description of California became enthusiastic over the business possibilities there.

Four years passed without Mr. Aspinwall entering the California trade, but in 1847, when Congress passed an act establishing a mail service between New York and Puget Sound, with San Francisco as a port of call, he saw the waited-for opportunity. The act referred to carried an annual subsidy of $200,000 and the contractors were to maintain a monthly service to Oregon and California. They were to build steamers under the government's supervision and these vessels were to be commanded by officials of the navy. Mr. Aspinwall secured the contract and, associating with him Gardner Howland and Henry Chauncy, incorporated on April 12, 1848, under the laws of the state of New York, the Pacific Mail Steamship Company.

Three Sidewheel Steamers

Immediately following the incorporating of the Pacific Mail Steamship Company three sidewheel steamers were ordered, the California, of 1050 tons, the Oregon, of 1099 tons, and the Panama, of 1087 tons. The California was completed first but before her sailing the rush of gold seekers caused Mr. Aspinwall and his associates to make San Francisco the northern terminus of the steamers in the Pacific, the mails to be forwarded thence to Puget Sound in sailing vessels.


BILL OF FARE.

The Bill of Fare served on the Pacific Mail Steamer Golden Gate on Thursday, December 9, 185[illegible]

The letter from Mr. Aspinwall to Mr. Robinson, confirming the latter's appointment as agent of the Pacific Mail Company and giving general instructions, is interesting reading at the present time:

"New York, Dec. 8, 1848.
N. 21—

"Alfred Robinson, Esq.,
"Dear Sir:

"Having explained my views to you verbally, as to your agency for the Steamers, I write this mainly to record our agreement that you are to receive Two Thousand dollars a year from the Company, as their Agent on the Coast of California, commencing from the 1st of January.

"To Get the Golden Price"

"I have to ask your kind aid & advice for Capt. Forbes—not only on the Coast but also at Panama, and also that you will use your best discretion for the benefit of the Company, in case you unfortunately find passengers disappointed by the non-arrival of the steamer. You may charter a vessel to send them forward or or pay their board at Panama or Taboga—should you deem it necessary though by agreement the passengers take all risks of non-arrival as their passage receipts will shew. I give you the alternative for the sake of the future good of the line—not expecting you will have to use it to the extent mentioned. If the steamer is in Panama & more passengers offer than can comfortably be accommodated an appeal from those likely to be left to Genl. Smith, Price Steenbergen & others who are berthed, would produce from the latter an expression of opinion which would justify Capt. Forbes in crowding a little. I have written him to land all that he could of machinery, ship chandlery & Hhd bread to make room for your stores & passengers' baggage. Capt. Forbes will shew you a list of his small stores provisions, etc., of which you may sell at high prices all that he will not require to take him back to Panama, where I order a supply left for him from the Panama & Oregon, & as he was provided for a year in most things he ought to have much to spare if anticipating at San

Sidewheel steamer John L. Stevens and Pacific Mail offices, San Francisco, 1872

Steamship Colorado at Pacific Mail docks, 1872

Francisco the supplies now on the way to get the golden price.

"I want the California to leave San Francisco on her return on the 1st of Feby. that if possible her letters may be in Washington by the 4th of March.

Mails for Oregon

"The mails for Oregon you will forward by the Belfast or Cayuga to the mouth of the Klamet river & if no one is there to receive them let them go on to Astoria—directing the Brig to return to you either with Coal from the Cowlitz river as a specimen or else a freight from Oregon City, as you may think best—choosing her consignees after making enquiries at San Francisco. From what I hear of the Cowlitz Coal it is very similar to the Vancouver's Island now on board the Belfast—but I wish much a cargo for trial. The Brig must bring mails in return or rather ask for them from the Postmaster.

"Mr. Van Voorhies, a passenger with you, will be able to give you some information about mails and I wish you to shew him all the civilities in your power. He goes out as agent of the Post Office Department.

Information of Puget Sound

"I send you an extract from a recent letter of Gov. Simpson showing the arrangements with the Hudson Bay Company for our future supplies of Coal & also one from him dated 13th April—containing information about Puget Sound which I promised to Gen. Smith. Please hand it to him taking a copy for your own guidance.

"You will remit us by the return of the Steamer consigned to us, through Zachrisson Nelson & Co, Panama—whatever you may have received from Capt. Forbes and passengers—in gold dust, sending by another opportunity a bill of lading for the same.

"I will write further on the subject by the Orus.

"I am sincerely
"Your friend
"Wm. H. Aspinwall
"Prest."

The California sailed from New York October 6, 1848, under command of Captain Cleveland Forbes, and making the passage of the Straits of Magellan, arrived at Panama to find hundreds of passengers who had been brought from New York to Aspinwall (the Atlantic port of the Isthmus) on the Falcon, a vessel put into service on the Atlantic to establish connection with the Panama-San Francisco steamers. The California arrived at San Francisco February 28, 1849, twenty-eight days from Panama, and was received with acclamation.

The Oregon was the second steamer to arrive and entered San Francisco Bay April 1, 1849, having among her pas-

Pacific Mail docks at First and Brannan Streets, 1872 sengers two hundred and fifty who had made the long voyage from New York through the Straits of Magellan. The Panama arrived in June of the same year.

Men Afterward Famous

The passenger lists of the first two steamers contain names of many of the men who afterward figured in the upbuilding of San Francisco. Among those carried in the California were De Witt Clinton Thompson, who commanded a California regiment in the Civil War; John Bigelow, first mayor of Sacramento; Rev. O. C. Wheeler, who erected the first Baptist church; Rev. S. W. Willey, founder of the State University; Pacificus Ord, judge and member of the constitutional convention; William Van Voorhies, first secretary of state; Rodman M. Price, member of the constitutional convention, later governor of New Jersey; William Pratt, surveyor general of California; Eugene L. Sullivan, collector of the port; Lloyd Brooke, one of the founders of Portland, Oregon; Alexander Austin, Asa Porter, Samuel F. Blaisdell, Henry F. Williams, Richard W. Heath, Robert B. Ord, William P. Walters, Edwin L. Morgan, Malachi Fallon, B. F. Butterfield, A. M. Van Nostrand, Charles M. Radcliff, Samuel Woodbury, Isaac B. Pine and Oscar J. Backus. Major General Persifer F. Smith and his staff also were on board.

The Oregon took on about five hundred passengers at Panama. Among those who first sighted the hills of San Francisco from her decks were John H. Reddington, Dr. McMullen, John McComb, Stephen Franklin, Ferdinand Vassault, George K. Fitch, A. J. McCabe, S. H. Brodie, John M. Birdsell and Joseph Tobin.

With Barely Enough Coal

With barely enough coal to last to San Blas the Oregon sailed on its return trip to Panama April 12, carrying back the first mail, treasure and passengers.

In the last ten months of 1849 the passenger business of the Pacific Mail aggregated 3959.

Hardly had the California cast anchor when the crew deserted, only one man, an engineer, remaining faithful. Mr. Aspinwall had foreseen this trouble and had secured a letter from the secretary of the navy to Commodore Jones authorizing the latter to furnish row guards and other protections necessary. The captain of the Oregon profiting by the experience of the California took his vessel to anchor under the guns of the man-of-war Ohio and asked that his crew be guarded until he was ready for sea.

The mails for Puget Sound, as stated, were to be forwarded from San Francisco, and the brigs Belfast and Cayuga were provided for this purpose. These vessels were to call at the mouth of the Klamut River and if there was no one there to receive them they were to go on to Astoria. The Hudson Bay Company, through its governor, Sir George Simpson, had arranged for the delivery of coal and also had written Mr. Aspinwall about conditions in the Puget Sound country recently taken over by the United States under the Northwestern Boundary treaty. This letter had been sent to Mr. Robinson with instructions to turn it over to General Smith, in command of the American army on the Pacific Coast.

Lieutenant David Porter

Mr. Aspinwall, in a letter to Mr. Robinson dated February 3, 1849, writes that "Lieutenant David Porter will take out the Panama, now ready for sea, but I do not think he will see you as he intends returning via the Isthmus." Lieutenant Porter did not leave the Panama at the Isthmus but continued to San Francisco as a passenger. This David Porter was the Admiral Porter of the Civil War. With Porter as a passenger on the Panama was Lieutenant-Colonel Joseph Hooker, later major general and known as "Fighting Joe."

As early as 1849 Congress was being urged to aid in the construction of a railroad across the Isthmus of Panama, but as Mr. Aspinwall wrote in one of his letters: "President-making and slavery were too engrossing to admit of attention being bestowed on this or any other matter of interest to California." Mr. Aspinwall went on to say that the Pacific Mail Company will take up the matter of improving the transit "so by next year at this time it will be accomplished in ten or twelve hours from sea to sea."

Railroad Across the Isthmus

Railroad transportation across the Isthmus was of too great importance, however, to await congressional action, and in 1850 the Pacific Mail Steamship Company started the construction of such a road, which after many delays, due principally to the excessive mortality among the working force, was completed in 1855 at a cost of $7,000,000. As soon as this road was in operation the time between New York and San Francisco was reduced to nineteen days.

Very soon after the American occupation of California there was agitation for overland transportation, but the Pacific Mail speedily furnished facilities which undoubtedly for a considerable period made an overland project seem visionary rather than practical.

Pacific Mail docks, San Francisco, today, as seen from an army balloon

During the early days of the Panama service regular calls were made at Monterey and San Diego. Under date of March 14, 1849, Mr. Aspinwall wrote to Mr. Robinson: "The steamers must touch for mails at Monterey and San Diego both coming and going." The importance of regularly monthly mail service being maintained between San Francisco and Puget Sound is also dwelt on in this letter.

The years between the arrival of the California at San Francisco and the outbreak of the Civil War were busy ones for the Pacific Mail Company. Its fleet was constantly being augmented by new vessels, each embodying the latest ideas in steamship construction. The New York-Panama-San Francisco service during this period was the most important factor in the development of the Pacific Coast of North America.

Confederates in a Plot

Confederate privateers were active in the Pacific, but there is no record of a Pacific Mail steamer being captured. In

San Francisco a group of Confederate sympathizers obtained letters of marque from Jefferson Davis authorizing them to prey upon the commerce of the United States and as a part of their scheme they planned to seize a Pacific Mail steamer. The San Francisco was the vessel selected for capture and the privateers intended to sail in her to the scene of the wreck of the Golden Gate, where another vessel was engaged in an effort to recover treasure from the wrecked steamer. The scheme came to naught, however, as the conspirators were taken in charge by a boat's crew of the United States sloop-of-war Cyane.

At the close of the Civil War trade expansion with the Orient was much discussed and the Pacific Mail with its large and well-equipped fleet was ready to do its share. Under a subsidy measure passed about this time by Congress the Pacific Mail Steamship Company entered into an agreement to maintain a monthly service between San Francisco and Hongkong. The sidewheeler Colorado of 3728 tons burden made the first sailing from San Francisco, January 1, 1867.

Flour for Hongkong

The Colorado's sailing was the occasion of a great celebration by the business community and the speakers in their glowing predictions of the future trade with the Orient, dwelt upon the enterprise of the Pacific Mail Steamship Company and the magnificence of the accommodations of its vessels. The Colorado carried as the chief part of its cargo 1000 barrels of flour and $560,000 in specie for Hongkong and a small amount of general cargo for Japan. Among the passengers were Governor Low, the president of the New York Chamber of Commerce.

In the first year under the subsidy five trips were made, and in 1869 the fleet was increased to nine steamers. The flour trade, which had shown shipments of 43,000 barrels in the first half of the sixties, for the last half recorded exports of 150,000 barrels. In 1872 a regular semi-monthly service between San Francisco and the Orient was inaugurated.

In 1873 the Pacific Mail Steamship Company sent out from the East the steamers Acapulco, Colima and Grenada, of 1759, 3836 and 2572 tons respectively. These vessels were followed at intervals during the same year by the City of New York, City of Panama, City of Rio de Janeiro, City of San Francisco and City of Sydney. These vessels, intended for the Australian and China trade, varied from 2000 to 2500 tons. The City of Peking and the City of Tokio, of 5800 tons, also were used in the China trade and their addition to the Pacific fleet attracted a great deal of attention, as they were the largest iron vessels built in the United States up to that time.

Service to Australia

During the year 1873 a regular service between San Francisco and Australia and one between the former port and Honolulu was initiated. The City of Sydney, City of New York, Zelandia and Australia were put on the Australian run and sailings were made every twenty-eight days from each end. This service was continued until 1886, when the vessels were taken off the run. It is interesting to note that when this line was first established the cargoes to Australia were made up largely of apples and blooded sheep, door-frames and sashes.

The Costa Rica was assigned to the San Francisco-Honolulu run, but after five round trips was wrecked, no more regular sailings being made until 1878, when a monthly service was established.

In the decade 1860-70 the company constructed or purchased sixty passenger-carrying steamers, each the acme of ship construction of the time. The imports from Japan had increased to $15,800,000 at the end of 1876, and from China to $21,000,000 in 1880. In 1872 the city of Peking and the City of Tokio cut the time from San Francisco to Yokohama to sixteen days. The steamers San Jose, San Blas and San Juan were added to the Panama trade in 1883.

Fleet and Docks Increased

The increasing trade with the Far East and Central America was met by the Pacific Mail Steamship Company with an increase of ships and docking facilities and in every way the company maintained its high reputation. The capital stock had been increased at different periods and in 1866 it was $20,000,000 and was selling at 100 per cent premium.

In 1893 the control of the Pacific Mail Company passed into the hands of C. P. Huntington; and during his administration and that of E. H. Harriman, who obtained control after Mr. Huntington's

Pacific Mail steamship City of Peking sailing for the Philippines with the First California back in '98 death in 1903, the trans-Pacific service was increased by the steamers Korea and Siberia, each of 18,000 tons displacement and a speed of 21 knots. These vessels were 572 feet long. In 1905 the Mongolia and Manchuria, each of 27,000 tons displacement, were placed on the run.

Old Service Discontinued

In 1915 the Harriman management, alleging its inability to operate its ships profitably under the act of Congress known as the La Follette Seamen's Act, sold the Mongolia, Manchuria, Korea, Siberia, Persia and China, discontinuing its trans-pacific service. The officers of the company in the Orient were closed and the house flag of the Pacific Mail, which since 1867 had been synonymous of American enterprise, disappeared from the Far East. The San Francisco-Panama service was continued.

The news that the Pacific Mail had withdrawn from the Orient was a shock to all, and immediately action was taken by individuals and commercial bodies looking toward the restoration of this trade. The American International Corporation and W. R. Grace & Company were interested and a reorganization of the Pacific Mail Steamship Company was soon effected with George J. Baldwin, senior vice-president of the American International Corporation and chairman of the board of directors of the New York Shipbuilding Corporation, as president, and John H. Rosseter, vice-president of W. R. Grace & Co. and president of the Sperry Flour Company of San Francisco, as vice-president and general manager.

Three Dutch Vessels Bought

The ability of Mr. Rosseter as an organizer was soon apparent. Although it was in the second year of the great war that he was called on to secure ships and rehabilitate the Pacific Mail, he soon had three fine passenger liners, the newly-built Dutch steamers Ecuador, Venezuela and Colombia, of 14,000 tons, on the old trans-Pacific run; and the San Francisco-Panama run was given new life.

Mr. Rosseter, however, did not stop there. His is not the mentality to be content with restoring the old service; he saw the ships of his line receiving and discharging cargoes in the ports of the Seven Seas, and carrying passengers to and from all countries.

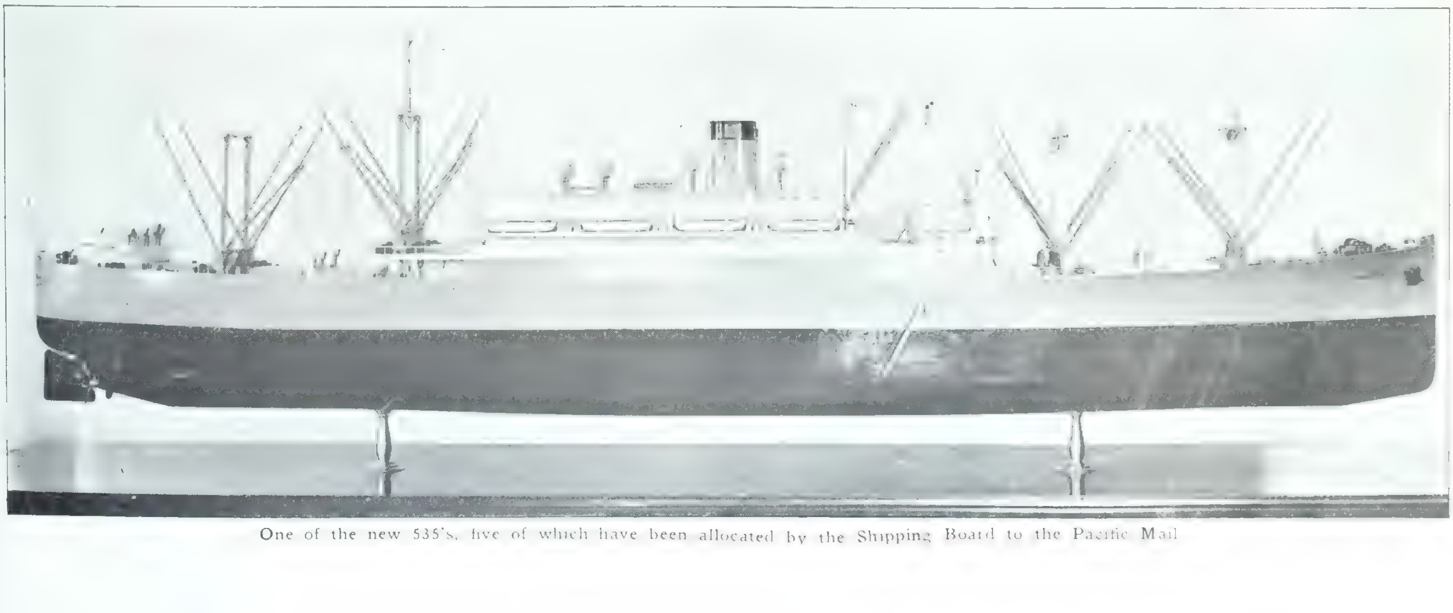
J. H. Rosseter, vice-president and general manager, Pacific Mail Steamship Company

Understanding the importance of direct communication between the United States, the Philippines and East Indies he established the Manila-East India service, with ships calling at Honolulu, Manila, Saigon, Singapore, Calcutta and Colombo. Soon after, he had Pacific Mail steamers sailing from San Francisco to Baltimore and return, calling at San Jose de Guatemala, Acjutla, Corinto, Balboa, Cristobal, Puerto Colombia, Havana and Baltimore.

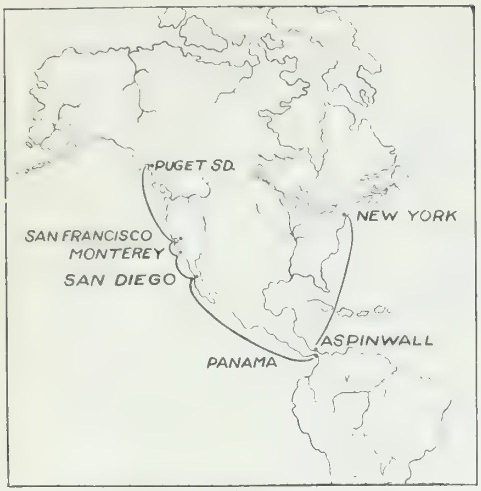
'Round-the-World Service

Another step forward was taken when a 'round-the-world service was put in operation, with new steel steamers of 8800 deadweight tons, and carrying 9200 measurement tons of cargo. Agencies were established at Alexandria, Egypt; Marseilles, France; Barcelona, Spain, and calls are made at Honolulu, Yokohama, Kobe, Dairen, Tientsin, Shanghai, Manila, Saigon, Singapore, Calcutta, Colombo, Bombay, Alexandria, Bizerta, Marseilles, Barcelona and Baltimore, thence to San Francisco.

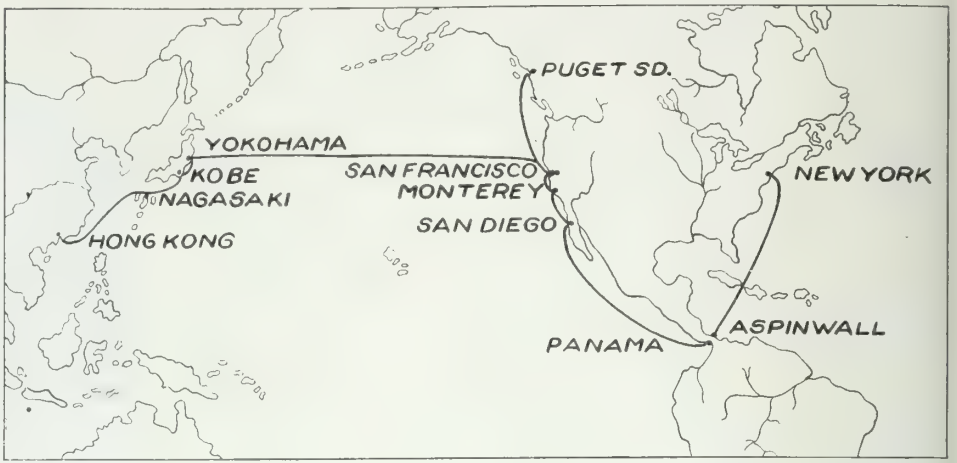
Eight freighters are operated as a feeder service between Shanghai, Hongkong and Colombo. Ten-day sailings are maintained and freight is transshipped in



One of the new 535's, five of which have been allocated by the Shipping Board to the Pacific Mail



Pacific Mail Lines in 1848



Services of the Pacific Mail in 1867

connection with the trans-pacific service. Calls are made at Shanghai, Hongkong, Saigon, Singapore, Penang, Rangoon, Calcutta and Madras.

In the Face of Obstacles

Such is a brief summary of the activities of the Pacific Mail Steamship Company under Mr. Rosseter's management. He has demonstrated what enterprise and courage can do in competition for world trade. He has shown that, in the face of many obstacles, the American flag can be carried to the ports of the world.

The United States Shipping Board has recently assigned to the Pacific Mail Steamship Company five of the new State-class liners, and their delivery is expected in the autumn. They will be put on the trans-Pacific run calling at Honolulu, Yokohama, Kobe, Shanghai, Hongkong and Manila. These five will be followed within a short time by three more, which will be put in the San Francisco-Manila-East India service.

The New 535 Vessels

These steamers, generally known as 535's, which figures represent their length in feet, are of 12,600 deadweight tons; are of the flush deck type, with a beam of 72 feet, and depth to shade deck of 50 feet; the draft is 30 feet 6 inches; and free-board, 19 feet 6 inches. The hold will have a cargo capacity of 11,000 tons deadweight. Eight hatches have been provided (four, 19 feet wide by 30 feet long; two, 19 feet wide by 24 feet long; two, 19 feet wide by 18 feet long), permitting a quick turnover of cargo.

Fuel oil-burning watertube boilers and turbines give a total shaft horse power of 12,000. The fuel oil tanks have a capacity of 3290 tons, which gives a steaming radius of 11,700 miles at 17 knots. In other words the steaming radius is ample for the round trip, San Francisco-Yokohama, either direct or by way of Honolulu, and is sufficient for the round trip San Francisco-Hongkong or Straits Settlements, with a partial fueling at either Manila or Honolulu.

249 in the First Cabin

The vessels are provided with accommodations for 249 first-class passengers, these quarters comprising two suites on the bridge deck, thirty-one rooms on the shade deck and sixty-one on the shelter deck. The suites and single rooms are large, well ventilated and most comfortably and attractively furnished.

Three hundred third-class passengers can be carried in quarters that are unusually comfortable and well equipped.

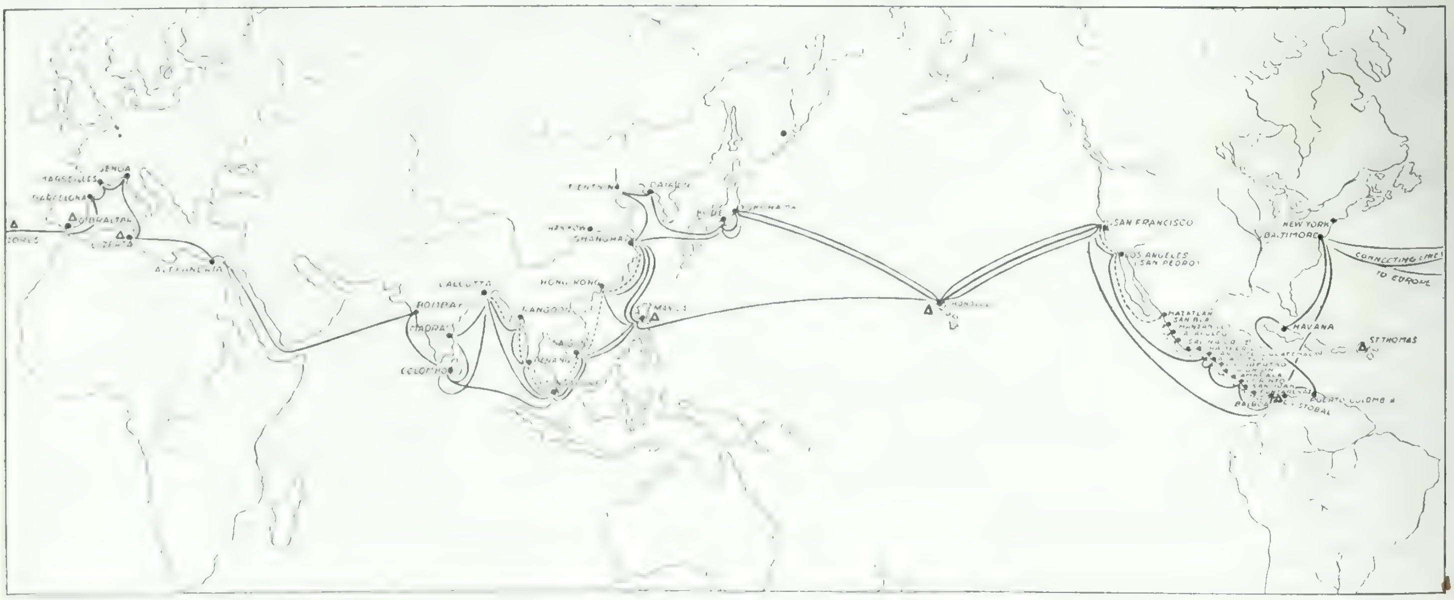
In placing these vessels on the Pacific runs the Pacific Mail expects to bring Manila within sixteen days of San Francisco, a service that is of importance to the trade with these islands. The run to Singapore will be made in twenty-five days and to Calcutta in thirty-five.

Served by Faithful Men

In closing this sketch of the activities of the Pacific Mail Company, activities that have been of almost incomparable value to the Pacific Coast and the United States at large, a few words must be said of the organization in foreign ports and of the commanders, officers and crews of the vessels afloat.

Since 1867 experienced Americans have represented the Pacific Mail in the ports of the Orient and they have accomplished much in upbuilding and protecting American foreign trade and influences.

The officers of the ships have been of the best type, trained in the trade and of the highest efficiency and integrity. Their ability, tact and untiring diligence in the performance of their duties; their courage and resourcefulness have many times been tried in the white heat of emergency and to the honor of the flag under which they sail, they never have been found wanting.



Trade routes of the Pacific Mail. On this map are shown the following services: trans-Pacific; Manila-East India; Shanghai-Hongkong-Calcutta; San Francisco-Baltimore, San Francisco Panama; and round-the world. The Shanghai-Hongkong-Calcutta, San Francisco-Baltimore and around-the-world services are freight only. The triangle indicates fuel oil stations.

The Moore Shipbuilding Company

Waterfront, Moore yard, 1913

WHEN the great destruction of vessels began early in the war, new shipbuilding yards were founded and old-established plants increased their equipment so that the lost tonnage might be replaced. Especially after the declaration of war by the United States and the beginning of the program of the Emergency Fleet Corporation, the world witnessed a most remarkable expansion of shipbuilding in America: scores of new yards went up almost overnight and the tonnage constructed surpassed that of any other like period. Even then, however, shipping authorities realized that all the plants called into existence or greatly enlarged by the war emergency could not be expected to survive the signing of peace; and, on the part of the onlookers, there was speculation as to which yards would endure. Many of the builders realized that their business would not be permanent; others, however, determined that, having been firmly set on their feet by the war, they would intrench themselves against dislodgment when peace came.

Among the latter was the Moore Shipbuilding Company, of Oakland. Before the outbreak of the war, the Moore & Scott Shipbuilding Company was a going concern; although small, it was in a position to take advantage of the demand for tonnage. Early in 1916 a reorganization was effected and the Moore Shipbuilding Company was formed. During the war it grew steadily, launching more and more vessels with each month, until, on December 20, 1919, it set a world's record by launching, in less than sixty minutes, six vessels of an aggregate deadweight tonnage of 58,200. Throughout the building for the war emergency, the yard management had worked with an eye to consolidating its position in peace times, with the result that 1920 finds the Moore Shipbuilding Company in a situation of assured strength, with ten ways (two of which will be dismantled to make room for a new floating drydock), adequate repair facilities, and an excellent yard organization and high efficiency. The accompanying illustrations, however, will show more clearly than any narrative what progress has been made since 1913.

More Improvements Planned

Remarkable as the growth of the yard has been in the last seven years, there is no tendency to rest on laurels earned; the policy of the management is toward constant improvement and expansion. The drydocking and repair facilities have been increased rapidly; there have been interesting developments in new machinery and labor-saving devices designed by Moore employes; and plans are being formulated for the building of large marine Diesel engines.

Preliminary negotiations with Burmeister & Wain of Copenhagen looking toward exclusive Pacific Coast rights for the manufacture of Burmeister & Wain Diesels have been completed; and with the intention of closing the contract, George A. Armes, president, and R. S. Moore, chairman of the board, departed in June on a trip to Copenhagen and other European cities. When the contract has been signed, the Moore yard immediatey will begin the construction of new shops: a machine shop, 150 by 700 feet; a pipe and copper shop, 50 by 450; a foundry, 150 by 450; and a yard, 100 by 450. These new works will cost between $3,000,000 and $3,500,000, and will employ 2000 or 2500 additional men. In these shops one large marine Diesel could be built each month.

Standard Diesel Vessels

The yard's program is for specializing on standard Diesel-engined ships of 7100 and 9400 tons deadweight; and in general to develop a policy that is somewhat of an innovation on the Pacific Coast, but which has been employed elsewhere with marked success—that of building for its own account.

On their trip Messrs. Moore and Armes will visit Diesel engine plants besides that of Burmeister & Wain, among them the Busch-Sulzer factory, St. Louis; Werkspoor, Amsterdam; McIntosh & Seymour, Auburn; and Harland & Wolff, Belfast. It is interesting to note that Mr. Moore, when he was with the Risdon Iron Works twenty-one years ago, went East to test one of the first Diesels seen in the United States.

Largest Marine Railways of World

In its repair equipment the Moore yard has been going ahead quite rapidly. It now possesses some of the largest marine railways of the world, an inspection of which will alter the conceptions of those who had regarded that type of drydock as adapted only to smaller vessels. Moreover, the yard purchased the floating drydock of Skinner & Eddy, Seattle, and towed the five pontoons to San Francisco. To the five will be added three more, now building at the yard; and the eight will have a lifting capacity of 24,000 tons (3000 tons to the pontoon); each being 90 feet long.

Of the marine railways, No. 3, the oldest, has handled a vessel of 4400 tons' weight; the capacity of No. 2 is from 6000 to 7000 tons; and that of No. 1, from 6000 to 7000. This last will be in operation about August 1. Its length is 420 feet; that of No. 2, 379 feet; and of No. 3, 360 feet.

No. 2 railway lifted the concrete tank steamship Palo Alto June 18, the weight being no less than 7000 tons. In all respects the operation was successful.

Constant Search for Quicker Way

Radical methods characterize the shop practices of the Moore yard. Innovations are being made constantly, all looking toward increased efficiency. In some respects the Moore yard uses these new methods in common with other plants of the Pacific Coast; and still other special methods have been developed by the Moore yard. By "radical methods" is meant, not departures from standard methods of con-

By 1919 all the old structures had been replaced struction, but improvements in the means employed, so that results are obtained more quickly and efficiently. Consequently, upon this forward-looking policy, the Moore yard is visited frequently by engineers from Eastern yards.

One striking example of the use of new methods is found in the boiler shop. For upsetting the ends of boiler tubes the mill asked $3 each. By employing a special die in the hydraulic press, the Moore yard is enabled to do this work at a cost of 40 cents a tube, or less than one-seventh of the mill price. With the same set of dies stayrods also are upset, the dies having slots of different sizes capable of taking stayrods, ranging from 2 to 4 inches in diameter, and tubes from 2½ to 3½ inches. Approximately the same time is required for upsetting a 4-inch stayrod as a 2½-inch tube, handling of the pieces being the greatest single factor of the operations.

Boiler Plate Drilled Flat

In common with some other Pacific Coast yards, the Moore plant drills boiler-shell plate on the flat, instead of waiting until the plate has ben put in place on the boiler. Three plates are drilled at one time, a fourth being used as a pattern; and thus the plant eliminates layout-out and much handling, in addition to attaining a vastly greater speed. Despite careful measurements (inspectors were hot on the trail when this practice first was adopted) no noticeable distortion of the holes has been discovered after rolling. Plates for smaller boilers, such as those six feet in diameter, are rolled before being drilled. The smallest plate drilled on the flat has been for boilers 14 feet 9 inches in diameter.

Boiler heads also are flanged and drilled before being put in place—another departure from the usual practice. The saving that results from this (the labor of putting the heads on and drilling them in place) is approximately 50 per cent. Before the heads are flanged, while they still are straight, six are drilled in one operation, a seventh being used as a pattern; and so with butt straps. Sixty per cent of the time required for drilling straps by the old method is saved. Nuts of mainstay braces are turned down on the drill press instead of in a lathe; they are faced on the surface, on the outside and countersunk in one operation, in one-third the time required for a lathe to do the same work. Boiler legs are stamped out in one blow under a hydraulic press fitted with a special die designed at the Moore yard; and the legs are heated with gas and fitted to the shell while still hot, so as to eliminate chipping and filing. Staybolt holes in the heads, shell and combustion chamber are drilled on the flat before the boilers are put together; and the combustion chambers are staybolted and assembled so that they can be put into the boilers complete.

Handling Steel by Motor Truck

What expedition of production is attained may be seen in the building of boilers for the oil-tanker Vacuum. Rivet material was received March 25; plates not until April 10 (and some plates were moved by truck from Sacramento when the railroad cars bearing them were delayed by a strike); the first boiler was tested May 10; the second May 14; the third May 15; all were in the ship May 16; steam was raised May 26; the Vacuum was given her dock trial May 28; her official trial May 29; and was turned over to her owners that same day.

Concrete steamer Palo Alto pulled out on Marine Railway No. 2 at the Moore Shipbuilding Company. These marine railways were designed by Leland S. Resener.

Following the general system as outlined, 114 boilers have been built in the Moore shop without one plate having been spoiled. With about 325 men engaged in boiler work, the Moore shop builds about twelve boilers a month. In addition to building boilers, the Moore shop builds tanks, masts, derrick posts, breachings, uptakes and other hull parts, about 100 men being employed on this work.

Pitchometer for Propeller Blades

In the machine shop are two interesting devices, both of which were invented and developed by Moore employes. These devices are a pitchometer for measuring the pitch of propeller blades, and a machine that reduces the cost of testing valves by about 75 per cent. Both were invented in the yard.

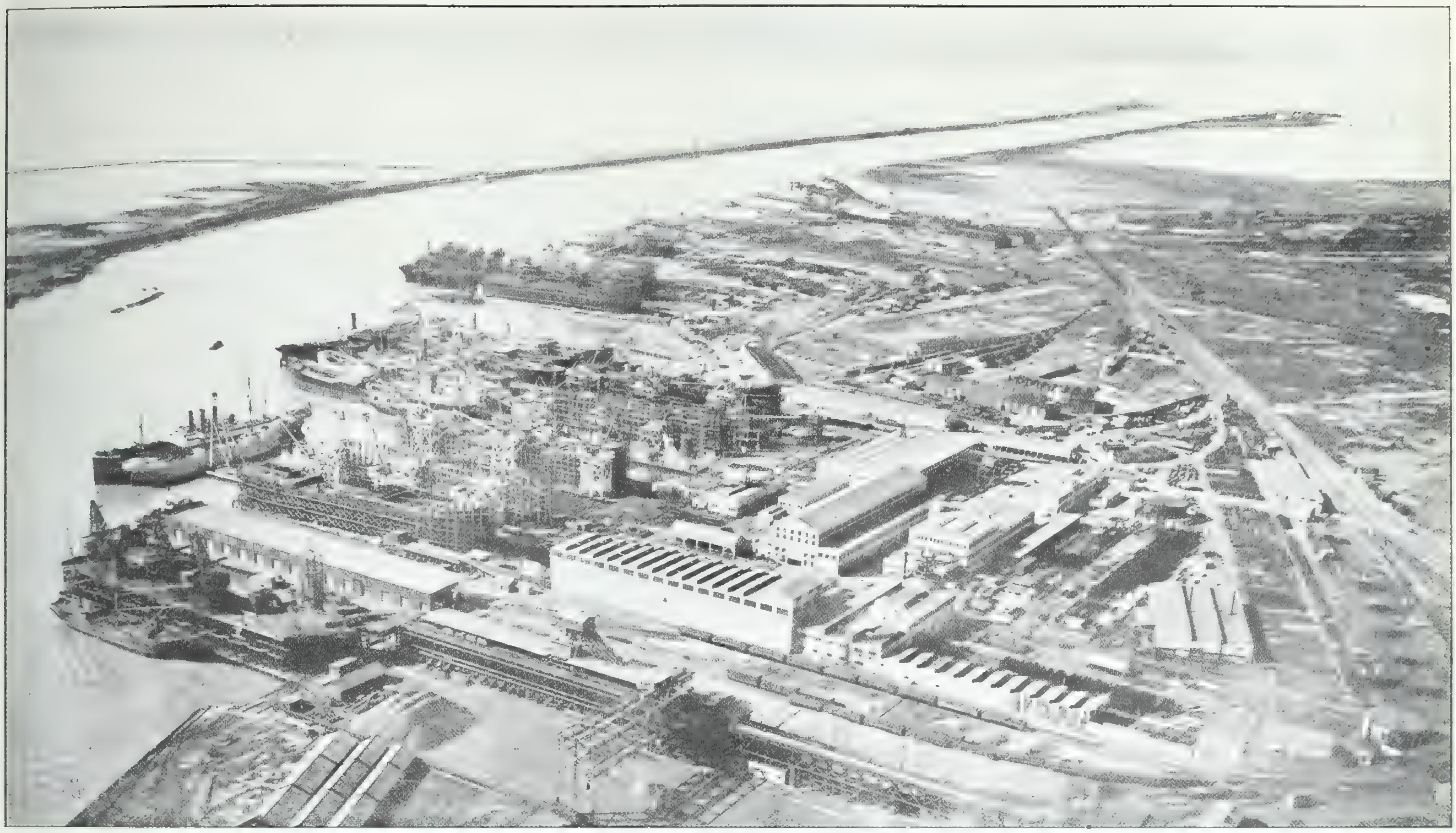
In the forge shop a mining drill sharpener has been adapted to a wide range of work, such as making deck pads; upsetting the ends and middle of rail stanchions; making buttonhead, countersunk and patch bolts and rivet tongs, the feet of detachable stanchions; and, in short, anything that requires an upset end up to two or three inches of metal, the remaking of bolts included. To accomplish these different ends with the machine required only the manufacture of special dies.

The use of gas for varied work has been developed to a high degree. Articles by Letson Balliet in Pacific Marine Review have described in detail the use of gas for rivet-heating; but this is by no means the only employment of gas.

Oxidation in Furnace Reduced

A down-draft furnace for heating steel rods for rivet-making has been found successful in reducing oxidation to a minimum. Inasmuch as an oil-burning furnace must have an excess of oxygen, the loss in scale was great, approximately 3 to 3½ per cent of the original weight of the rods; although the yard's experience is that an oil furnace is cheaper than gas if nothing but the heat unit value is considered. When other elements are weighed, however, such as the condition of the finished product, the scale loss and the cost of compressed air for spraying oil, then gas is discovered to be an economical fuel.

In the beginning a gauge pressure of 1½ pounds for the furnace was maintained; this eventually will be supplanted by a pressure of 2½ pounds. One cubic foot of ordinary illuminating gas is mixed with 1.6 cubic feet of air, which gives a non-combustible compound; and to this is added 3.5 cubic feet of air drawn in by the Bunsen burners, the final mixture being one foot of gas and 5.1 feet of air. This is regarded as being completely combustible, so that, if the furnace could function mechanically perfect, it would be non-oxidizing. The downward draft is through a perforated tile floor, on which are laid the rods; the metal, through this arrangement, being heated from all sides. In order to obviate oxidation from air entering the opened door, the furnace is four feet longer than the rods, the result being that most of the air entering at the feed door is drawn down through the tiles and out the stack without passing full length over the rods. And not only does the furnace reduce oxidation greatly, but it also



An airplane view of the Moore yard

has proved itself a labor-saving device, inasmuch as, on the third night of operation, the output of rivets of a gang was between eight and nine tons, or an increase of 60 to 70 per cent over normal. This feat was possible because virtually the undivided attention of the men can be given to rivet-making, since the furnace requires little attention.

City Gas Used for Cutting

Ordinary city gas also has been used successfully in cutting of steel. In perfecting this process much pioneering was necessary.

As one immediate result of substituting gas for coke in heating rivets, one powerhouse has been dismantled and the number of compressors in use has been reduced from fifteen to eight, effecting a saving, on the basis of 300 fires, of $1800 a day in power, reduced scale and burned rivet loss, labor in handling coke, etc. The yard generates its own acetylene; and uses this gas and oxygen directly from the bottle only in remote corners of the yard; for work elsewhere, eight or ten bottles of oxygen are discharged into a manifold at the same time, which obviates much handling of bottles and also assures the complete drainage of their contents. In each group there are three manifolds, and groups are placed at convenient spots about the yard.

One other use is made of city gas in preference to oil—that of tempering tools and liners.

$30,000 a Month Saved

A saving of $30,000 a month is being effected by the salvage department. What it has been able to do, at a relatively small cost, is evidenced by the report for May:

Scrap sold—common, 1,193,240 pounds; cast steel, 29,940; cast iron, 12,230; pipe and fittings, 46,480; sheet metal, 5400; a total of 1,287,290 pounds. Materials returned to the yard were: nuts, bolts and washers to the sorting table, 364,000 pounds; brackets, clamps, turnbuckles and cable to the shipwrights, 19,750; fittings and pipe to the pipe shop, 46,675; valves and castings, 5825; brass, copper, lead, castings and sheet packing to the storeroom, 8310; brackets and iron to the blacksmith shop, 6475; hand tools, 6310; rods, 4485; ladders, 1075; plate, 25,225; and miscellaneous material, such as 120 bottle tops, five air motors and six gas forges. The grand total of pounds handled was 1,775,420, at a cost for labor and truck of $853.16.

Salvage of Bolts

An ore-sorting table is used for separating the piles of nuts, bolts and washers. Along this endless belt are stationed men, each of whom recovers only a certain kind of bolt or nut. The nuts and washers are strung on wires as they are retrieved; and the bolts go to threading machines. For those bolts that are worn badly a process has been developed and found to be successful; and, when new equipment has been installed, another considerable saving will be effected. This reclamation will consist of sending the bolts to a drill-sharpening machine, which upsets the ends after the old threads have been stripped; after which the bolts will be rethreaded and will emerge as good as new, having lost in the process only one-fifth to one-half inch in length.

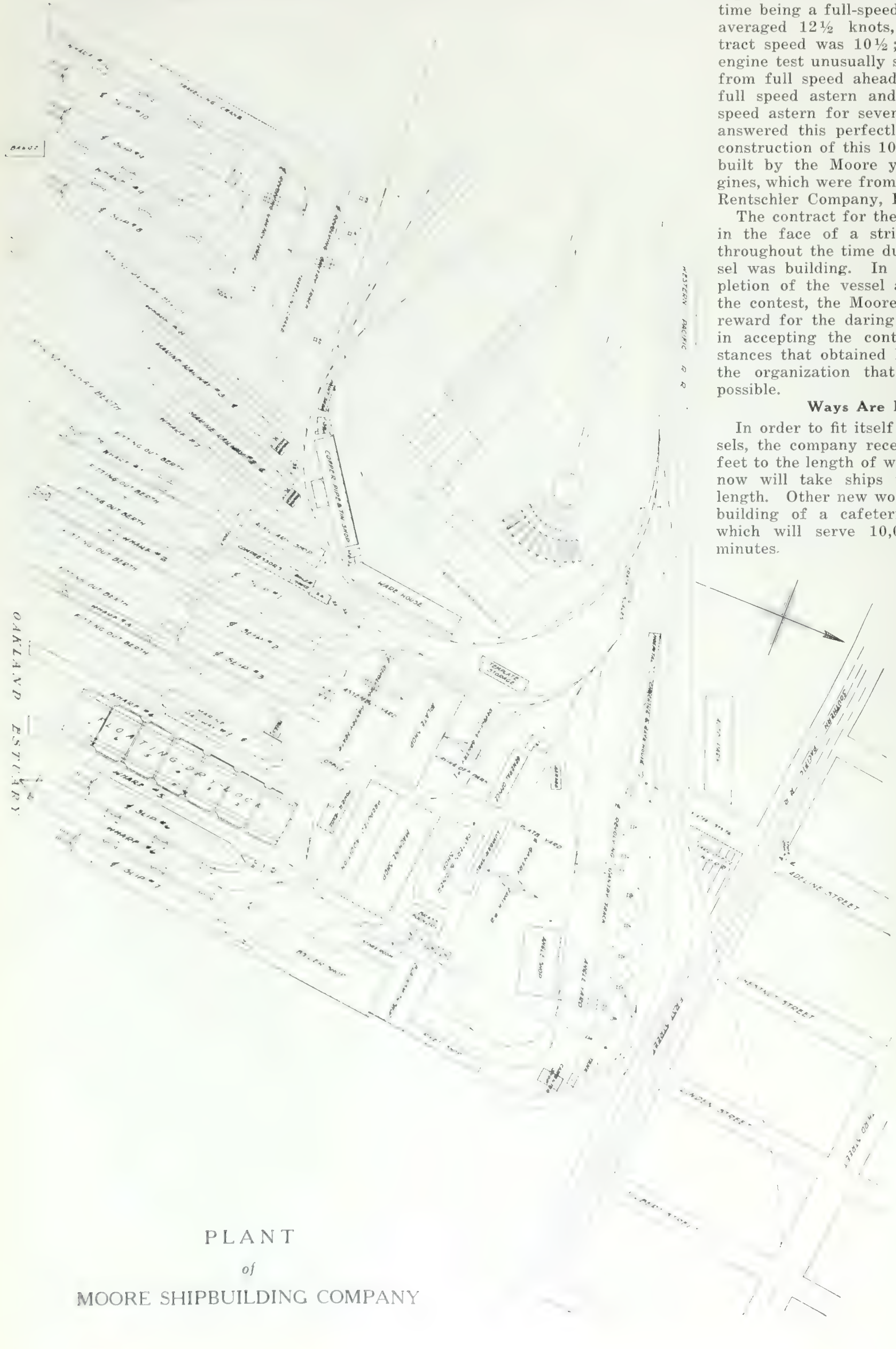
4.17 Cents on Each Bolt

In a yard that uses thousands of bolts the savings made possible by this system are great. For example, a bolt ¾ by 4 inches has a scrap value of about ½ cent. The cost of reclaiming in cents is: loss in shortening, .4; stripping, labor cost, .45; upsetting, labor cost, 1; threading, labor cost, 1/8; fuel, 1/24; air, 1/24; power, .009; lubricant, impossible of estimation, but very small; making a total cost of reclamation of 2.63 cents, as against a scrap value of .5 and the cost of a new bolt of 6.80 cents. The ultimate scrap value remains in the yard, it is held, so that the saving on each bolt is 4.17 cents.

Conservations such as these are possible only where the operations can be on a large scale; but there scarcely is a shipyard in the country, great or small, that could not employ some such system. And in other ways the Moore yard has its eye on the little things that make large aggregates — for example, in the burning of scrap wood under boilers, whereby a saving of about 1600 gallons of fuel oil costing $1.63 cents a barrel is made daily, which, expressed in dollars and cents, is about $62, or $18,000 a year.

Won With the Vacuum

Close attention to details has bred a marked efficiency in the Moore yard and has made possible such records as that of the oil-tanker Vacuum, constructed for the Vacuum Oil Company in competition with the Sparrows Point plant of the Bethlehem Shipbuilding Corporation, which had a contract for a sister ship. The keel of the Vacuum was laid January 7, as against December 31 for the vessel building at Sparrows Point, but in this particular the Moore yard had gained slightly, as its contract was let about two weeks after that of Bethlehem. The Vacuum was launched May 1, and was delivered at 5 o'clock in the afternoon of May 30, 113 working days after the keel was laid. On her trial May 29 she made a continuous run [illegible]



General plan of the Moore yard, as it will appear after the floating drydock has been placed in its permanent location. Two building ways will be dismantled to make room for the dock.

PLANT
of
MOORE SHIPBUILDING COMPANY

8 o'clock in the morning to 11 o'clock at night, seven and one-half hours of this time being a full-speed, full-load test; she averaged 12½ knots, although the contract speed was 10½; and was given an engine test unusually severe: of reversing from full speed ahead, 76 revolutions, to full speed astern and continuing at full speed astern for seventeen minutes. She answered this perfectly. All elements of construction of this 10,000-ton vessel were built by the Moore yard except the engines, which were from the Hooven, Owens, Rentschler Company, Hamilton, Ohio.

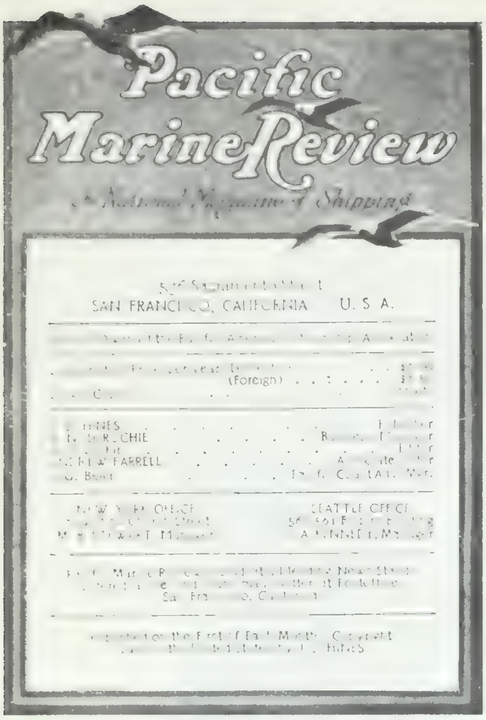
The contract for the Vacuum was taken in the face of a strike, which persisted throughout the time during which the vessel was building. In the successful completion of the vessel and the winning of the contest, the Moore yard has found its reward for the daring of its management in accepting the contract under circumstances that obtained last winter, and for the organization that made the victory possible.

Ways Are Enlarged

In order to fit itself to build larger vessels, the company recently has added 100 feet to the length of ways 9 and 10, which now will take ships up to 550 feet in length. Other new work under way is the building of a cafeteria, 90 by 60 feet, which will serve 10,000 men in thirty minutes.

A. P. HAMMOND

Pacific Coast manager Luckenbach Steamship Co., Inc., San Francisco


Pacific Marine Review
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San Francisco, California

ALL ABOARD

WHILE there are a great many differences of opinion as to some of the clauses in the Merchant Marine Act, there can be no doubt in the mind of any shipping or shipbuilding American that this act represents a very decided step in advance by Congress in a sincere effort to promote the welfare of the American merchant marine. The act is by no means perfect, but in many respects it is the most far-reaching and powerful measure ever passed by Congress, and the shipbuilding and shipping interests may congratulate themselves upon the fact that this measure is very evidently backed up by an almost unanimous public opinion. This is shown very markedly by the way in which the measure was put through at the eleventh hour in a belated session of the Senate just prior to a presidential primary.

An enlarged, reorganized Shipping Board is given greatly increased powers, and if proper choice is made by the President for the membership of this board it should be able to prove of great usefulness to the country and to the merchant marine. In this connection it is much to be regretted that in dealing with Section 3 of the "Shipping Act, 1916," the following clause was not amended: "Each commissioner shall devote his time to the duties of his office and shall not be in the employ of or hold any office relating to any common carrier or other person subject to this act, nor while holding such office acquire stock or bonds thereof or become pecuniarily interested in any such carrier."

It has always seemed to us that the Shipping Board should be composed of men who had proven themselves able to make good as operators of American ships and it is hardly fair to such men to require that they should dispose of all of their interests in shipping before they can become eligible as Shipping Board commissioners. This clause works injuriously to the personnel of the Shipping Board at both ends, so to speak. Practically every man who is intensely interested in shipping and is "of peculiar fitness" for the management of ship operation, will be either actually engaged in the shipping business or connected therewith in some manner. If we must choose our shipping commissioners from men who are ignorant of the shipping business, it will be necessary for them to thoroughly learn that business before they are of much use to us as Shipping Board commissioners. When they have thoroughly learned the business and possessed as they must be of unusual executive ability, they will be very greatly in demand by large shipping companies at salaries greatly in excess of $12,000 a year, and we will find ourselves with the same kaleidoscopic conditions of change in Shipping Board personnel that we have had during the last three years.

The essential idea, however, of the act is, as our caption expresses it, that the American merchant marine is now embarked on a program which has been definitely established by Congress and which contains many clauses that are decidedly helpful to both shipping and shipbuilding. Principal, among these, are the definite instructions to the Shipping Board that the government-owned ships shall be sold to private capital "as soon as practicable," and at prices which are left to the discretion of the board.

Ships engaged in foreign trade have their earnings exempted from war and excess profits taxes for ten years. The amount of this exemption is pledged to the building of new vessels and the shipowners must add to it twice as much capital of their own.

The Ship Mortgage System provided under the act gives assurance to investors in ships that their interest will be protected. There is also a definite official recognition of the American Bureau of Shipping as an official classification society for Shipping Board-owned ships and there are clauses which will be very helpful for American marine insurance. The bill authorizes a liberal rate of pay for the transportation of trans-oceanic mail. It also authorizes the Shipping Board to set aside each year a considerable amount of the proceeds of the sale and operation earnings of its ships to form a fund from which loans will be made to shipowners for the construction of new vessels of approved types.

Two features of this bill viz., those relating to the restriction of export and import railroad rates to freight carried in American ships and to the extension of the coastwise clause to include the insular possessions of the United States, have been the subject of a great deal of controversy on the Pacific Coast and have raised considerable protest from the shipowners of other nations.

Under Section 22, "foreign built vessels admitted to American registry, owned on February 1, 1920, by persons citizens of the United States, and all foreign built vessels owned by the United States at the time of the enactment of this act, when sold and owned by persons citizens of the United States, may engage in the coastwise trade so long as they continue in such ownership, subject to the rules and regulations of such trade." This section is so important to American shipowners and to prospective purchasers of vessels built in Japan and China for the United States Shipping Board, that a survey of the former laws is necessary to make clear what changes have been made.

Foreign - built vessels found American registry virtually impossible of attainment prior to the passage of the Panama Canal act of August 24, 1912. The only vessels, other than those built in American yards, admitted to registry were: prizes of war; two vessels belonging to the American Line, which were granted registry on condition of the line building two sister ships in American yards; ships wrecked on any coast of the United States, purchased by American citizens and repaired in an American yard at a cost at least three times the appraised salvage value. Besides ships in these classes there were a few, among which was the China, that gained American registry through the annexation of Hawaii.

Section 5 of the Panama Canal act admitted to American registry foreign-built vessels not more than five years old, owned by Americans, but closed the coastwise trade to them. The ship registry act of August 18, 1914, removed the age limitation. By the act approved October 6, 1917, the President was authorized to permit foreign vessels and American-owned foreign-built vessels, for the period of the war and 120 days thereafter, to engage in the coastwise trade, Alaska excepted. This act, however, merely authorized a suspension of the coastwise laws and did not in the least alter the permanent status of vessels built in foreign yards. That is, without the provisions of Section 22, Jones act, none of the foreign-built vessels acquired since 1912 could have engaged in the coastwise trade permanently, whether coastal, intercoastal or insular.

One concession is made to Hawaii, in that the Shipping Board is authorized to issue permits for the transportation of passengers in foreign ships between Hawaii and the Pacific Coast up to February 1, 1922.

By Section 22 the coastwise laws from and after February 1, 1922, are extended "to the island territories and possessions of the United States not now covered thereby." The principal effect of this provision is to close the Philippine trade to foreign vessels; but "the foregoing provisions of this section shall not take effect with reference to the Philippine Islands until the President of the United States, after a full investigation of the local needs and conditions, shall, by proclamation, declare "that an adequate shipping service has been established as herein provided and fix a date for the going into effect of the same." There has been some objection in the Philippines to the inclusion of the islands in the coastwise laws because of what was termed inadequate service under the American flag. Extreme rate-cutting by foreign lines, such as has been done recently in the hemp trade from the Philippines to the Pacific Coast, will be a thing of the past after the President has fixed a date for the extension of the coastwise laws to the archipelago.

The President is authorized also to extend the period allowed (to February 1, 1922) for the extension of the coastwise laws to other American possessions, if adequate service has not been established by that time. Establishment of such service is laid upon the Shipping Board.

PREFERENTIAL RATES

HRDLY had the ink of the President's signature dried on the Merchant Marine Act when there arose a protest on the Pacific Coast over the probable effect of Section 28 of the act. Many prominent shipping firms (notably those whose vessels operate under foreign registry) were claiming that all trans-Pacific commerce would be driven from American Pacific Coast ports to Canadian ports.

Section 28 provides: "That no common carrier shall charge, collect or receive, for transportation subject to the Interstate Commerce Act of persons or property, under any joint rate, fare, or charge, or under any export, import, or other proportional rate, fare, or charge, which is based in whole or in part on the fact that the persons or property affected thereby is to be transported to, or has been transported from, any port in a possession or dependency of the United States, or in a foreign country, by a carrier by water in foreign commerce, any lower rate, fare, or charge than that charged, collected, or received by it for the transportation of persons, or of a like kind of property, for the same distance, in the same direction, and over the same route, in connection with commerce wholly within the United States, unless the vessel so transporting such persons or property is, or unless it was at the time of such transportation by water, documented under the laws of the United States. Whenever the board is of the opinion, however, that adequate shipping facilities to or from any port in a possession or dependency of the United States or a foreign country are not afforded by vessels so documented, it shall certify this fact to the Interstate Commerce Commission, and the commission may, by order, suspend the operation of the provisions of this section with respect to the rates, fares and charges for the transportation by rail of persons and property transported from, or to be transported, to such ports, for such length of time and under such terms and conditions as it may prescribe in such order, or in any order supplemental thereto. Such suspension of operation of the provisions of this section may be terminated by order of the commission whenever the board is of the opinion that adequate shipping facilities by such vessels to such ports are afforded and shall so certify to the commission.

Since the Merchant Marine Act has become law the Shipping Board has obtained from the Interstate Commerce Commission a ninety-day suspension of the application of this section thereof.

This ninety days will give a breathing space in which the Shipping interests of the Pacific Coast should get busy and decide on a course of action so as to derive the greatest possible benefit and the least possible harm from the application of this law. A few suggestions occur to us anent this problem which might be helpful in its solution.

First: As we have often stated in these colmns, and as has recently been affirmed by B. F. Cresson, Jr. (the engineer who was employed by the San Francisco Chamber of Commerce to make a survey of the harbor needs), the future of Pacific Coast ports should not be based upon trans-shipment of goods to or from the Orient and Middle West or Atlantic Coast ports, but upon the industrial and agricultural production of the Pacific slope.

Second: That water-borne freight via the Panama Canal from either Atlantic Coast or Gulf ports offers a much more economical transport for heavy commedities than does rail-borne freight, and at practically the same time schedule.

Third: That passenger traffic for and from the Orient from and to Western Europe and Eastern America will always come largely via transcontinental railroads and will demand fast passenger steamers across the Pacific and these steamers will carry considerable freight.

If the passenger and freight vessels now running under foreign flags wish to retain their present business through San Francisco and Seattle, they have three alternatives—either to absorb the difference between the present export rate and the regular rate, or to make some arrangement with the American lines running a coast-to-coast service through the Panama Canal or to establish direct steamship connections from the Orient via the Canal to Atlantic Coast ports. The chances are greatly in favor of the middle course, that is, the trans-shipment to American bottoms at a Pacific port of the large bulk of the freight, and this, of course, would be very favorable to the growth of these Pacific Coast ports as shipping centers.

THE SHIPBUILDING OUTLOOK

NEVER before in the history of the world has there been so great an aggregate of merchant tonnage under construction as at the present time. Construction has caught up with the deficiency caused by the war and is fast catching up with the normal increase due to the needs of commerce. On account of these circumstances many very prominent shipbuilders are dubious over the future, notwithstanding the large program for private account which followed almost immediately on the closing of the government program both in America and in Great Britain.

There have recently appeared, however, many rifts through which one catches the glimpse of a golden lining to these gloomy clouds.

Labor seems to be assuming a more reasonable attitude. Here on the Pacific Coast we have seen during the past few days the official ending of a great strike which for a time threatened to overthrow the shipbuilding industry. This action was taken by the men themselves after they had come to see the unreasonableness of their position.

The Merchant Marine Act authorizes the Shipping Board to set aside each year $25,000,000 from the earnings of vessels and the proceeds of sales. This money is to be used as a fund for the use of shipowners in building new tonnage. The act also provides for building funds in all American ship operating firms engaged in foreign trade in amounts equal to three times the war and excess profits taxes of such firms.

This provision alone, taken in conjunction with the normal demand for special types of ships and for vessels in the coastwise and Lakes trades, will make a very respectable program of construction for American yards.

In addition to this there will be a huge program of alteration, reconditioning and repair work, which will be in force for many years. The present trend of marine engineering will require much change in the propelling machinery of practically all our present fleet of steamers to fit them for competition on the trade routes of the world.

The sale program of the Shipping Board will stretch over a long period of time and will, in our judgment, be so gradual as not to interfere with new construction along conservative lines. We do not have very many large, fast freight and passenger liners, and we will need many of them. We have scarcely any motorships, and if we are really to compete we will be forced to the motorship inevitably. So that we may expect much work for shipyards for a period long enough to allow a gradual adjustment to normal conditions in our aggregate shipbuilding plant.

We are on the threshold also of a great increase in foreign trade with the Orient. Which should warn the constructive imagination of every shipbuilder. Growth in Pacific Ocean commerce means a larger proportional growth in tonnage than would growth in the commerce on any other ocean. The greater length of the trade routes on the Pacific means larger and faster ships or more of them to handle the freight.

The writer well remembers how this truism was impressed on his young mind when helping make out a schedule for a proposed line of steamers from San Francisco to New York by way of the Straits of Magellan, to be known as the "County Line." The steamers for this line were to be built at the old Union Iron Works under a co-operative share plan. In the address which presented this scheme to the commercial associations of San Francisco a forecast was made of the future conditions of Pacific Ocean trade and the author predicted that the time would come when 1000-foot steamers would be much more practical on the Pacific than on the Atlantic.

We are now on the verge of that time and we should look into the future with our eyes focussed for an enlarged vision.

The hardest kind of work will be necessary; the competition will be keener than ever before in the history of the industry; there will be no opportunity to "put over" some of the brands of workmanship that have been "put over" during the war emergency; but every real shipbuilder will have ample opportunity to establish the work of his hand and brain for the benefit of America and for the furtherance of world trade.

A WOODEN SHIP

ONE murky morning last April there was towed into the naval dockyard at Portsmouth, England, an old wooden vessel needing minor repairs and painting. She was of rather a curious build to modern eyes and we went aboard to look her over. As she stood in the huge graving dock her hull gave a curious impression of large bulk, although very short in comparison with the length of the dock. Measurement proved her to have the following dimensions:

Length, figurehead to taffrail	226′ 6″
Length of keel	151′ 3″
Extreme beam	52′ 0″
Depth of hold	21′ 6″
Tonnage	2162

We find her sides and deck and frame timbers to be of well-preserved oak, apparently as sound as the day she was built.

A short consultation with the log shows that she was built at Chatham to the design of Sir Thomas Slade and launched in May, 1765. Do you get that date? One hundred and fifty-five years is some life for a ship.

Soon after her launching she proved herself to be the best sailing three-decker ever built in England. She saw active service in the British navy during forty-seven years. Thirteen British admirals used this vessel as their flagship. Not a plank in her deck, not an inch of her bulwarks but was steeped in blood from some British heart.

Almost one hundred years ago a grateful nation honored this ship as no other vessel ever had been honored, making her permanent flagship at the great British naval base at Porthmouth harbor.

You, dear reader, will long since have guessed her name and you are right—H. M. S. Victory, Nelson's flagship and Nelson's death bed at Trafalgar.

Apropos of all this, there are two things we would really like to see.

First, we would like to see an iron or steel hull even approximate the record of this "Wooden Wall of England."

Second, we would like to see the United States Senate honor in a similar fashion some of the fine old ships of the United States Navy.

LORD FURNESS VISITS AMERICA

RETURNING to England on the last leg of a voyage around the world, Viscount Furness and a party of friends arrived at San Francisco June 18 on the steam yacht Sapphire. Lord Furness is head of the well-known British shipping corporation of Furness, Withy & Company. With him on the Sapphire were Lady Furness, Countess Drogheda, Lady Sarah Wilson, Captain R. G. Wilson, Dr. Barclay Gavin, William Bruce Rankin and Captain Lawrence Straker.

The Sapphire sailed from Southampton February 24 via Suez. From San Francisco she returned to England via the Panama Canal and Bermuda. She is an oil-burner, of 1200 tons.

UCHIDA REPRESENTS JAPAN

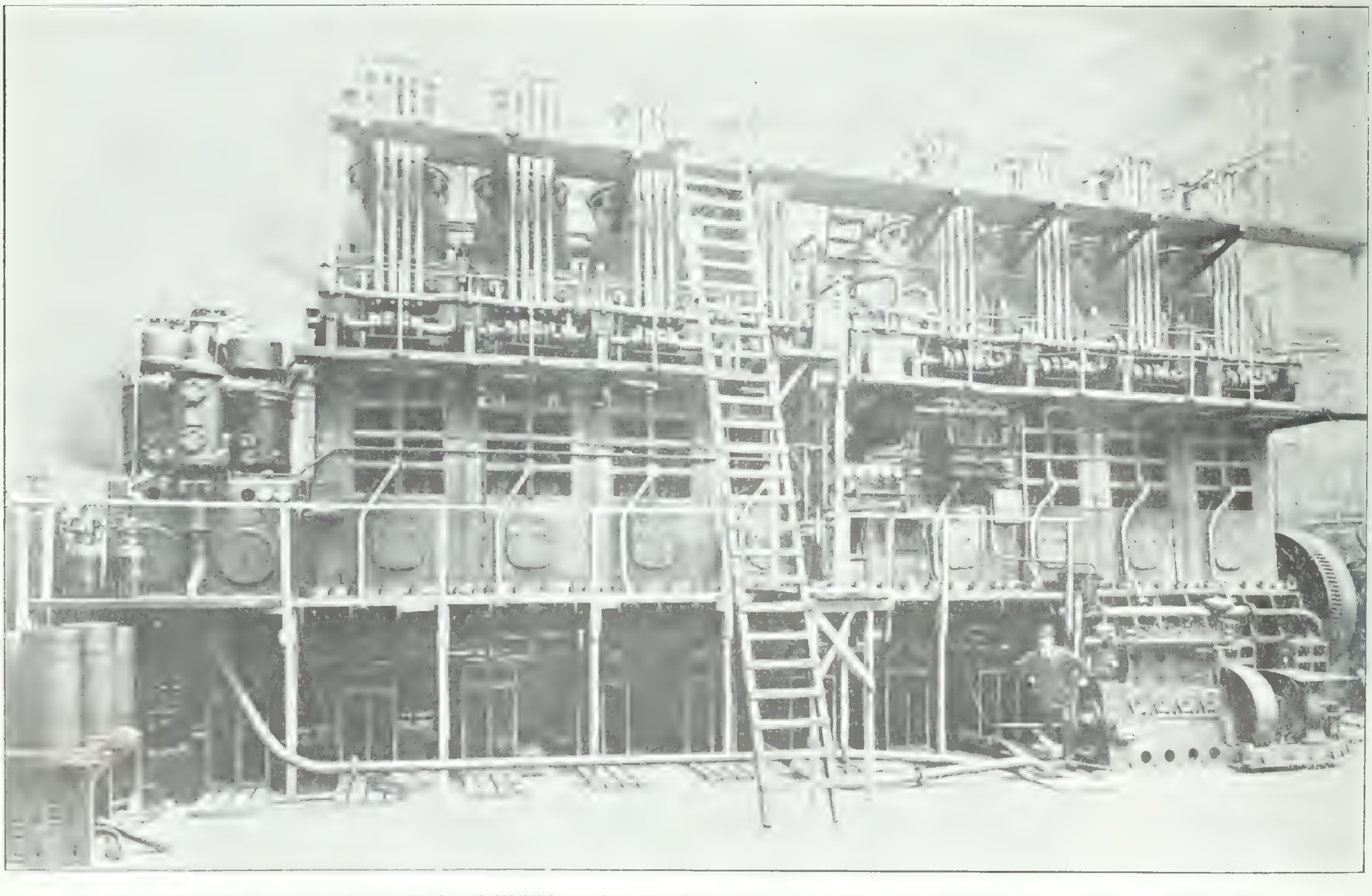
Kakichi Uchida, former vice-minister of communications of Japan and organizer of the Kokusai Kisen Kaisha, or International Steamship Company, is delegate of the Japanese government to the International Seamen's Conference at Genoa, Italy. Mr. Uchida will return to Japan through the United States.

BROWN LEAVES SKANDIA

Earl B. Brown, purchasing agent of the Skandia Pacific Oil Engine Company, has resigned his position and has associated himself with Butler & Nickerson, brokers, of 40 California Street, San Francisco. Mr. Brown was in the Skandia service for three years.

WALLACE F. DUTHIE MARRIED

Wallace F. Duthie, son of J. F. Duthie, the president of J. F. Duthie & Company, Seattle, and Miss Gladys Swalwell were married at Seattle June 10. They departed for San Francisco June 12 and sailed for Honolulu on the Matson steamship Matsonia June 16 on their honeymoon.



One of the Eight-Cylinder 3200 I. H. P. Harland and Wolff-Burmeister and Wain Diesel Engines installed in the motorship Glenapp. This is the highest powered Diesel engine yet installed in a ship

History of the Load Line

By J. C. Rohlfs

THE first statutory obligation to mark a load line on the sides of a vessel was contained in the British merchant shipping act, 1875. This act was the outcome of the agitation against the alleged unseaworthiness of ships, with which agitation the name of the late Mr. Samuel Plimsoll was so closely associated, and the circular disk, with a horizontal line drawn through its center, which is the statutory mark, has ever since been commonly referred to as the "Plimsoll mark."

The merchant shipping act, 1875, was only to remain in force one year, and under it the compulsory marking of a load line only applied to foreign-going vessels. Accordingly, in 1876 a further act was passed which required the owners to place the statutory mark upon every British ship except those under eighty tons register employed solely in the coasting trade, ships employed solely in fishing, and pleasure yachts. This mark was to indicate the maximum load line in salt water to which the owner intended to load the ship for the voyage upon which she was about to proceed.

It is to be observed that, although the mark was a statutory mark, its position on the sides of a vessel was determined by the owner, and it was permissible for him to alter the position at the commencement of any voyage from a port in the United Kingdom. When, however, the disk had been marked on the sides of a vessel, any owner or master of a vessel who allowed the ship to be so loaded as to submerge in salt water the center of the disk was liable to a penalty not exceeding 100 pounds sterling.

These provisions of the law respecting the compulsory marking of the load line remained in operation without alteration until the year 1890, in which the law was amended. To properly understand the alteration which was made in that year, it is necessary to refer to the merchant shipping act, 1873, under which the board of trade was empowered to detain overladen ships. In attempting to use this power the board of trade found it necessary to prepare tables of freeboard for the guidance of their surveyors.

These tables of freehand were not published until 1882, and later in the same year Lloyd's Register of Shipping also issued tables of freeboard based upon principles which were afterwards adopted by the first load-line committee, which was appointed by the board of trade in December, 1883. This committee reported in August, 1885, that it was practicable to frame general rules concerning freeboard which would prevent overloading without unduly interfering with trade, and submitted tables of freeboard giving the maximum loading which could be permitted with safety in cargo-carrying vessels. These tables were adopted by the board of trade, and, on the voluntary application of shipowners, the board of trade and Lloyd's Register of Shipping assigned load lines to vessels in accordance with the tables.

For nearly five years the tables of freeboard were administered in this way by the board of trade and Lloyd's Register of Shipping without any statutory obligation requiring shipowners to have their vessels marked with load lines in accordance with the tables. The application of the tables was, however, accepted, and in 1890 the merchant shipping (load line) act was passed making it **compulsory** for the position of the load line disk to be fixed in accordance with the tables of freeboard used by the board of trade at the time of the passing of the act.

By the same act the board of trade was empowered to appoint Lloyd's Register of Shipping and any other corporation or association for the survey and registry of shipping approved by the board of trade, to approve and certify on their behalf the position of any disk indicating the load line and alteration thereof; and, accordingly, Lloyd's Register of Shipping, Bureau Veritas, and the British Corporation for the Survey and Registry of Shipping were appointed for those purposes. These authorities, in conjunction with the board of trade, have continuously from that time performed the duty of assigning load lines to vessels in accordance with the law, and the load line assigned under the tables of freeboard to any particular ship depends, among other considerations, upon the quality and condition of the vessel at the time the assignment is made.

The load-line committee, in recommending in 1885 the tables of freeboard which were afterwards adopted by the board of trade, anticipated the necessity for subsequent modification of the tables. The following statement appeared in their report:

> "We are of the opinion that these tables can be adopted at least for all existing types of cargo vessels and for some years to come without the exercise of any other discretion on the part of the officers who have to see that they are complied with than that which concerns the quality and condition of the ship. To the responsible authorities a large discretion must be allowed, viz., that of applying the tables themselves with reasonable modifications to any very exceptional vessels which may now exist or may hereafter be constructed.
>
> "For careful as we have been to give full considerations to all actual types and sizes of vessels, we can not but admit that undue interference with trade might occasionally arise were the tables to be applied henceforth to all ships, present and future, without any exception whatever. We are well aware that the discretion which we thus regard as necessary is such as should be exercised with very great skill, care and judgment; but we see no reason why those charged with the responsible duty of preventing the overloading of merchant ships should not have at their command all needful assistance."

When the statutory obligation to mark the position of the load line in accordance with the tables of freeboard was imposed, this statement was not overlooked, and provision was made in the merchant shipping (load line) act, 1890, for the board of trade to approve modifications of the tables and the application thereof. It was further enacted that in approving any such modifications the board of trade should have regard to any representations made to them by the authorities appointed to approve and certify the position of the load line.

These provisions of the law with respect to the compulsory marking of the load line have remained in operation to the present time and are now embodied in section 438 and in section 443 of the merchant shipping act, 1894. An extension of the provisions made by section 7 of the merchant shipping act, 1906, which provided that the exemption of ships under eighty tons register employed solely in the coasting trade from the compulsory marking of a load line should cease so far as respects cargo-carrying steamships.

Present British Law

437. (1) Every British ship (except ships (a) under eighty tons register, employed solely in the coasting trade, (b) ships employed solely in fishing, and pleasure yachts, and ships employed exclusively in trading or going from place to place in any river or inland water the whole or part of which is in any British possession) shall be permanently and conspicuously marked with lines (in this act called deck lines) of not less than twelve inches in length and one inch in breadth, painted longitudinally on each side amidship, or as near thereto as is practicable, and indicating the position of each deck which is above water.

(2) The upper edge of each of the deck lines must be level with the upper sides of the deck plank next the waterway at the place of marking.

(3) The deck lines must be white or yellow on a dark ground, or black on a light ground.

(4) In this section the expression "amidships" means the middle of the length of the load water line as measured from the foreside of the stem to the aft side of the sternpost.

438. (1) The owner of every British ship proceeding to sea from a port in the United Kingdom (except ships under eighty tons register employed solely in the coasting trade, ships employed solely in fishing, and pleasure yachts) shall, before the time hereinafter mentioned, mark upon each of her sides, amidships within the meaning of the last preceding section, or as near thereto as is practicable, in white or yellow on a dark ground, or in black on a light ground, a circular disk twelve inches in diameter, with a horizontal line eighteen inches in length drawn through its center.

(2) The center of the disk shall be placed at such level as may be approved by the board of trade below the deck line marked under this act and specified in the certification given thereunder, and shall indicate the maximum load line in salt water to which it shall be lawful to load the ship.

(3) The position of the disk shall be

fixed in accordance with the tables used at the time of the passing of this act by the board of trade, subject to such allowance as may be made necessary by any difference between the position of the deck line marked under this act and the position of the line from which freeboard is measured under the said tables, and subject also to such modifications, if any, of the tables and the application thereof as may be approved by the board of trade.

(4) In approving any such modifications the board of trade shall have regard to any representations made to them by any corporation or association for the survey or registry of shipping for the time being appointed or approved by the board of trade, as hereinafter mentioned, for the purpose of approving and certifying the position of the load line.

439. If a ship is so loaded as to submerge in salt water the center of the disc indicating the load line, the ship shall be deemed to be an unsafe ship within the meaning of the provisions hereafter contained in this part of this act, and such submersion shall be a reasonable and probable cause for the detention of the ship.

440. (a) (1) Where a ship proceeds on any voyage from a port in the United Kingdom for which the owner is required to enter the ship outward, the disc indicating the load line shall be marked, before so entering her, or, if that is not practicable, as soon afterwards as may be.

(2) The owner of the ship shall upon entering her outward insert in the form of entry a statement in writing of the distance in feet and inches between the center of this disc and the upper edge of each of the deck lines which is above that center, and if default is made in inserting that statement, the ship may be detained.

(3) The master of the ship shall enter a copy of that statement in the agreement with the crew before it is signed by any member of the crew, and a superintendent shall not proceed with the engagement of the crew until that entry is made.

(4) The master of the ship shall also enter a copy of that statement in the official log book.

(5) When a ship to which this section applies has been marked with a disc indicating the load line, she shall be kept so marked, or, if the mark has been altered abroad in accordance with regulations made by the board of trade for the purpose, marked with the mark as so altered, until her next return to a port of discharge in the United Kingdom.

441. (1) Where a ship employed in the coasting trade is required to be marked with the disc indicating the load line, she shall be so marked before the ship proceeds to sea from any port; and the owner shall also, once in every twelve months, immediately before the ship proceeds to sea, transmit or deliver to the chief officer of customs of the port of registry of the ship, a statement in writing of the distance in feet and inches between the center of the disc and the upper edge of each of the deck lines which is above that center.

(2) The owner, before the ship proceeds to sea after any renewal or alteration of the disk, shall transmit or deliver to the chief officer of customs of the port of registry of the ship, notice in writing of that renewal or alteration, together with such statement in writing as before mentioned of the distance between the center of the disk and the upper edge of each of the deck lines.

(3) If default is made in transmitting or delivering any notice or statement under this section, the owner shall, for each offense, be liable to a fine not exceeding 100 pounds.

(4) When a ship to which this section applies has been marked with a disc indicating the load line, she shall be kept so marked until notice is given of an alteration.

442. (1) If any owner or master of a British ship fails without reasonable cause to cause his ship to be marked as by this part of this act required, or to keep her so marked, or allows the ship to be so loaded as to submerge in salt water the center of the disc indicating the load line; or any person conceals, removes, alters, defaces or obliterates, or suffers any person under his control to conceal, remove, alter, deface, or obliterate any of the said marks, except in the event of the particulars thereby denoted being lawfully altered, or except for the purpose of escaping capture by an enemy, he shall for each offense be liable to a fine not exceeding 100 pounds.

(2) If any mark required by this part of this act is in any respect inaccurate, so as to be likely to mislead, the owner of the ship shall for each offense be liable to a fine not exceeding 100 pounds.

443. (1) The board of trade shall appoint the committee of Lloyd's Register of British and Foreign Shipping, or at the option of the owner of the ship, any other corporation, or association for the survey or registry of shipping approved by the board of trade, or any officer of the board of trade specially selected by the board for that purpose, to approve and certify on their behalf from time to time the position of any disk indicating the load line and any alteration thereof, and may appoint fees to be taken in respect of any such approval of certificate.

(2) The board of trade may make regulations determining the lines or marks to be used in connection with the disk, in order to indicate the maximum load line under different circumstances and at different seasons, and declaring that this part of this act is to have effect as if any such line were drawn through the center of the disk; and as to the mode in which the disk and the lines or marks to be used in connection therewith are to be marked or affixed on the ship, whether by painting, cutting or otherwise; and as to the mode of application for, and form of, certificate under this section; and requiring the entry of those certificates and other particulars as to the draft of water and freeboard of the ship, in the official log book of the ship, or other publication thereof, on board the ship, and requiring the delivery of copies of those entries.

(3) All such regulations shall, while in force, have effect as if enacted in this act, and if any person fails without reasonable cause to comply with any such regulations made with respect to the entry, publication or delivery of copies of certificates or other particulars as to the draft of water and freeboard of a ship, he shall for each offense be liable to a fine not exceeding 100 pounds.

(4) Where in pursuance of the regulations any such certificate is required to be delivered, a statement in writing as to the disk and deck lines of a ship need not be inserted in the form of entry or transmitted or delivered to a chief officer of customs under the provisions hereinbefore contained.

444. Where the legislature of any British possession by any enactment provides for the fixing, marking, and certifying of load lines on ships registered in that possession, and it appears to Her Majesty the Queen that that enactment is based on the same principles as the provisions of this part of this act relating to load lines, and is equally effective for ascertaining and determining the maximum load lines to which those ships can be safely loaded in salt water, and for giving notice of the load line to persons interested, Her Majesty in council may declare that any load line fixed and marked and any certificate given in pursuance of that enactment shall, with respect to ships so registered, have the same effect as if it had been fixed, marked, or given in pursuance of this part of this act.

445. (1) Where the board of trade certify that the laws and regulations for the time being in force in any foreign country and relating to overloading and improper loading are equally effective with the provisions of this act relating thereto, Her Majesty in council may direct that on proof of a ship of that country having complied with those laws and regulations, she shall not, when in a port of the United Kingdom, be liable to detention for noncompliance with the said provisions of this act, nor shall there arise any liability to any fine or penalty which would otherwise arise for non-compliance with those provisions.

(2) PROVIDED, That this section shall not apply in the case of ships of any foreign country in which it appears to Her Majesty that corresponding provisions are not extended to British ships.

U. S. Load Line Legislation

Following the London International Conference of 1913-1914 on safety of life at sea, a United States government committee on bulkheads and freeboard was appointed, consisting of the following personnel:

Stevenson Taylor, chairman.
Prof. H. C. Sadler.
W. A. Dobson.
J. W. Powell.
Alfred Gilbert Smith,
Prof. C. H. Peabody.
W. Gatewood.
H. H. Raymond.
H. N. Herriman.
Prof. W. F. Durand.
William D. Arnott.
O. J. Olson.
T. M. Cornbrooks, secretary-treasurer.

And on October 15, 1919, an act to establish load lines for certain vessels, known as "H. R. 3621," was passed by the House of Representatives, but owing to our entry into the war, no further action has been taken on this subject by the Senate. The bill, as passed by the House of Representatives, reads as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this act shall apply to the following vessels:

(a) Cargo-carrying vessels of five hundred gross tons or over loading at any port or place within the United States or its possessions for a foreign voyage by sea.

(b) Cargo-carrying vessels of the United States of five hundred gross tons or over loading at any foreign port or place for a voyage by sea.

(c) Other vessels loading at any place or port in the United States or its possessions, whenever, in the judgment of the Secretary of Commerce, the safety of such vessels and their crews requires the estabishment of a legal load line.

Sec. 2. That the Secretary of Commerce is hereby authorized and directed in respect of the vessels defined in section 1 (a) and (b) of this act and is hereby authorized in respect of the vessels defined in section 1 (c) of this act to establish by regulations from time to time the load water lines and marks thereof indicating the maximum depth to which such vessels may safely be loaded. Such regulations shall have the force of law.

Sec. 3. That it shall be the duty of the owner and of the master of every vessel subject to this act and to the regulations established thereunder, to cause the load line or lines so established to be permanently and conspicuously marked upon the vessel in such manner as the Secretary of Commerce shall direct, and to keep the same so marked. The Secretary of Commerce shall appoint the American Bureau of Shipping, or such other corporation or association for the survey or registry of shipping as may be selected by him, to determine whether the position and manner of marking on such vessels the load line or lines so established are in accordance with the provisions of this act and of the regulations established thereunder; Provided, however, that, at the request of the shipowner, the Secretary of Commerce may appoint, for the purpose aforesaid, any other corporation or association for the survey or registry of shipping which the shipowner may select and the Secretary of Commerce approve; or the Secretary of Commerce may appoint for said purpose any officer of the government, who shall perform such services as may be directed by the Secretary of Commerce. The Secretary of Commerce may, in his discretion, revoke any appointment made pursuant to this section. Such corporation, association, or officer shall, upon approving the position and manner of marking such load line or lines, issue a certificate in a form to be presribed by the Secretary of Commerce, that the same is in accordance with the provisions of this act and of the regulations established thereunder, and shall deliver a copy thereof to the master of the vessel. It shall be unlawful for any vessel subject to this act and to said regulations to depart from her loading port or place without bearing such mark or marks, approved and certified by such corporation, association, or officer, and without having on board a copy of said certificate.

Sec. 4. That it shall be unlawful for any vessel subject to this act and to the regulations established thereunder to be so loaded as to submerge, in salt water, the load line or lines marked pursuant to this act and to the regulations established thereunder, applicable to her voyage; or so as to submerge under like conditions the point where such load line or lines ought to be marked pursuant to the provisions of this act and of the regulations established thereunder; or so as in any manner to violate the said regulations.

Sec. 5. That whenever the Secretary of Commerce shall certify that the laws and regulations in force in any foreign country relating to load lines are equally effective with the regulations established under this act, the Secretary of Commerce may direct, on proof that a vessel of that country has complied with such foreign laws and regulations, that such vessel and her master and owner shall be exempted from compliance with the provisions of this act, except as hereinafter provided; Provided, that this section shall not apply to the vessels of any foreign country which does not similarly recognize the load lines established under this act and the regulations made thereunder.

Sec. 6. That it shall be the duty of the master of every vessel subject to this act and to the regulations established thereunder and of every foreign vessel exempted pursuant to section 5 of this act, before departing from her loading port or place for a voyage by sea, to enter in the official log book of such vessel (if any) a statement of the position of the load line mark applicable to the voyage in question with reference to the actual water line at the time of departing from port, as nearly as the same can be ascertained.

Sec. 7. That if any collector of customs has reason to believe, on complaint or otherwise, that a vessel subject to this act and to the regulations established thereunder is about to proceed to sea from a port in the United States or its possessions within his district, when loaded in violation of section 4 of this act; or that any vessel exempted pursuant to section 5 of this act is about to proceed to sea from such port, when loaded, in violation of the laws and regulations of her country with respect to load line, he may by written order served on the master or officer in charge of such vessel detain her provisionally for the purpose of being surveyed. The collector shall then serve on the master a written statement of the grounds of her detention and shall appoint three disinterested surveyors to examine the vessel and her loading and to report to him; whereupon the said collector may release or may, by written order served on the master or officer in charge of such vessel, detain the vessel until she has been reloaded in whole or in part so as to conform to section 4 of this act, or, in case of a vessel exempted pursuant to section 5 of this act, so as to conform to the laws and regulations of her own country with respect to load line. If the vessel be ordered detained, the master may, within five days, appeal to the Secretary of Commerce, who may, if he desires, order a further survey, and may affirm, set aside, or modify the order of the collector. Clearance shall be refused to any vessel which shall have been ordered detained.

Sec. 8. (a) That if the owner or master of any vessel subject to this act and to the regulations established thereunder shall permit her to depart from her loading port or place without having complied with the provisions of section 3 of this act, he shall for each offense be liable to the United States in a penalty of $500. If the owner or master of any vessel exempted pursuant to section 5 of this act shall permit her to depart from her loading port or place without having the load line or lines required by the laws and regulations of the country to which she belongs marked upon her as required by said laws and regulations, he shall for each offense be liable to the United States in a penalty of $500. The Secretary of Commerce may, in his discretion, remit or mitigate any penalty imposed under this paragraph.

(b) If the master of any vessel subject to this act and to the regulations established thereunder, or of any foreign vessel exempted pursuant to section 5 of this act, shall fail, before departing from her loading port or place, to enter in the official log book of such vessel (if any) the statement required by section 6 of this act, he shall for each offense be liable to the United States in a penalty of $100. The Secretary of Commerce may in his discretion remit or mitigate any penalty imposed under this paragraph.

(c) If any person shall knowingly permit or cause or attempt to cause any vessel subject to this act and to the regulations established thereunder to depart, or if, being the owner, manager, agent or master of such vessel he shall fail to take reasonable care to prevent her from departing from her loading port or place when loaded, in violation of section 4 of this act; or if any person shall knowingly permit or cause or attempt to cause a foreign vessel exempted pursuant to section 5 of this act to depart, or if, being the owner, manager, agent, or master of such vessel he shall fail to take reasonable care to prevent her from departing from her loading port or place when loaded more deeply than permitted by the laws and regulations of the country to which she belongs, he shall in respect of each offense be guilty of a misdemeanor, unless her going to sea in such a condition was, under the circumstances, reasonable and justifiable; and shall be punished by a fine not to exceed $1000 or by imprisonment not to exceed one year or both.

(d) If the master of any vessel or any other person shall knowingly permit or cause or attempt to cause any vessel to depart from any port or place in the United States or its possession in violation of any order of detention made pursuant to section 7 of this act, he shall in respect of each offense be guilty of a misdemeanor and shall be punished by a fine not to exceed $500 or by imprisonment not to exceed three months, or both.

(e) If any person shall conceal, remove, alter, deface, or obliterate, or shall suffer any person under his control to conceal, remove, alter, deface, or obliterate any mark or marks placed on a vessel pursuant to this act or to the regulations established thereunder, except in the event of lawful change of said marks, or to prevent capture by an enemy, he shall, in respect of each offense, be guilty of a misdemeanor and shall be punished by a fine not to exceed $1000, or by imprisonment not to exceed one year, or both.

(f) Whenever the owner, manager, agent, or master of a vessel shall become subject to a fine or penalty by way of money payment pursuant to the provisions of this act, the vessel shall also be liable therefor, and may be seized and proceeded against in the district court of the United States in any district in which such vessel shall be found.

Sec. 9. That this act shall take effect six months after the date of its approval.

Further Investigation by Sub-Committees

The matter of a load line for our American merchant marine is again before our legislators, and as soon as the Shipping Bill has been acted upon, load line legislation will no doubt be taken in hand promptly. Owing to the difficulty of assigning load lines to all types of vessels, it has been decided to make further investigations, and in addition to the general committee on load lines, sub-committees have been appointed—one for the Atlantic Coast, one for the Gulf, and one for the Pacific Coast—to investigate the problem of applying a load line to all types of vessels peculiar to these locations. The Pacific Coast sub-committee is composed of the following personnel:

W. F. Durand, chairman.
George Armes.
A. C. Dierícx.
J. C. Rohlfs.
A. W. Follansbee, Jr.
A. F. Pillsbury.
O. J. Olson.
A. F. Haines.
F. L. Baker.
W. C. McNaught.
T. M. Potts, U.S.N., secretary-treasurer.

This committee has established offices in the Santa Marina Building, San Francisco, and is now preparing data pertaining to this subject, which it will submit to every shipowner and shipbuilder on the Pacific Coast for study and recommendations. Conferences will then be held and after conclusions are reached concerning the placing of load lines on Pacific Coast owned vessels, representatives of the Pacific Coast sub-committee will then be thoroughly prepared to appear before the proper legislation committee in Washington to state the opinions and conclusions of the Pacific Coast shipowners.

Arousing Interest in Merchant Marine Through Advertising

By Albert E. Haase

CONGRESS is now engaged in the formulating of legislation which seeks to keep our merchant fleet from vanishing and our flag from being driven from the seas. With 10,000,000 tons of shipping created during the war at an expense of $3,000,000,000, the need of water-tight legislation is said to be necessary if we are to realize the first opportunity to be a real maritime power since the Civil War.

Of the legislation pending, House Bill 10378 as amended and presented by the sub-committee of the Committee on Commerce of the Senate, in which it is proposed to terminate articles or provisions in treaties to which the United States is a party, which restrict the right of the United States to impose discriminating duties, is the most important.

In that bill the size of the United States Shipping Board is increased and full authority is given that board to build up a merchant marine. In it restrictions are placed on the sale of government-owned ships and provision is made that the government shall assist private shipping interests in building new vessels and in establishing new trade routes.

Senator Wesley L. Jones, chairman of the Commerce Committee, in formally reporting on the bill last week, said:

"The aim of this bill is to place the United States merchant marine on a permanent basis, owned and controlled by Americans, and operated as a thoroughly American institution."

Some weeks ago, on March 23, at a meeting of representatives of shipbuilding in the United States, after approving of provisions in House Bill 10378, it was resolved that a committee be appointed by the shipbuilders then assembled which should offer its assistance to the several congressional committees "in the final determination of legislation in connection with the merchant marine and also in the preparation of any statistical information that the committee may require."

It was also further resolved, "that a committee of six be appointed to formulate and give publicity to statements of facts and figures to support the principles of the legislation advocated by the committee and to represent the shipbuilders in connection with all shipping and shipbuilding measures."

The committee appointed has the following members and is known as the "Committee of American Ship Builders":

Chairman, J. W. Powell, vice-president of the Bethlehem Shipbuilding Corporation, Ltd., Bethlehem, Pennsylvania; H. K. A. Evans, president of the Baltimore Drydock & Shipbuilding Company, Baltimore, Maryland; A. C. Pessano, chairman of the board of directors, Great Lakes Engineering Works, Detroit, Michigan; J. W. Mason, president of the Western Pipe & Steel Company of California, San Francisco, California; H. B. Taylor, vice-president of the William Cramp & Sons Ship & Engine Building Company, Philadelphia, Pennsylvania; J. F. Duthie, president J. F. Duthie & Company, Seattle, Washington.

In order that this committee might be able to give publicity to principles involved in the legislation suggested by the first committee and as contained in House Bill 10378 in its revised form, the shipbuilding companies of the United States were requested to subscribe in an amount not to exceed one dollar per employe, based on the average number of operating employes for the calendar year 1919.

There were more than 100,000, a rough estimate is 115,000, employes of shipyards of the United States in the year 1919.

Practically all of this entire sum, about $115,000, is to be spent in paid advertising. For it was immediately decided by this committee that paid advertising was essential to arouse public interest in understanding the necessity of legislation that would make possible the preservation of our merchant marine.

A campaign extending over a period of eight weeks, restricted to daily newspapers and covering the entire country, was entered upon.

Believing that "it is realized by the people of the Mississippi Valley as well as those of the Atlantic, Pacific and Southern seaboards that an American merchant marine is a national necessity, the Committee of American Shipbuilders hopes that by presenting in this series of advertising the more important phases of the situation it will get all these people pulling together for a permanent merchant marine."

Team Work for the Merchant Marine

IN the good old days of the sail, when a voyage between Atlantic and Pacific ports was a matter of four months or so, and no railroad or telegraph lines spanned the vast areas between the two coasts, an intimate relation between the shipping interests of East and West was unthought of. Even after the railroads and telegraph came, and the passage around the Horn was cut down by the clipper ships and steamers, and later cut out by a rail journey across the Isthmus, East and West remained twain, so far as community of interests in shipping was concerned. Railroad men of the two coasts worked together, in various organizations for their mutual betterment, but shipping men not at all.

Today all that is changed. Shipping men of the Pacific Coast have their organizations for mutual benefit in business matters, and these organizations are in touch with similar ones on the Atlantic Coast. Thus the common welfare of West Coast and East Coast ships is safeguarded by concerted effort. Further than that, prominent West Coast shipping men, like Captain Robert Dollar, John H. Rosseter and others, have eastern connections which identify them almost as closely with the Atlantic ports as with the Pacific. All this is in accord with a new movement in American shipping business methods dating from the opening of the world war. The day of the lone hand in shipowning has passed, and that of national community of interests is here.

"Each for all and all for each" would be an appropriate motto for American shippers today. Team work is the keynote of their efforts to maintain as a growing and profitable institution the great merchant fleet which was created as a result of the war and is being developed and balanced to meet the demands of peaceful world-trade. Interchange of ideas, mutual effort for the common good and a closely-knit alliance of the various units of the shipping business in matters of policy affecting its general welfare, with means of an interchange of ideas and information with allied interests of national scope, form the basis of new business methods in the American shipping world.

P. A. S. Franklin, president, International Mercantile Marine, and member of executive committee, American Steamship Owners' Association

H. H. Raymond, president, Clyde and Mallory Lines, and president, American Steamship Owners' Association

In the early days of American shipping, now chiefly recalled for the triumphs of our clipper ships, no owner conferred with his competitor on the development of trade routes or the study of economic problems in the shipping business. It was a period of every man for himself among American shipowners, and secrecy was the mainstay of each individual's ventures. This was carried so far at one period at the old port of Salem that ships were fitted out by stealth and sailed at night. One Salem ship made three voyages to Sumatra for pepper and earned a fortune for her owner before competitors could discover the source of her cargoes.

Today such a system is impracticable, nor is it to be desired. The trade map of the world lies before every shipowner, with its every sea route designated. The route on which a ship sails usually is announced in advance. Her freight rate is fixed in competition with other ships of her own and other flags. A ship no longer sails into silence and mystery when she leaves port. She is in daily touch with other ships or the shore by means of the radio. Her consignee or agent in a distant country is advised by cable of her departure and by radio of her progress and expected hour of arrival at her destination, and yet the shipping business is vastly more complex than in the good old days of the sail, when every owner was for himself. Costs are extraordinarily high. Rates in all cases are not adequate to meet those costs, as, for example, in the coastwise trade. The relations of the ship operator and the men employed on his ships are subject to negotiation and agreements into which numerous troublesome elements enter that were not present in earlier times. Insurance is a complicated and difficult branch of the shipping business; navigation laws, long in need of revision, in many instances are a burden on the shipowner; vast amounts of capital are invested in ships, and to earn adequate returns for these great sums, even with business active, the shipowner must be always on the alert, and must know the ebb and flow of trade in all parts of the world.

A community of interests among shipping men, therefore, is logical and inevitable. By such means the shipping men of the country avail themselves of their combined strength and resources in solving the many problems, economic in the main, that arise in a business so vast as theirs and so newly grown to its present proportions. The country invested between three and four billion dollars in ships between 1917 and 1920. This great investment is now subject to the test of competition with the mercantile services of other countries. The task of making the investment permanent rests upon the shoulders of the American shipowners.

Fortunately for the American merchant marine, the shipowners of the country when the war began were not without an organization of a national character, equipped to take the lead in concerted action by shipping interests in behalf of the new-fledged fleet and for the protection of the great investment it represented. This was the American Steamship Association, a body including in its membership the leading companies owning and operating steamships under the American flag. Organized in 1906 by a number of coastwise steamship companies, the association had grown so steadily that in 1917, when the United States entered the world war and embarked upon the great shipbuilding program that resulted in its present merchant fleet (which by the end of 1921 will embrace 18,000,000 deadweight

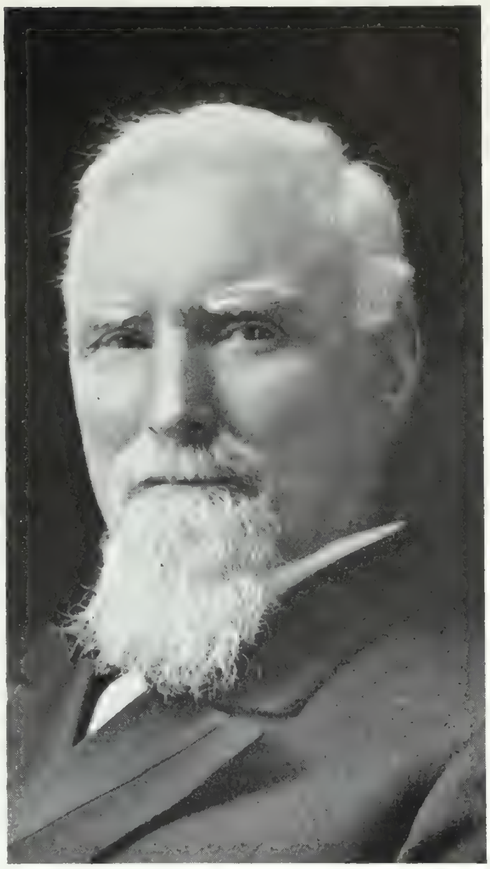
Edward J. Barber, president, Barber Steamship Lines, and vice-president, American Steamship Owners' Association

tons of ocean-going ships), the American Steamship Association included in its membership the principal companies engaged in overseas' trade under the American flag. As new companies were formed in the era of rapid shipping expansion that now set in, many obtained membership in the association, which in September, 1919, found an expansion of its organization necessary to carry on its varied and rapidly growing activities. At that time the word "Owners" was added to the association's title, and the executive committee, the governing board, was enlarged to twenty-five to make it more thoroughly representative of the increased membership of the association. Mr. H. H. Raymond, president of the Clyde & Mallory Lines, at once a leading figure in the coastwise trade and conspicuous in overseas' carrying, who had served as president of the association for several years, was unanimously re-elected to the presidency. Mr. Edward J. Barber, head of the important Barber Steamship Lines, Inc., operating to the River Plate, the Orient and trans-Atlantic ports, was reelected vice-president, while Mr. Winthrop L. Marvin was elected to the new office of vice-president and general manager. Mr. Marvin brought to the office a profound knowledge of shipping problems, and wide experience in securing co-ordination of effort by large business interests. At the same time the important office of general counsel of the association was assumed by J. Parker Kirlin, Esq., one of the foremost admiralty lawyers in the United States.

President Raymond in the strengthened organization has been able to avail himself of the voluntary services of many able men in the shipping business, who, seeing the need of concerted effort by American shipowners, have consented to serve on various committees formed to deal with the vital problems of the merchant marine. Thus in a short time there has been built up an efficient and highly specialized association for dealing with the practical, every-day questions of prime importance that confront shipowners and operators in their regular line of affairs.

By the spring of 1920 the association's members represented an ownership of not less than 3,000,000 gross tons of steamships under the American flag, or more than three times the amount of the nation's tonnage engaged in overseas' trade at the beginning of the war. In addition to this tonnage, the association members operated as agents for the United States Shipping Board between 4,000,000 and 5,000,000 deadweight tons of the war-built cargo fleet. (Three deadweight tons about equal two gross tons.) The aggregate tonnage thus controlled by the association's members (between 6,000,000 and 7,000,000 gross) was nearly equal to the nation's total tonnage, including all ships in the Great Lakes, in 1914.

With the Shipping Board the nominal owner of the government-built ships, constant and often exhaustive conferences between the board and the shipowners and operators are necessary. With legislation before Congress involving fundamental principles of shipping policy, and therefore the future of the merchant marine as a whole, while the new fleet was not yet completed, it behooved the shipowners to present their views collectively and with unity, clearness and precision.



Captain Robert Dollar, president of the Robert Dollar Company, and president of the Pacific American Steamship Association, a national and international figure in shipping, as well known in London and Shanghai as in New York and San Francisco.

Below is Winthrop L. Marvin, vice-President and general manager, American Steamship Owners' Association, an authority and writer on shipping and shipping problems.

This has been accomplished through common counsel by the association's members and by sustained and intensive work by its committees. A brief summary of the functions of a few of these committees will serve to indicate the practical character of the work handled by the association:

Committee on Managing Agency Agreement

The duty of this committee is to deal with matters pertaining to the agreement with the United States Shipping Board, under which members of the association operate government-owned ships. Members of the committee attend fortnightly conferences at Washington of a joint committee composed of representatives of the Shipping Board, the shipowners of the Atlantic, Gulf and Pacific coasts, and the United States Ship Operators' Association. These conferences deal with affairs involving a greater volume of shipping traffic in one month than half a century ago stood to the credit of the entire American merchant marine in a year. Mr. Franklin D. Mooney, president of the New York & Porto Rico Steamship Company, was appointed first chairman of this committee on behalf of the American Steamship Owners' Association. During Mr. Mooney's absence on a trip abroad, Mr. Oakley Wood, vice-president of the Barber Steamship Lines, Inc., served as acting chairman.

Committee on Wages and Working Conditions Aboard Ship

The negotiation annually of a working agreement with representatives of the seagoing unions, on wages and working conditions (in conjunction with the United States Shipping Board), and the adjustment of all differences between the labor aboard their ships and the members of the association, are the principal duties of this committee, whose findings are the basis of present wage agreements on all American ships plying out of Atlantic and Gulf ports. Captain Eugene E. O'Donnell, manager, marine department, C. H. Sprague & Son, Boston, is chairman of this committee. The names of the other members indicate the representative character of the committee:

Captain William Anderson, manager, marine department, C. H. Sprague & Son, Boston.

Mr. A. G. Bates, vice-president, Atlantic & Pacific Steamship Company (W. R. Grace & Company).

Captain John G. Crowley, president, Coastwise Transportation Company.

Mr. J. D. Tomlinson, operating manager, American-Hawaiian Steamship Company.

Mr. A. S. Hebble, superintending engineer, Southern Pacific Company.

Mr. E. A. Kelly, assistant to president, Clyde Steamship Company.

Mr. R. C. Thackara, vice-president, Luckenbach Steamship Company, Inc.

Mr. A. J. McCarthy, American Flag Steamers, International Mercantile Marine Company.

Mr. F. C. Osborn, manager, ownership operations department, Munson Steamship Line.

Mr. Robert F. Hand, assistant manager, foreign shipping department, Standard Oil Company of New Jersey.

Committee on Depreciation

The question of the proper depreciation to be charged off annually on account of vessels owned for purposes of taxation and otherwise has been one of the most vexing to come before the members of the association. This committee sent out a questionnaire to American shipowners, seeking their views on the subject, and embodied the replies received in a report to be submitted to the association and by it to the Shipping Board and to the Treasury Department. The chairman of this committee is Mr. Alfred Gilbert Smith, president, the New York & Cuba Mail Steamship Company.

Another active committee of the association deals with the subject of the revision of the United States navigation laws and rules, including the laws and rules of the Steamboat Inspection Service, which is now being considered also by a special commission appointed by the Shipping Board. Still another committee of the association is that which deals with accounts and auditing, with especial regard to the accounts of government-owned vessels operated by the shipowners. This committee is composed of auditors of the member companies of the association.

Its own solidarity assured, the association has established close relations with other shipping associations in the country. These include the following:

United States Ship Operators' Association, New York.

Pacific American Steamship Association, San Francisco.

Puget Sound Shipowners' Association, Seattle.

New Orleans Shipowners' Association.

New York Boat Owners' Association, New York.

Lake Carriers' Association, Cleveland.

National Board of Steam Navigation, New York.

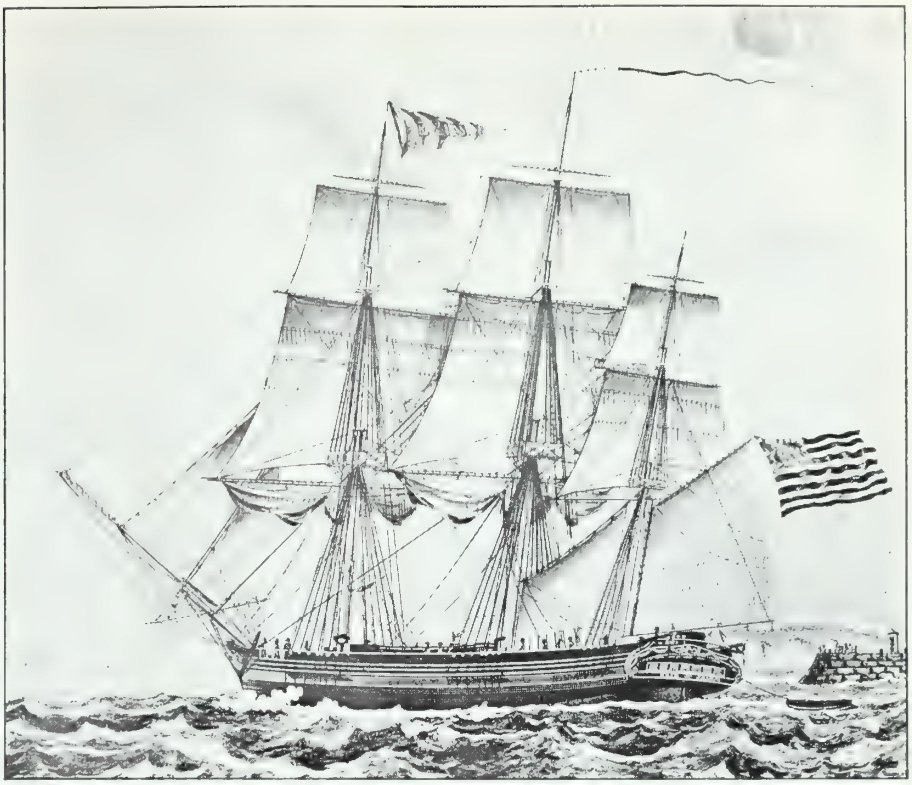
Other business associations with which the American Steamship Owners' Association is in close touch include the following:

American Manufacturers' Export Association, New York.

National Foreign Trade Council, New York.

National Association of Manufacturers, New York.

Atlantic Coast Shipbuilders' Association, New York.


The Erin, 270 tons, an American cargo-carrier of a century ago. From a painting by Montardier, a French artist, made in 1819

Center of American shipping in 1920—Lower Manhattan Island, where the principal owners and operators of steamships have their offices

The Matson steamship Maui, a modern freight and passenger liner

Derby wharf, Salem, center of American shipping in 1820. From a photograph taken about 1880. In the first quarter of the last century more rich foreign cargoes were landed at this wharf than anywhere else in the United States

Through the United States Chamber of Commerce the association is enabled to present data concerning the economic phases of the shipping business to business men in all sections of the country. Illustrating this connection, it may be stated that after members of the association had appeared before the Senate Committee on Commerce at hearings on the measure later known as the Jones bill, their arguments, printed in pamphlet form, were distributed to the chambers of commerce of the country through the co-operation of the United States Chamber of Commerce. Information on the merchant marine and overseas' trade is supplied this national body of business men by the association whenever it is requested.

Touch with the banking interests of the country has been maintained by the association through an interchange of views and information with the committee on ship securities, appointed by the United States Shipping Board from among prominent bankers, with Henry M. Robinson of Pasadena, California, as chairman. This committee has made a study of the relation of present shipping values, costs and earnings to popular investment in shipping securities and has submitted its first report to the board.

Other organizations with which the association maintains relations are:

National Marine League of the United States of America, New York.

National Merchant Marine Association, Washington.

Navy League of the United States, Washington.

These three organizations disseminate information about the merchant marine through the press and by means of speakers, while the National Marine League is sponsor for the National Marine Exposition, which was held for the first time in April, 1920, at New York.

To each of the organizations named, the association sends its published communications, and in many cases special bulletins on matters regarding the merchant marine that are of current interest to business men. Furthermore, it has adopted a policy, now in effect, of supplying information of public interest on shipping matters to the daily and trade press, whenever it is requested. With the growth of our merchant marine, there has developed a widespread interest in ocean trade and commerce, and the American Steamship Owners' Association has come to be accepted as, in a sense, a clearing house of information on matters maritime all over the United States.

British motorship Glenluce America needs some of this type to make her position secure

Team Work on the Pacific

CO-OPERATION between the steamship owners and operators of the Atlantic and Pacific Coasts is part and parcel of the policy of the Pacific American Steamship Association, the membership of which comprises the principal companies of the Pacific.

The Pacific American Steamship Association was organized in 1919. Because of the distance from New York and Washington and the difficulty of getting prompt action through Eastern organizations, a separate Pacific Coast association was formed to deal with problems peculiar to the Pacific, but nonetheless to work in harmony with the American Steamship Owners Association. Many of the members of the Pacific American Steamship Association also are members of the American Steamship Owners' Association, although the former, not limiting itself to owners, has a more diverse membership, non-owning operators among others.

In many problems affecting both coasts the Pacific is interested to a greater or different degree, or perhaps is able to throw new light on questions under consideration. Co-operation has been the dominating note of such relations between the two organizations.

Prior to the opening of the Panama Canal coastwise relations between the Atlantic and Pacific were not so close as they have become since the distance by water between the two coasts was reduced several thousand miles. This fact has made for closer working understandings, and in many respects has made the problems of the Atlantic and Pacific very similar.

A. F. Haines, vice-president, Pacific Steamship Company, and first vice-president, Pacific American Steamship Association

The member corporations of the Pacific American Steamship Association are: the Admiral Line, Associated Oil Company, China Mail Steamship Company, Columbia-Pacific Shipping Company, the Robert Dollar Company, E. C. Evans & Sons, General Steamship Corporation, W. R. Grace & Company, Gulf Mail Steamship Company, Hind, Rolph & Company, Los Angeles Pacific Navigation Company, Luckenbach Steamship Company, Matson Navigation Company, McCormick & McPherson, Oceanic Steamship Company, Pacific Mail Steamship Company, W. S. Scammell & Company, Shell Company of California, Standard Oil Company of California, Struthers & Dixon, Sudden & Christenson, Swayne & Hoyt, Union Oil Company of California, Frank Waterhouse & Company, Williams, Dimond & Company.

Captain Robert Dollar is president of the Pacific American Steamship Association; A. F. Haines, of the Pacific Steamship Company, the Admiral Line, is first vice-president; Daulton Mann, of the Pacific Mail Steamship Company, second vice-president; J. B. Banning, Jr., secretary and treasurer; and the directors are F. S. Samuels, Oceanic Steamship Company; C. W. Saunders, Matson Navigation Company, and J. C. Rohlfs, Standard Oil Company.

San Francisco business district and the bay. The future center of American shipping

Deliver the Goods in Our Own Ships

IN an address April 28, 1920, on the above subject before the General Session of the Annual Convention of the Chamber of Commerce of the United States at Atlantic City, B. F. Harris, president of the First National Bank of Champaign, Illinois, gave in his introduction a masterly resume of the reasons for the necessity that the United States should enter more seriously into foreign trade and the advisability to that end of establishing a permanent policy with regard to the operation and disposal of our merchant marine. On the actual immediate problem of the disposal by the Shipping Board of its cargo carriers, Mr. Harris has made some very sensible remarks and we quote them in full as follows:

"It has been shown that when the building program has been completed there will be 746 cargo ships adaptable to overseas' commerce, and these vessels constitute the real problem involved in a sale. The tugs, the barges and the wooden vessels are a problem apart and should be so considered. As to the wooden vessels, no one predicts any future for them. As to the small steel vessels, a certain number will doubtless be required to fill certain requirements of our own merchant marine. The surplus should probably be sold in the world market. There is a considerable demand abroad for this type of ship, and that market should be exploited before it is too late.

The vessels of 6000 tons deadweight and over should be sold at a price that will attract American capital to invest in them. It should not especially concern us what similar ships are being bought and sold for abroad under conditions entirely dissimilar from those existing in this country. We are not, strictly speaking, a maritime nation. We are not accustomed to operating ships in foreign commerce, nor to making investment in them. We have to build up organizations and to establish agencies throughout the world. It is not to be expected that this can be accomplished under the incentive of a moderate return, in view of the risk involved in purchasing ships at abnormal prices.

Delayed Sales

Had the Shipping Board the courage immediately after the armistice to write down the sale price of these ships, at a time when large profits were possible, all of the adaptable ships would have been sold and the owners would have realized profits in their operation that would have enabled them to establish themselves in strong position with reference to future competition. But the Shipping Board seems to have been more concerned in making good trades and a good financial showing than in building up a merchant marine. Even if the ships had been sold at current prices of reproduction, or, better still, if they had been sold at an appraisal, a great many, if not all, of the adaptable ships could have been sold. The contention of the Shipping Board has been that the excess in their prices, above the cost of building the same ship today in American shipyards, was justified by the fact that they were in a position to make immediate delivery. In respect of any common commodity for which there was a strong demand, this policy might easily be approved, but it has no place in a governmental policy ostensibly designed to promote a great national enterprise. But the best answer to the contention is that in the past eighteen months the Shipping Board has been able to sell less than thirty of the substantially 500 adaptable vessels that have been delivered to the board. At that rate of disposal a life-time will have passed before all of these ships are sold. Unless these ships are sold at a price that will permit the owners operating them in years to come to compete with foreigners who bought their cargo tonnage at pre-war prices, American ship operators will require government aid to a large extent. Is it not better to treat these ships as war material, and mark down the price, as has been done in the case of all other war material, rather than to draw largely upon the national treasury for subsidies? It must be one or the other. High capitalization now means large drafts upon the public funds hereafter, if we are to keep our ships at sea.

Declining Prices

The fact is, experienced shipping men are afraid to embark in shipping enterprises if they are obliged to pay Shipping Board prices for tonnage in view of the uncertainty of the future. These men of experience realize that at the present rate of ship construction throughout the world there is soon bound to be an excess of tonnage, and that freight rates, already declining, will be so low as to make the operation of cargo boats unprofitable. As long as American shipyards can turn out ships, specially designed and built, at $175 a ton, how can the Shipping Board explain holding their ships, built under war pressure, at $225 a ton, less some slight discount for depreciation recently announced?

As bearing upon the claim of the Shipping Board that ship operators are awaiting a break in Shipping Board prices before purchasing, there is instruction in the fact that, of 263 vessels under construction in American shipyards on private account March 1, 132 were freighters and 84 were tankers, and of the freighters, 74, considerably more than half, were being built on builders' account. This does not indicate a great demand for freighters, even at prices considerably below the Shipping Board standard.

What's the Purpose?

The proposition simmers down to this: Are we working for an American merchant marine on a permanent basis with a continuous and enormous direct and indirect profit to the nation, or, are we in a penny-wise and possibly peanut-political method, trying to make one little profit or saving in the sale of these ships? In other words, are we wise and visioned enough to look for our profit in the harvest and not in the seed—to think in terms of decades and not days?

This chamber has taken a formal referendum from all its many members, resulting in an overwhelming vote to get the government out of the shipping business and have it charge to war loss the difference between war cost and present values. Under all these facts and circumstances, why delay a prompt appraisal and sale on that basis at the earliest practicable moment? It is only fair to the government and the taxpayers that the elements affecting price be settled so far as they may be settled by the government's policy before the ships are sold, so that the government and the taxpayers will get the benefit of that policy. If the government is to have any other policy than that which it now has, it is only fair that the purchasers of the ships should know what to expect.

Tomorrow's Too Late

There are numberless losses from every day's delay. For the small hope of more cash profit and every chance of actual loss, why lose millions and precious time and opportunity at this crucial and psychological moment?

> "Tomorrow I will live, the fool doth say;
> Today itself's too late, the wise lived yesterday."

Let us take our loss now and be done, sending no more good money after bad. Surely we have had our fill in three years of such a policy. The argument for continued government ownership and the "pork barrel" propositions inevitably to result therefrom in connection with the develment of new ports—political and otherwise—rests neither upon good judgment nor past experience, or, in any event, on a reasonable regard for the public funds. We must have in mind that government ownership or direct control is nothing more nor less than political possession.

The Committee's Idea

The chamber's committee on ocean transportation recognizes the desirability of establishing as many shipping centers as there are ports of consequence. But in accomplishing this purpose it is not a wise policy, either for the ports to be served or for the country at large to establish the necessary lines with government-owned ships. More efficient, more economical results will be attained by the Shipping Board entering into contracts with private owners, costs and terms clearly defined.

Under such an arrangement the new lines will the more quickly determine their profitableness and the advisability of their continuance. Although this suggestion may not meet with the approval of gentlemen desirous of operating government ships, it certainly, if adopted, will better promote the interests of the several ports and the national interests.

How to Compete

Having determined upon a policy of ownership, there arises the question, How is our merchant marine to be maintained in competition with nations that, after years of experience, have acquired and intelligently developed world-wide organizations? How may we compete with this thorough knowledge of the shipping business, and these vessels, capitalized at much lower values than our own? This is a matter for most serious thought—not to be decided by illy-digested measures; certainly not through the application of individually recommended panaceas. Government aid in some or several forms will be required. But the nature and extent of that aid, the wisest among us cannot at the moment foretell.

This question, together with questions

of differential railroad rates, through bills of lading, foreign trade representatives of the government stationed abroad, increased mail subventions, changes in the navigation laws, remission of taxes on vessel property, differential duties, and the like, should receive the careful consideration of somebody or group qualified to pass upon it, and a report made that can be used as a basis for careful legislation.

Look Out for Ourselves

The thing that concerns us is to stop attempting to supply the export trade with idealism and look after our own interests. If we are advised and unprejudiced we will recognize that no people can approach England in the games of international trade, shipping, finance or politics. We will know the games some day—we're paying an awful price to learn and only working at it with union hours and efficiency.

But it hasn't been our game and we might as well recognize it and play close to our stomachs. England is linking government and business in close co-operation as will any sane nation and, against all precedent, her battleships now carry her commercial travelers to a battle royal for business.

What a Competitor Thinks

I want to close with the words of Milton Hayes of Manchester, for this brave, strong program of our wise and worthy brothers, yet competitors, points out the way toward which we must bend all our united effort. 'Tis—

"The Song of the Overseas' Trade"

Merchandise! Merchandise! England was made
  By her men and her ships and her overseas' trade.
Widen your harbors, your docks and your quays,
  Hazard your wares on the seven wide seas,
Run out your railways and blast out your coal,
  For only by trade can a country keep whole.
Feed up your furnaces, fashion your steel,
  Stick to your bargains and pay on the deal;
Rich is your birthright and well you'll be paid
  If you keep in good faith with your overseas' trade.

Learn your geography work out your sums,
  Build up your commerce and pull down your slums;
Sail on a Plimsoll that marks a full hold:
  Your overseas' trade means a harvest of gold.

Bring in the palm-oil and pepper you've bought
  But send out ten times the amount you import:
Trade your inventions, your labor and sweat:
  Your overseas' traffic will keep you from debt.

Hark to the song of the shuttle and loom,
  "Keep up your commerce or crawl to your tomb!"
Study new methods and open new lines,
  Keep up your factories, foundries and mines.
Think of what Drake did and Raleigh and Howe,
  And waste not their labors by slacking it now;
Work is life's currency earn what you're worth,
  And send out your ships to the ends of the earth.

So send out your strong to the forests untrod,
  Work for yourselves and your neighbors and God,
Keep this good England the home of the free
  With merchandise, men, and good ships on the sea.
Merchandise! Merchandise! Good honest Merchandise!
  Merchandise, men and good ships on the sea.

European Marine Notes

Exclusive Correspondence of Pacific Marine Review

THE Chamber of Shipping, which represents the shipowners of the United Kingdom, held its annual dinner at the Guildhall by invitation of the Lord Mayor of London on May 12. Lord Inchcape, who replied to the toast of "The Shipping Industry," said that the Chamber of Shipping now represented 11,116,000 tons of shipping. It was a rallying ground for shipowners and liner owners. He did not think the brotherhood of shipowners had been so strong as it was today. The country had faced the peril from without. It had to confront the peril from within with equal power and resolution. A state could be laid low just as effectively by wrong ideas as by an invading army. There was no agency of destruction known to chemists half as formidable as the T. N. T. of bad economics. We ought to see what our income is and budget our expenditure not to exceed it. The government had rationed other people. Let it ration itself.

Coming Slump in Shipbuilding

Some astonishment has been expressed at the statement of a prominent Sunderland shipbuilder about signs of approaching slackness in the shipbuilding trade. He argues, however, that there need not be any surprise at the fact, for as long ago as June, 1919, the world's building yards had more than restored the amount of mercantile tonnage which had been lost in the war. In June, 1914, Lloyd's Register gave the total steam tonnage afloat as just under 45,500,000 tons. In June, 1919, the total was increased by just under 2,500,000 tons. True, the British total was down by 2,547,000 tons, but that of America was up by over 7,750,000 tons. Other countries had their gains and losses for the period, but those are the two crucial figures.

Though the actual figures showed an increase for the five years, that increase was only about one-third of that which would have taken place had times been normal and no war had intervened. Britain is rapidly overtaking the deficit in her total. At the end of March, 1920, there were in British yards 3,380,000 tons of steel steam shipping under construction, that figure being half as great again as the corresponding quantity returned twelve months earlier. Shipbuilding is very costly indeed at the present time, labor and material being at levels undreamed of before the war.

A writer here, discussing these matters, declares that one can quite see that the demand for tramp tonnage will soon begin to slacken. But the yards which devote themselves to the highest class of merchant ship will nevertheless be busy for a long time, for the ravages of the U-boats were so carefully directed against that class of ship that it will take years to replace the lost passenger steamers and to bring the fleets of the mail companies up to the standard which they would have attained had their progress not been checked by the war.

Shipping Competition

The question of freights is naturally interwoven with the question of shipbuilding. Speaking very broadly, in normal times, after a great output of tonnage, freights are bound to have a downward tendency. The great output which has been taking place during the last months had in the first place to fill up the gaps left by the war. Then it had to reckon for the ships under construction and those still in government service. Finally it had to find more tonnage than would have been needful for a given amount of work in pre-war days owing to the fact that congestion and control had lessened the economic efficiency of merchant ships.

But when these voids are filled and the yards are still continuing to pour out their new ships, there is bound to come a time when competition in the world's carrying trade will once more be seen. No one is big enough to corner ocean freights, and as soon as competition is again felt there is expected to be a general downward tendency in the rates of freight and consequently in the earnings of shipowners.

Shipping and Banking

Great interest has been aroused by the issue of the prospectus of the P. & O. Banking Corporation because it comes out under the auspices of the doyen of British shipping companies and of some of the leading banks of the country, but also from the wide scope of its sphere of operations, which, as shown by its articles of association, includes financing, trading, company promotion, underwriting, and generally, in addition to ordinary banking, the business of a great commercial corporation. The capital of the company is $25,000,000 in $50 shares, and the present issue is of 250,000 shares, which are offered at 60 cents premium. Of these, however, 80,000 have been applied for by the London, County, Westminster and Parr's Bank, Lloyd's Bank, the National Provincial and Union Bank of England and the P. & O. Company, while as regards the 170,000 left for the public preference will be given to the stockholders and employes of the P. & O. Company.

This alone is sufficient to give the new institution a good send-off, but a further augury for its successful conduct is afforded by the extremely influential character of its directorate, which includes Lord Inchcape, chairman of the P. & O. Company; Sir Richard Vassar Smith, chairman of Lloyd's Bank; Sir Montagu Turner, chairman of the Chartered Bank of India, and Sir Duncan Carmichael, director of the P. & O. Company and of the Chartered Bank of India. In addition, there are two directors of the National Provincial and Union Bank of England, one of whom is also the general manager, and E. H. Cunard, a director of the Cunard Steamship Company and of the London, County, Westminster & Parr's Bank.

The scope of the articles of association may seem a trifle adventurous for a bank, though less so in these days than in pre-war times, and who would not venture under such a board and with such a lead from prominent banks? That conservatism as well as enterprise will enter into the conduct of the affairs of the institution may also be gathered from the statement in the prospectus that it will be the primary object of the directors to build up the corporation's reserves, while the widespread and influential connections it will enjoy in the East and in London should assure it a lucrative business almost from the outset. The preliminary expenses payable by the corporation are estimated at $50,000, exclusive of the government stamp duty on capital.

Dearer Merchant Ships

Judging from the prices which are being quoted for oil tank steamers, shipbuilding costs have risen sharply during the past few weeks. A 10,000-ton vessel has been placed at $225 a ton deadweight, with delivery in eighteen months, while $250 is talked about elsewhere for similar vessels. It is said that United States prices for the same class of tonnage are not much higher, while delivery is offered in two-thirds of the time. Steel difficulties are blamed for the British trouble, but rising costs of labor are indubitably a considerable cause.

Shipping Ministry's Huge Deficit

All tongues have been set wagging by the issue of a White Paper showing that the British Ministry of Shipping exceeded its estimates by over $500,000,000, made up of $427,325,000 spent in excess of the gross estimate, and a deficit of $74,693,430 in sums realized on account of appropriations in aid. The expenditure included $44,424,725 for shipbuilding abroad, and there is now awaiting settlement on this service accounts for nearly $130,000,000.

With regard to the scheme undertaken by the Admiralty for the establishment of national shipyards with the object of increasing the shipbuilding resources of the country, the Auditor General states that the total expenditure brought to account to March 31, 1919, amounted to $23,972,490, including $11,751,635 paid to the War Office, who, through the Inland Waterways and Docks Department, constructed the shipyards for the Admiralty under agreement, whereby the amount charged to the Admiralty for military labor and supervision should be the "cost account total." The claim by the War Office included $5,794,220 for labor and supervision, a sum which the Shipping Controller considered to be unreasonable, as the accounts showed that the cost of the military officers and men engaged on the work was $2,618,285 only, the difference being made up of the full cost of officers and men at the depot at Bristol, and of ineffectives employed on purely disciplinary duties, or sick, etc. The War Office contended that, having recruited the number of men which it was understood would be required, they were entitled to recover the whole cost to them whether the men were or were not productively employed. In the end the Shipping Controller paid the claim in full.

Concrete Ships

In his remarks on shipyard extension grants, Sir Henry Gibson deals at some length with the subject of concrete ships. For the concrete vessels required by the Admiralty it was necessary to construct special yards, and grants were made up to 30 per cent of the cost, with the proviso that after the war the yards were to be revalued, and an additional grant or a refund of grant made according to whether upon revaluation each yard was found to be worth more or less than the first cost, less the grant already paid. After the armistice the program of concrete ship construction was immediately reduced by cancelling a large proportion of the orders for ships, and the whole position was carefully reviewed. Opinion was divided as to the possibility of constructing concrete ships at a cost which would compare favorably with that of steel ships, and in view of the difficulty of finding a market for the concrete ships, if completed, the Shipping ontroller considered that the most economical course would be to maintain the cancellation of the contracts and to pay compensation to the contractors.

This course involved the cancellation of the arrangements made for the shipyard grants, and it was eventually agreed to pay the difference between the actual first cost of the yards and the residual values thereof, as determined by the chief valuer of the Inland Revenue Department. The actual first cost had been agreed at $3,022,350 and the residual value at $909,615, the charge to be borne by the Ministry of Shipping being $2,112,735, including the grants, amounting to $589,570, already paid in 1918-19 under the approved scheme.

It was estimated that if the whole of the program had been carried out the total loss to the State would have amounted to $20,585,000, and it is stated that under the arrangements made the loss is reduced to about $12,500,000. The proposals of the Shipping Controller for the winding-up of the scheme have received the approval of the British Treasury.

Cunard Meeting

At the meeting of shareholders of the Cunard Steamship Company held in Liverpool on April 28, an interesting review of the shipping situation and of developments to meet growing traffic was made. Sir Alfred Booth referred to the company's interests in the Twenty-five Broadway Corporation and in the company which will shortly be formed to construct a terminal for the use of Cunarders and others at Weehawken in New Jersey—almost opposite the piers on Manhattan Island which are now used by Cunard passenger steamers, and which will still be required when the Weehawken piers are finished. The Twenty-five Broadway Corporation is the American company which is erecting a large twenty-two-story building on lower Broadway near the custom house. This building, which has already been fully described and illustrated in the columns of Pacific Marine Review, is already well under way. Said Sir Alfred Booth: "We hope to move into the very fine quarters designed for our use next year, and shall then have space for the proper conduct of our growing business, which is now carried on under great difficulties in cramped quarters. The greater part of the building (we are, of course, only renting a comparatively small proportion of the whole) has already been let on very favorable terms, and the small portion still available is being rapidly taken up. I had the opportunity when I was in New York two months ago of going closely into the cost of the building and the rental return which is now assured. I can safely say that our investment in the Twenty-five Broadway Corporation will not only provide us with magnificent offices, but will also give us a handsome return for our money. I believe the Weehawken terminal will prove an equally satisfactory venture. In this case we have joined forces with several other shipping companies. We have secured a very valuable river frontage of about 3500 feet, partly by purchase and partly by a long lease, and on this frontage the company which will be formed to take over this enterprise will build seven or eight piers, each 1000 feet long, with sheds and warehouses complete. For convenience of railway access to all the main lines which serve the port the site is unsurpassed in New York harbor. Our interest in the company will be proportional to the number of piers allotted to us, which will be three, or possibly four, out of a total of seven or eight."

Island Wrecks, III

By Andrew Farrell

IN the hazards of the long swims men have struggled by twos and threes, briefly if desperately; a few hours at most have ended all, and the castaways have gained shore in safety or have perished at sea; to them fate has spoken curtly and decisively. And so of those shipwrecked on inhabited coasts: they live or die within the day. But to the hundreds of men who have sought the refuge of Hawaii, loss of a vessel has been only the beginning of suffering: their ship burns at sea, and before them stretches a voyage of 2500 miles in open boats to Honolulu; their craft piles up on Ocean Island, and, though they escape then, worse terrors enfold them on the long beat to windward. The isolation of Hawaii, the fact that it offers well-nigh the only island refuge in the North Pacific, and the deadly chain of reefs stretching to westward, have endowed its wrecks with marvelous and epic qualities. With the refugees life and death toy through long days; hope and despair rise with each morning; rains fall in abundance, or the sun blazes from a cloudless sky on a tossing boat filled with maddened men; night follows night, week follows week, before the wanderers pass forever from human sight or behold the clear, azure peaks of an island on the horizon. This long-drawn-out torment, this battle of a company against the ocean, is the lot of many who have gone down to the Islands in ships.

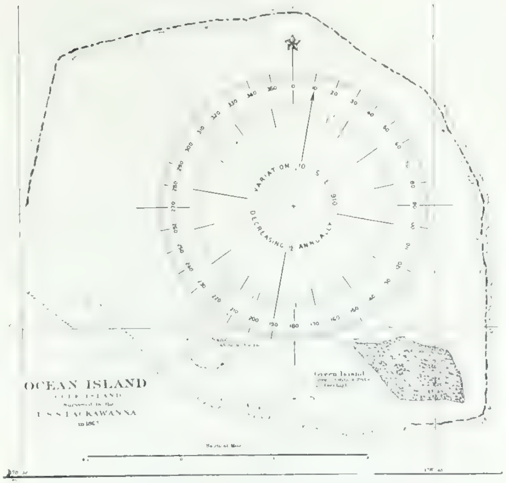
Early Wrecks of Whalers

Of the voyages to Honolulu of mariners early cast away on the leeward reefs, accounts are fragmentary: the actors in great tragedies usually are the last to leave accounts of their fortunes; we know, however, that for the most part the vessels were whalers. This is to be expected, because whaling ships were numerous and cruised widely, and few other vessels were about the Islands a century ago.

On the night of April 26, 1822, two British whalers, the Pearl and the Hermes, discovered with their bows the chain of reefs to which they gave their names. They were lost about ten miles apart. For a few days the weather remained good, so that the crews were able to salvage most of their stores. The company of the Hermes immediately set to work on a schooner in which to sail to Honolulu; but while this work was going on a third British whaler appeared and took off all the men except twelve, who elected to remain with James Robinson, builder of the schooner, and take their chances of reaching Honolulu. They did arrive at that port, after ten weeks at sea, during which they almost starved.

Wreck of the Gledstanes

At the western end of the leeward chain, on Ocean Island, the first vessel lost was the British ship Gledstanes, which struck at midnight July 9, 1837. One man, who apparently jumped overboard while intoxicated, was lost. Captain J. R. Brown and his men remained on the island for five months, during which they built a schooner from the wreck, as the Hermes' crew had done on Pearl and Hermes Reefs. In this boat, Captain Brown, the first mate and eight seamen embarked for Hawaii, whence a relief vessel was sent to take off those who had remained on Ocean Island. These men were rescued after several months of misery. Five years later, on September 24, 1842, the American whaler Parker also was trapped by Ocean Island, and within an hour was a total wreck. Only after severe struggles did the men gain the shore, where they remained, with little clothing and less food and water, for eight months, until May 2, 1843, when the Nassau removed them.



Ocean Island, on which the British ship Gledstanes was the first vessel lost, July 9, 1837. Surveys of this island have been much more complete than those of most of the others of the leeward chain.

These stories at best are too brief to be satisfactory: many a volume of struggle and suffering is compressed to a few lines in these early narratives; but perhaps the loss is more apparent than real, for other disasters, about the middle of the century, were quite similar to those of the Hermes and Gledstanes and afford an insight into their shipbuilding.

An Uncharted Land

On October 15, 1805, the Russian ship Neva, Captain Lisiansky, struck the island that now bears the skipper's name, and narrowly avoided destruction. Despite this enforced discovery, the isle appears to have gone uncharted; because, at 3 o'clock in the morning of April 12, 1844, the American whaler Holder Borden, Captain Pell, of Fall River, struck on unknown land that the master found to be in longitude 174:55 west and latitude 26:01 north.* Since that day the island has been known both as Lisiansky and Pell's.

Lisiansky Island, discovered when the Russian ship Neva struck the southeastern point where her name appears. There probably are other long reefs to the southeast. A most dangerous island.

The Holder Borden ran her bows lightly into a sand bank; and soon thereafter the stern swung around and struck on a coral reef, wedging the vessel tightly against all hope of salvage. By morning there was four feet of water in the hold.

Daybreak unveiled a low, sandy island four or five miles away, while close to the vessel lay a long line of bare rocks. Stripping the ship was begun immediately—masts were cut away; spars, rigging, anchors, chains, provisions and 1400 barrels of whale oil were landed—everything, in short, that could be of value in the desert.

Water Plentiful But Brackish

The island was about three miles in circumference and at its greatest elevation thirty feet in height, "with a swampy lagoon covered with grass in the center, into which the highest tides partly flow." Evidently it was an atoll in process of transformation into a sand island. The only vegetation was beach grass and a few flowering shrubs; of animal food there was abundance: hair seals, turtles, wild ducks and other fowl; and water was plentiful, although brackish, despite the fact that in five months there was only twelve hours of rain. (This curious phenomenon is met frequently on atolls; I leave it to the geologists to explain.) Potatoes, melons and other vegetables sprouted readily, but withered for lack of water. About the island was a reef, extending from the southeast to the south-southwest about twenty miles, which was broken by only one channel. On the leeward side of the reef the sea was calm; on the windward the breakers frequently rose to the height of a masthead.

Soon after landing, the men of the Holder Borden laid the keel of a thirty-five-ton schooner. "In its construction they labored under many difficulties, being obliged to make their saws of hoop-iron, but having a carpenter and a blacksmith with a forge and coal, they persevered, and by the 8th of September they had completed a vessel of a good model, painted, sheathed and copper-fastened throughout," said the Polynesian, of Honolulu, in its issue of October 12, 1844. "She is named the Hope, was launched on the 10th and sailed for this port on the 14th ult. (September 14, 1844), having on board Captain Pell and twenty-four of his crew, with forty barrels of oil and one cable. She arrived here on the 8th (October, 1844), having left eleven men on the island to look after the property there, which is estimated at $30,000."

The voyage thus required twenty-four days. So well was this schooner built that she sold in Honolulu for $1400. A few weeks after Captain Pell arrived at Honolulu the brig Delaware rescued the eleven men who had remained on Lisiansky, and recovered most of the whale oil salved from the wreck, although a large portion had been lost through leakage.

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* Captain Pell determined the latitude correctly; he made an error of about one degree in longitude, the correct position being approximately 173:55 west; and this mistake was not rectified for several years.

The Polynesian of August 1, 1846, thus related the story of the American whaler Konohasset, Captain Worth, of Sag Harbor:

Loss of the Konohasset

"Yesterday a small sloop arrived from Pell's Island, bringing the captain and six men of the whale ship Konohasset, five months out, no oil, wrecked on the reef extending from Pell's Island, about seventeen miles southeast from where the Holder Borden was wrecked in 1844. The Konohasset ran ashore May 24, at 1 a. m., going five knots, and in one hour bilged. The crew took to their boats and remained alongside until daylight, when they discovered the low sand island on which the crew of the Holder Borden took refuge. After securing some provisions they pulled for the land and arrived at 12 m. Here they found the remains of the H. B., and soon after discovered water (Pell's well). The wreck was again boarded and sufficient materials secured from it to construct the boat in which they arrived here. She is about eight tons, of neat model, sails well, and is called the Konohasset Junior. She was completed in eighteen days and sailed on the 20th June, arriving here (Honolulu) 31st July. The crew took on board but forty pounds of meat, which with bread and water have been their sole subsistence for forty-two days. Twenty-four of the crew remain on the island and if not speedily relieved will be likely to suffer from scurvy. The American consul intends despatching a vessel immediately to their relief.

"The cocoanut trees planted by Captain Pell have vegetated, and were about two two feet high. As they were planted close to the edge of the beach, Captain Worth, for their better security, transplanted them further back from the water.

"Pell's Island lies in 26 02 N. 174 51 W., and with its reefs extending upwards of twenty miles, not rightly laid down in the charts, is very dangerous to vessels bound to the N. W. and Japan."

The Whalers on Lisiansky

Young Mr. Dana, who wrote "Two Years Before the Mast," should have heard of these exploits. For almost a century the world has known what he thought of whaling crews: by no means were they sailors; and the oily filth and unshipshapeness of the vessels nauseated him. Nor is he alone in his strictures; it would be well if nothing worse had been said. On Lisiansky, however, we have another view of the whalers. The crews of the Holder Borden and Konohasset were two-handed men, who could care for themselves on desert islands; who knew how to build a boat and navigate it to boot; who, with canny New England thrift and foresight, salved their cargoes and planted cocoanut trees on the sandy beaches of Lisiansky. Sailor-like and man-like were they in all that they did. Their breed has disappeared except for a few men; has succumbed, rather, to steel and kerosene oil, leaving behind many a memory wild and dark; yet amid these scenes there stands, singularly sharp and bright like a cameo, sunlit, blown upon by clean winds, the spectacle of Captain Pell and his men framing that "vessel of a good model" with saws of hoop-iron.

Afire for Fourteen Days

Having been on fire fourteen days, during which her entire cargo was destroyed and her sails and rigging burned, the brig Brothers returned to Honolulu March 8, 1850. When the blaze was halted it had burned to within a few inches of a hundred pounds of powder in the storeroom.

Fire was discovered in the early morning of February 18 in a box of clothing stowed near the mainmast. In the dark night the crew and passengers attempted to extinguish the blaze by passing down water in two buckets, all they could find. Naturally, they failed, because of poor equipment and dense clouds of smoke that filled the hold and drove them choking to the deck. Recourse was had to flooding, which was done until the hold contained several feet of water; and then the single lantern was broken in the darkness and confusion of the night, leaving only the flames to light up the ship.

At noon February 19, the Brothers, being in latitude 33:55 north and longitude 155 west, Captain C. C. Soule decided to run for Honolulu; and the brig was put about. At this time she had become partly water-logged, and the pumps were manned for two hours, five feet of water, however, being left in the hold to keep down the fire. Day by day thereafter the fight went on, the flame being extinguished in one spot to reappear unexpectedly in another; and to this grim menace was added a fresh wind and heavy sea from the north that arose February 20. At noon the next day the brig's position was latitude 31:21 north and longitude 157 west. In that afternoon the wind rose to a gale, and the Brothers took in topgallant sails and double-reefed the topsails.

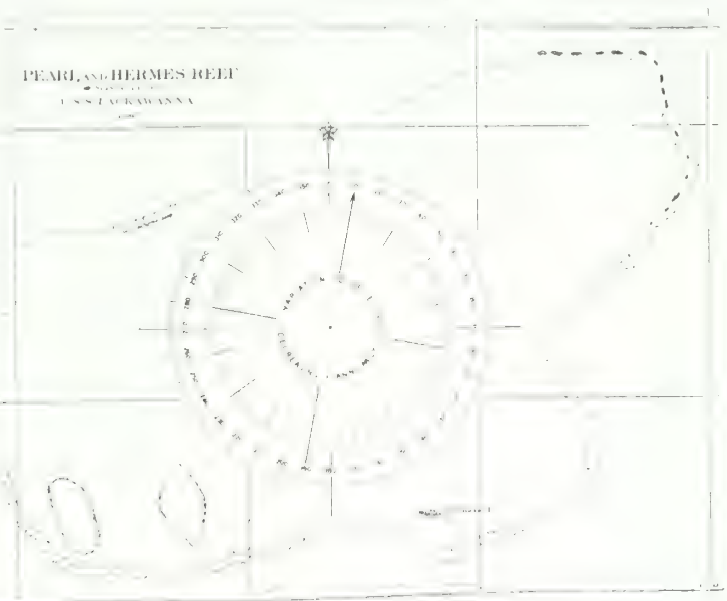
Compass Carried Away

About midnight, February 21-22, a tremendous sea swept the larboard quarter, stopping the chronometer, breaking the binnacle and carrying away the compass. During the morning the gale increased until the seas were making clean breaches over her and she rapidly began to fill. Fire and flood threatened her; and, desperate as was her case, other dangers arose: precise navigation was impossible because longitude could not be determined. Latitude observations of course were taken religiously. By noon of February 22 the brig had run down to latitude 28:12 north.

Attended by heavy squalls and rain, the gale continued blowing February 23. Another good gain in latitude had been made by noon, to 25:55 north; but the next day, February 24, the weather being unusually squally, no observation could be taken. Moreover, the fire appeared to be spreading, as many parts of the deck became insufferably hot. On the next day the gale began to abate, and during the morning the Island of Niihau was picked up, bearing east "by compass," which meant that the brig had run 200 miles or so to the leeward of Honolulu. She began her steady beat to windward, picking up Kauai February 27, north-northeast forty miles; and at noon, March 1, she made out her position as latitude 21:56 north, longitude 159:26 west. In the meantime provisions became almost exhausted and the deck was "scuttled" forward of the main hatch, but all the food was found more or less damaged.

On March 4 the snow-capped mountains of Hawaii were picked up on the starboard quarter: the brig had run past Honolulu the second time. On that day, however, the fire finally was extinguished; and after four days more of baffling about the Islands, the Brothers, on March 8, arrived at Honolulu.

(To be continued)



Pearl and Hermes Reefs, on which the British whalers Pearl and Hermes were lost April 26, 1822, thus discovering the chain of reefs and islets. There is anchorage inside the lagoon, but the islands cannot be approached by vessels closer than two miles

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MACOMBER AND WHYTE RENAMED

THE corporate name of the Macomber & Whyte Rope Company, Kenosha, Wisconsin, has been changed to Macwhyte Company, effective June 1, 1920. No change in ownership, management or policy of the company is involved.

The products of the Macwhyte Company have for several years been known and advertised under the trade name, "Macwhyte." The change, therefore, brings the name of the company into line with the name of the products.

AMERICAN BOYS FOR AMERICAN SHIPS

In what status the Jones bill would leave the recruiting service of the United States Shipping Board was in doubt until the passage of the act and approval by the President. Various changes in the system were proposed in earlier drafts of the bill, but they were deleted before passage. These changes appeared in a section at first numbered 22 and later 19, the most important being provision for the installation of an apprentice system.

In the belief that this section, if unamended, might destroy the present recruiting and training service of the Shipping Board, Captain Irving L. Evans, director of the recruiting service, in a letter to R. P. Dean, general counsel of the board, suggested a substitution for Section 22 and gave reasons why the present method of training was better than that proposed in the bill. As a result of this letter, the bill was amended, to include a proviso that nothing in the act should be deemed to impair any existing authority of the board to maintain the recruiting service; but Section 19 (virtually the same as the original Section 22) nevertheless continued to carry the provisions regarding apprentices on board government and privately-owned vessels.

Now comes the bill, in its final form as passed and approved by the President June 5, without any of the provisions of Sections 19 and 22 of the earlier drafts, so that there is nothing regarding an apprentice system. Although the plan thus has been dropped, those interested in American Boys for American Ships will find food for thought in the various changes which the bill underwent.

Section 19 follows:

"That the board, as soon as practicable after the enactment of this act and from time to time thereafter, is authorized and directed to determine what apprentices should be carried upon vessels documented under the laws of the United States and to prescribe the duties, compensation and conditions of employment of such apprentices and to make rules and regulations requiring such apprentices to be carried on the vessels of the board, on vessels sold by it, and on vessels having contracts for the carrying of the mails, and the board is directed to submit to Congress from time to time its recommendations for additional legislation to make available a sufficient number of officers and able seamen who are citizens of the United States to officer and man the merchant marine of the United States to such an extent as it may deem desirable: Provided, that nothing in this act shall be construed to impair any existing power or authority of the board to organize or maintain its recruiting service."

Recommend Continuing Service

Captain Evans' letter to Mr. Dean, arguing against the apprentice system, was as follows:

"Confirming our verbal discussion of the effect of Section 22 of the committee Print H. R. 10378, referring to the promotion and maintenance of an American merchant marine, etc., I beg to submit the following:

"On March 1, 1920, the Shipping Board appointed a committee, consisting of Commissioner Scott, the director of operations and myself, to confer with the managers of Shipping Board vessels as to the question of continuing the recruiting service, which has been since the beginning of the war and is now training officers and men for our merchant ships. This question was duly submitted to the managers of Shipping Board vessels and on March 19, 1920, through a committee representing them, the managers recommended that the recruiting service be continued.

Resolution of the Board

'Acting upon this recommendation, the Shipping Board on April 5 passed a resolution authorizing certain changes for the best interests of the service. This resolution read in part as follows:

" 'Whereas, on March 1, 1920, the board appointed a committee to confer with the operators of Shipping Board vessels as to the question of continuing the recruiting service; and

" 'Whereas, that question was duly submitted to the operators and they have recommended the continuance of said service; and

" 'Whereas, it is the sense of the board that the recruiting service should be continued, subject to such changes and modifications as the best interests of the service may require from time to time, etc.'

65 PER CENT ARE AMERICANS

In American Boys for American Ships, June number, Pacific Marine Review, a typographical error in the address of Captain Irving L. Evans, director, recruiting service, United States Shipping Board, before the National Marine League, New York, made Captain Evans say that "of all men placed on ships by the recruiting service during the last six months 6 per cent have been Americans," whereas the statement should have read' "65 per cent have been Americans"—two of three instead of one of sixteen.

"It appears from an examination of Section 22 of the act above referred to that the present system of training which has been approved as outlined above would not be authorized. I believe that this is a matter in which Congress should at this time adopt a liberal policy, that is, give authority to the board to determine and carry out, upon proper recommendation of the vessel managers, that policy for providing officers and men, which will give the best results and highest efficiency to our merchant marine.

"I attach hereto a memorandum which I believe could be substituted for Section 22 of the act above referred to.

"Some of the most important reasons which suggest the present method of training in preference to that proposed are given below.

"First—The policy of placing apprentices on each merchant ship adds an extra burden to the operating expense. Since the government is trying to induce private capital to purchase government vessels, no unnecessary burdens should be added, which constitute obstacles in the way of the sale, especially until we have had an opportunity to determine what burdens our ships can carry and at the same time succeed in open competition with foreign ships.

"Second — The aggregate expenses of carrying apprentices on each ship would exceed the expense of training under the present system or a similar system.

"Third—In addition to the wages and subsistence of apprentices, alterations would have to be made in a large percentage of the vessels to accommodate such apprentices, as they have no accommodations at present beyond the regular crew requirements.

"Fourth—Judging from the action of the vessel managers in recommending the continuance of the present general system of training, such system is satisfactorily meeting our requirements.

Instructors Take Pride in Work

"Fifth—A further serious objection to the system of having apprentices on each ship is that comparatively few officers or men are qualified as instructors or even inclined to give any assistance or advice to apprentices, while under the present system we have men thoroughly qualified for the work, who take a special interest and pride in the advancement of the men. Also, under the present system the men receive intensive training in seamanship, boat - drill and other preliminary work. Men receiving training on the regular cargo and passenger ships develop more slowly because of the lack of interest in them and therefore they are unable to learn until the actual necessity arises to do a particular thing.

"Sixth—I have heretofore urged and still strongly advise against having extra men placed on regular cargo or passenger ships for training purposes. One of the objections to such policy is that it would form a dangerous labor precedent and if systematically followed would soon become the basis for the demand that the extra men are needed permanently as part of the ships' regular complement. This applies particularly to the training of men below the grade of officers.

Engineers Trained in Turbines

"Seventh—Under the present system the government is now giving to men who have actually had experience at sea, the necessary technical training to qualify them for an officer's license. This includes training of deck officers and engineers. We are also training experienced licensed marine engineers in the operation and repair of marine turbines. This work is carried on in the plants of the turbine manufacturers. All the foregoing would be abolished under Section 22 of the act referred to as it now stands."

The memorandum which Captain Evans suggested for Section 22 follows:

"Section22. That the board is hereby authorized and directed in aid of the development and maintenance of an American merchant marine to determine whether apprentices should be carried upon American ships or some other suitable method of training adopted to make available a sufficient number of officers and able seamen who are citizens of the United States, to officer and man our merchant marine, and the board is directed to make and to change from time to time such rules and regulations, and to submit to Congress its recommendations for such additional legislation as may be found necessary to carry out the purpose of this section."

8800-Tonner for Training

One decision was made by Captain Evans, on a visit to San Francisco and Seattle in May and June, that will improve immediately the training system of the Pacific. This is the assignment of a standard 8800-ton steel cargo vessel to a triangular voyage between San Francisco, Puget Sound and the Hawaiian Islands, the steamship to have quarters for 150 boys. Heretofore the deep-sea training, following upon the preliminary instruction ashore, has been given on smaller vessels, the Brookdale, for example, on the Pacific, besides wooden steamers on the Atlantic and sailing vessels such as the Moshulu and Monongahela in the Oriental trade. The assignment of a standard 8800-ton steamship for training is expected primarily to reduce the expense of the government, inasmuch as the vessels used up to this time have been small carriers (the Brookdale transporting only about 1800 tons of cargo); whereas the new ship will carry much more, enabling her to pay the expense of maintaining and instructing the recruits, with perhaps a profit besides. There are other considerations, however, among which is the belief that the youngsters will take more pride in their work if they are placed on what they can regard as a "real ship." But, for the present, at least, the Brookdale will be retained in service on the Pacific.

On the outward voyage, the new training ship will burn coal; on the homeward voyage, oil. By using two fuels the engine-room recruits will be given instruction in the handling of both. The deep-sea service will succeed the customary period of two or three weeks' preliminary instruction ashore; and, upon the return of the training ship to San Francisco, the boys will be ready to ship on a commercial vessel.

May Go to Far East

This plan for the operation of the 8800-tonner is definite only for the summer months. During the winter she might be left in the Island trade, should freights demand; but there also is under consideration the project of sending her across the Pacific, to the Philippines, Japan, China or Australia. When the northern fishermen return toward the end of the year the demand for recruits will not be so great, a fact that will make it possible to give the youngsters a longer voyage than they will have during the summer months on the run to the Islands.

Quarters for 150 boys will be arranged in the deckhouse amidships. Unless there should be an unusual demand for apprentices of one class, two-fifths of the recruits will be engine-room, one-fifth steward, and two-fifths deck. The number of boys might be increased, although not without crowding (which Captain Evans wishes to avoid); and, of course, the number could be reduced should the demand decline. The mess will be cafeteria style, which experience has proved results in a saving of 20 to 25 per cent in food. Inasmuch as the quarters will be amidships, above the engine and fire rooms and near the funnel, special asbestos and air-space insulation against heat will be provided.

A large recreation room, approximately 28 by 22 feet, will be in the forecastle.

Captain Evans found a vessel under construction on the west coast that could be refitted to provide quarters for the boys at a minimum expense. Before arriving at a decision to use an 8800-tonner he had a series of conferences with shipping officials of San Francisco and Seattle. This new system may not be followed in all its details when the final policy has been drawn up by the recruiting service, but at least it will afford much valuable data.

Captain Evans had desired to have the bark Moshulu assigned to the Pacific for training recruits to become officers, and the ship Monongahela to the Atlantic for the same purposes; but both vessels have been sold by the Shipping Board.

To Improve Recruiting

In one noteworthy respect the West has lagged behind the East: recruiting men in the inland states has not been done so thoroughly. Agents of the board have been working as far west as Minnesota, enrolling boys and sending them to the training centers on the seaboard. This work has been done in the West also, but not with the same degree of thoroughness; so that Captain Evans wishes to place permanent agents in the interior states, each with a definite territory of somewhat wide extent. These men would cover their fields, enlist boys, have them examined physically, and sent to Seattle or San Francisco.

In all these projects nothing has been brought forward for a definite program of training boys as officers. The only education now offered by the board is to promising youngsters who have had several months' experience at sea; such boys are instructed in navigation and other essentials, and, this having been completed, may be sent to vessels as cadet officers to complete the time at sea required to qualify them for licenses. This system has been supplemented by different steamship companies, which placed cadets aboard vessels for the entire period of service at sea, so that these youngsters could qualify for licenses without service as seamen. But the board has no system comparable to that of the different nautical schools. This weakness of the training program will receive Captain Evans' attention.

Suzuki Shipyards and Steel Works

General view, Harima yard, Teikoku Kisen Kaisha

THE name Suzuki ranks high among the giants of Japanese industry and commerce. That name is not so well known in the States as it should be, despite the fact that Suzuki & Company have many branches and that the name appears frequently in English newspapers published in the Far East. On the whole, if one could ascertain the status of the Suzuki family, he probably would discover that it was a real rival of the better known firms of Mitsui and Mitsubishi. But the Suzukis have not advertised their wide-flung holdings by giving their companies their own name; the precise extent of the financial power is known to few and these companies that are recognized popularly as Suzuki firms are generally those in which the family has a complete or large majority control. Breweries, spinning mills, steamship lines and yards, to cite three or four, will indicate the broad nature of the Suzuki enterprises.

Take, for example, the Teikoku Kisen Kaisha. That name will mean little to the average citizen of the States, interested though he is in Japan. Yet it is the Teikoku line that is meant when one speaks or writes of the Suzuki steamships. And that company not only operates its own vessels, and charters very many more, but it also controls two building yards—those of Toba and Harima—besides the Kobe Steel Works, one of the most important of the empire.

A visitor from the States cannot fail to be impressed by the number of alliances between shipbuilders and operators in Japan. The Yokohama Dock is popularly known as an arm of the Nippon Yusen Kaisha; Uchida is a name to conjure with in shipping as well as in shipbuilding; there are a Kawasaki yard and Kawasaki steamship line; Mr. Asano is the directing power of the Toyo Kisen Kaisha and the Asano Shipbuilding Company; and so on and on.

Iwajiro Suzuki, long dead, founded the great firm. There survive his widow and two sons, Iwajiro and Iwajo, the two latter being the Messrs. Suzuki of the newspapers. At their right hand is Nawokichi Kaneko.

In March, 1916, the Suzuki interests bought the Harima and Toba works. Prior to that time, neither had built large vessels. Although Harima had been established for twenty years, it had constructed only small steel steamers, in addition to doing repair work; but under the Suzukis the yard was extended greatly. At Owe, a small fishing village, fifty miles west of Kobe, where the yard is situated, the Suzukis built houses to accommodate 5500 workmen and their families, probably 15,000 persons, all told. In the field of building, these figures will demonstrate how the yard grew:

Year	Number of Vessels	Deadweight Tons
1916	3	3600
1917	4	8500
1918	13	34,700

Included in the number of vessels were: one small launch in 1916; one tug in 1917; two tugs and one launch in 1918. The capacity of the yard is about 100,000 deadweight tons a year. The largest vessels have been of the Eastern Shore class, 11,000 tons deadweight, which was built for the United States Shipping Board in

Another view, Harima yard, Teikoku Kisen Kaisha

1918; keel laid February 5, 1918; launched August 12, 1918; delivered at Seattle October 20, 1918. The keel of the other Shipping Board vessel, the Eastern King, of 5000 tons deadweight, was laid November 11, 1917; she was launched January 1, 1918, and was delivered at Seattle July 31, 1918.

Among vessels built in 1919 were the Eastern Soldier, 11,000 tons deadweight, and the Eastern Pilot, 5000 tons, for the United States Shipping Board; besides three 11,000-tonners and one 4950-tonner for Japanese.

The Eastern Soldier was classed as a 10,500-tonner on the lists; however, a sister gave 11,032 tons. She is 425 feet long, 53 feet 8 inches beam, 29 feet depth of hold; single screw, equipped with three Scotch boilers and triple-expansion reciprocating engines. The contract called for a speed of ten and one-half knots an hour on a six-hour, continuous trial. Under full load the Eastern Shore drew 28.8 feet, which is approximately the draft of the Eastern Soldier.

Although much smaller, the Eastern Pilot had the same trial speed—ten and one-half knots. She is 325 feet long, 43 feet 9 inches beam, 27 feet 3 inches depth of hold; single-screw, and having three boilers and triple-expansion engines.

Five Ways at Harima

All the five Harima ways are of the same dimensions—500 feet by 60—and all are of concrete on wood piling. They are new, having been built in 1916 and 1917. Seven-ton traveling cranes and three-ton derrick posts serve them. In general, a steamer could be delivered within three or four months after the keel laying. The Shipping Board contracts were for delivery eight months after the last consignment of material was dispatched from an American port.

Besides the usual shops found at a shipbuilding yard, Harima has boiler and engine shops, which, however, are regarded principally as reserve, to be called upon when the Kobe Steel Works cannot supply machinery. The yard has an iron and brass foundry; the usual locomotive and other cranes, besides a fifty-ton floating crane; and a graving dock, the dimensions of which are as follows: length, 440 feet; on bottom, 428 feet; breadth at entrance, 57 feet 8 inches; depth of water on the sills at high tide, 21 feet 4 inches; at ordinary spring tides, 20 feet.

Neither Harima nor Toba has built many vessels under contract, most of the ships having been for builders' account. The principal exceptions were the vessels for the Shipping Board and one 3500-ton steamer. Through the embargo on steel, the Shipping Board was able to command the Suzuki yards as well as the others of Japan. Of the stock vessels, some were sold, when prices were sufficiently attractive; but the Teikoku Kisen Kaisha has built primarily for itself. It did contribute vessels to the new Kokusai Kisen Kaisha, or the International Steamship Company.

Toba did not build for the Shipping Board. It is situated near the famous Ise shrine, 136 miles from Kobe, or midway between Kobe and Yokohama. Prior to the purchase by the Teikoku company, late in 1915, it built only small wood steamers and did repair work. It has engine and boiler shops and employs 3500 workmen. There are two ways, about 300 feet by 45, of concrete on wood piling, which can build a steamship up to 5000 tons deadweight. Three-ton derrick posts serve the ways. Toba's 1919 program was: one 3500-tonner, March delivery, for Uenishi, Kobe; two 3500-ton stock vessels, June/July and September/October delivery; one 1950-ton stock, August/September delivery; one 3500-ton stock, December/January delivery; one 1950-ton stock, November/December delivery; one 3700-ton stock, February/March, 1920, delivery.

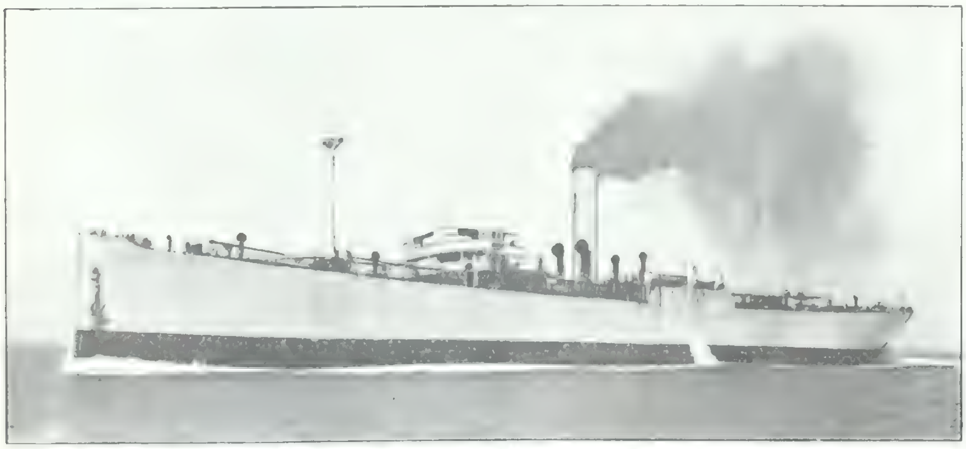
Temporary Yard Closed

A temporary yard, Naniwa, at Osaka, launched two vessels in 1919, both 3500-ton stock, but it was abandoned, and it is the intention to build no more there.

A graving dock at Toba has these dimensions: length, 294 feet; length on bottom, 292 feet; width on top, 52 feet; on bottom, 46 feet; depth of water on sills at high tide, 18 feet; at ordinary tides, 16 feet.

Five thousand men are employed at the Kobe Steel Works. Under the name of the Kobayashi Seikojo, it was established in 1903; Suzuki & Company purchased it in 1905; changed the name, improved and extended the plant and started it on the way to its present commanding position. In 1911 it became a stock company.

There are two sets of Siemens-Martin open hearth furnaces of ten and twenty tons, respectively, and the program is for a further extension. In the foundry there are three sets of mold drying chambers and four electric traveling cranes—twenty-five-ton, fifteen, ten and five. The brass foundry has eight sets of crucible furnaces, two drying chambers and a three-ton electric traveling crane. The other shops have:


Eastern Shore, 11,000 tons deadweight, built by Suzuki for the Shipping Board

Machine Shop No. 1 — One hundred lathes, drills, planers, slotters, saws, air compressors; a 200-ton hydraulic press; three sets of five-ton overhead traveling cranes.

Machine Shop No. 2—Two hundred machine tools, such as two automatic gear cutters, thirteen milling machines, twenty-one planers and slotters, eight grinders, shrinking apparatus, a steam trial apparatus with air reservoir, and piping for testing air compressors; one twenty-ton, three five-ton and one three-ton traveling cranes.

In the smith shop there are: seven sets of enclosed furnaces, two sets of gas generators; one five-ton overhead traveling crane; seven sets of jib cranes; two three-ton, one one-and-one-half-ton, one one-ton, one three-fourths-ton and one one-fourth-ton steam hammer.

Hydraulic press works: one 1200-ton and one 500-ton steam and hydraulic forging press.

Testing room: one thirty-ton Backton testing machine; a Shoer scleroscope; a chemical laboratory, besides other equipment.

In the Power House

Power house: two sets of 125-horsepower gas engines and two seventy-five-horsepower steam engines, connected to four sets of direct current dynamos, generating in all 400 b. h. p. Steam engines in addition generate about 500 b. h. p., and the Kobe Electric Company supplies 400 horsepower besides.

Tool factory: forty machines.

The melting capacity is 20,000 tons of steel and 2000 tons of alloys a year. Steel castings up to thirty tons and alloy castings up to two and one-half tons can be made. The maximum weight of steel forgings is twenty tons. Four Scotch boilers of 15 feet 9 inches diameter and three engines for 11,000-ton deadweight steamers can be built a month. No watertube boilers have been constructed, but it is the intention of the plant to engage in that work eventually. Other products are: car wheels, stern and rudder frames, shaft brackets, stern tubes, anchors, mine crushers and rollers; tumblers, buckets and back pieces for dredges; sugar mill rollers and crushers; hydraulic cylinders, dynamo yokes, transmission gear.

Military and Naval Work

Steel forgings: special ingots of any required hardness; nickel, manganese and other special steels; shafts for men-of-war and merchant vessels; projectile material.

Machine shop products: gun carriages, ammunition hoists, torpedo tubes and accessories, air compressors; other military materials.

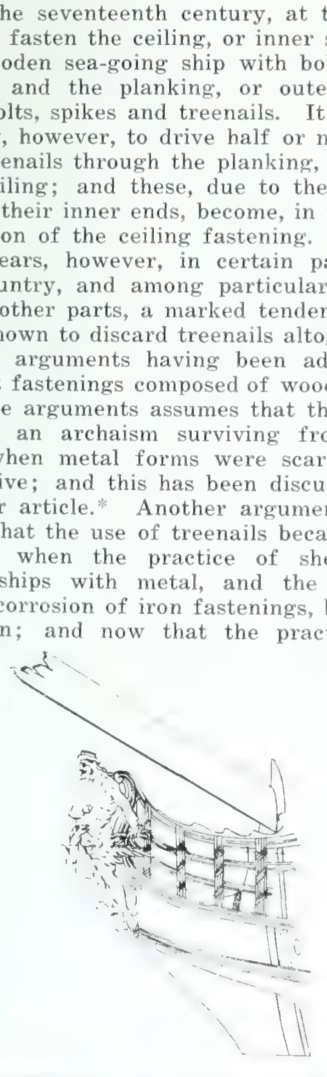
In addition, the plant turns out mining machinery, tools, high-speed drills, cutters, reamers, taps, dies, ball-bearings and special bronze and brass castings of a maximum tensile strength of thirty tons to the square inch, and 28 per cent elongation. No steel plates are rolled.

Bolts Versus Treenails as Fastenings in Wooden Ship Construction

By **A. K. Armstrong**
Formerly Assistant to Chief Surveyor, American Bureau of Shipping

LONG cylindrical wooden pins, employed to connect the planks of a ship's side and bottom to the corresponding timbers. The treenails are justly esteemed superior to spike nails or bolts, which are liable to rust and loosen, as well as to rot the timber; but it is necessary that the oak of which they are formed should be solid, close and replete with gum, to prevent them from breaking and rotting in the ship's frame. They ought also to be well dried, so as to fill their holes when they are swelled with moisture. They have usually one inch in thickness to 100 feet in the vessel's length; so that the treenails of a ship of 100 feet long are one inch in diameter; and one inch and a half for a ship of 150 feet.—Definition of treenails taken from William Falconer's Universal Dictionary of the Marine, published by T. Cadell, in the Strand, London, 1789.

It has long been the practice (dating from the seventeenth century, at the latest) to fasten the ceiling, or inner skin, of the wooden sea-going ship with bolts and spikes, and the planking, or outer skin, with bolts, spikes and treenails. It is customary, however, to drive half or more of the treenails through the planking, frames and ceiling; and these, due to the wedging of their inner ends, become, in reality, a portion of the ceiling fastening. In recent years, however, in certain parts of the country, and among particular builders in other parts, a marked tendency has been shown to discard treenails altogether; several arguments having been advanced against fastenings composed of wood. One of these arguments assumes that the treenail is an archaism surviving from the days when metal forms were scarce and expensive; and this has been discussed in another article.* Another argument supposes that the use of treenails became advisable when the practice of sheathing wood ships with metal, and the consequent corrosion of iron fastenings, became common; and now that the practice of sheathing has fallen into disuse, the employment of the inferior wood fastenings should be discontinued. One writer, evidently a devout man, partially accepts the story of the Ark; and considers that since Noah used treenails, the very conservative followers of his profession have never entirely discarded the practice. This argument fails of its own weight; since, if the entire story of the Ark is accepted, it must be admitted that the specifications for this redoubtable craft were perfect, according to the Bible, having been drawn up by Jehovah Himself. Leaving this matter as it stands, the apparently legitimate arguments against the use of treenails will be considered in the following paragraphs:



General Arguments Against Their Use

Some of the arguments advanced against the treenail were printed as early as 1817. In that year there appeared, in London, a book by Isaac Blackburn, entitled "A Treatise on the Science of Ship Building," in which it was stated:

"Treenails are a very inferior fastening; the material is too weak, they generally soon decay, and it is around the treenail holes that the timbers decay first.

"The treenail is, in every respect, the most inferior fastening, with regard to either security, durability or economy."

The arguments in favor of all-metal fastenings invariably bring up these, or similar, arraignments of the treenail, and add others, without presenting specifically the data concerning the cases in which the treenail has apparently been unsatisfactory. In fact, where specific statements are made and the properties of the treenail in any way discussed, so great a misapprehension as to the properties of wood in general are shown that the argument put forth is hardly ever worth consideration.

Oak Timber Had Disappeared

It may be said in passing that Blackburn's treatise appeared at the end of the Napoleonic wars, whose tremendous demands upon the British navy had resulted in the almost total obliteration of England's remaining stand of oak timber; and it is to oak treenails and oak ships that Blackburn referred. These ships, built in an emergency, had been constructed hurriedly of green oak timbers (which is a far different matter from green pine or fir heartwood), and, consequently, gave very poor service.

Leaving this aside, however, it is proposed to discuss all the points brought up with reference to metal fastenings as well as treenails; but it is to be borne in mind that true black locust (Robinia pseudacacia) treenails of good quality and not inferior species, such as English oak, are the basis for comparison.

Points to be Considered—Durability

CORROSION.—England, from the earliest times, built its ships of oak; and transplanted English shipwrights, in the early days of the Colonies, turned to trees of the same genus for their supply of ship timber. They, no doubt, knew that the great drawback to the use of oak is its acid content, which causes the corrosion of all iron that comes in contact with it.

Where oak is used it would be better, of course, to employ copper or brass fastenings in place of iron, since these are but slowly attacked by the acid in oak. Expense, however, always has made the use of copper or its alloy undesirable, except where safety absolutely demands it. Consequently, where a copper or composition sheathing upon a ship's bottom indues corrosion, through electrolytic action, in all iron fastenings in contact with the sheathing metal, it has been found safer (and less expensive in the long run) either to use fastenings of the same composition as the sheathing metal, or the still far less expensive treenails.

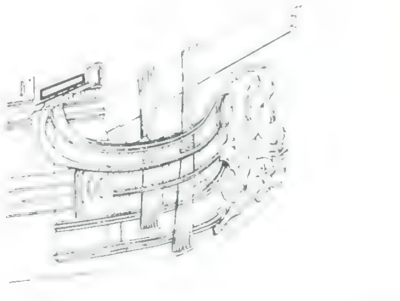
Oak Falling Into Disuse

Today, metal sheathing is not a factor that needs to be often taken into account, and oak is falling more and more into disuse as an important ship timber; so that, from the standpoint of the corrosion of iron or steel fastenings by either material, no further discussion is essential, except to state that iron or steel driven into oak should be at least galvanized.

However, iron and steel are not only corroded by contact with the acid in oak, but also through the chemical and electrolytic action induced by sea water. Even copper is not immune to this action, although its rate of destruction is apparently much lower than that of steel. According to Commander R. W. Meade, U. S. N. (1869), cast iron and steel in ship construction "decompose rapidly in warm or impure sea water"—testimony borne out by the results of numerous experiments and investigations by those not primarily interested in ship construction. It is also a matter of common knowledge that the modern steel ship requires the utmost care and protection against corrosion to make it last for even twenty years.

Zinc Not Permanent

In modern practice the attempt is made to prevent corrosion by sea water through the galvanizing of all iron or steel bolt and spike fastenings which are to be subject to contact with this element. This is effective so long as the zinc coating remains, but since the zinc protects the iron



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* "The Antiquity of Various Iron and Wood Planking Fastenings for Wooden Ships," by A. K. Armstrong, Pacific Marine Review, November, 1918.

or steel by itself wasting away, it is not to be expected that the corrosion of iron or steel can be prevented indefinitely by this means. Meade stated that "during some recent experiments (1864) in England, it was found that zinc sheathing upon iron lost about .002 inch of its thickness by six months' exposure to sea water." Another authority stated in 1868 that ships sheathed with British zinc required resheathing in twelve months, whereas when Belgian zinc was employed renewal had to be made on an average of every three years, but sometimes not for six or seven years. This was just after a period when, in American practice, it was found that copper sheathing on wood ships, subject to voyages in all seas, had to be renewed on an average of once every three years. These figures would indicate that the life of copper or zinc in sea water may be comparatively short; and that galvanizing cannot be depended upon to protect the iron or steel fastening for any long period.

In this connection it is to be noted that a planking bolt requires to be headed before galvanizing; which would generally necessitate the installation of a galvanizing plant at the shipyard. Under such conditions galvanizing is often found to be unsatisfactory. It is also evident that, in driving, especially with long bolts, the galvanizing on the head is likely to be beaten off or ruptured; in which case the entire effect of the zinc coating may be as utterly lost as if the bolts were headed in the fire just prior to driving. The latter is a practice all too common.

Plugs Driven in Countersinks

Further precautions are taken to prevent salt water from coming in contact with the heads of iron or steel fastenings; that is, by driving wood plugs, dipped in white lead, into the countersinks over the heads of the bolts and spikes exposed directly or indirectly to the action of the weather or water. These plugs are dry when placed, and are set with their grain running parallel to that of the plank or other member which receives them. Since they are driven tight and, in most cases, subsequently swell, they completely fill the countersinks and aid in protecting the head of the fastening from corrosive action.

Corrosion of iron and steel bolts is also likely to be caused through the practice of salting, the brine resulting from this process being considerably more active in this respect than sea water. This being the case, it would be necessary to protect the iron fastening, so far as this is possible, by galvanizing; which would apply to ceiling and other fastenings subject to the action of brine, as well as planking bolts and spikes.

In any event, corrosion of the iron or steel fastening in parts affected by the acid of oak, by salt water or by brine, ultimately will take place; with the result that the metal, being oxidized, will swell in volume. This will cause an enlargement of the hole surrounding the fastening, and, since the rust formed by corrosion has little cohesion, the holding power of the bolt or spike is partially or wholly lost. The probabilities that the wood surrounding corroded iron is otherwise deteriorated is strongly indicated by its condition, since brittleness seems a characteristic effect.

Water Does Not Corrode Wood

DECAY.—It should be unnecessary to state that wood is not corroded by the action of sea water, or brine; and, if of a very durable species, such as true black locust, will suffer no detriment from any cause for a very long period. When always covered with water, either salt or fresh, no wood will decay, and, aside from mechanical destruction, will last for ages. This is abundantly attested by great numbers of examples, the wood piles under the buildings of Venice being one of the best. Even when exposed to alternate wetting and drying, a durable wood will give much longer effective service than iron or steel exposed to the same conditions. Nothing will be said here relative to effective preservative treatments of strong non-durable woods; since the best treatments, while rendering easily decayed woods equal in life to durable woods, are considered objectionable by ship operators on account of odor.

Regarding "Hearts of Oak"

Blackburn's strictures against treenails, because of their low durability and consequent quick decay, undoubtedly refer to oak, of which the English treenails were made. The durability of the English variety, although reputed greater than that of the American species, has probably been much over-estimated, due largely to the fact that "hearts of oak," being the pride of the Briton's heart, always have been the standard of durability among the English-speaking peoples. On the other hand, in the United States, true black locust is the standard for all treenail woods; and is so recognized by all first-class shipbuilders. No complaint is ever made that black locust treenails soon decay, since they invariably outlast the remainder of the ship.

Blackburn also charges that timbers first decay around the treenail holes. If water percolates between the timber and the treenail, this is to be expected; but under like conditions the same thing is bound to occur where metal fastenings are used. Percolation indicates a slack treenail or bolt—the most useless thing in a ship. It must be concluded, from the properties of all woods, that water is less likely to percolate around a good treenail than around a bolt or spike; since, when driven, it does not crush and tear the fibers of the wood around it as does the bolt or spike, and it swells to a tighter fit when wet.

Surrounding Wood Attacked

If the treenail is of a wood that readily decays, it is apparent that the wood surrounding the treenail also is likely to be attacked. It is safe to say, however, that the wood surrounding the treenail is likely to be attacked by decay through conditions in which the treenail is not directly or indirectly concerned; and that, if a species like true black locust is employed for treenail purposes, it will be called upon to resist the transmission of decay from the surrounding wood to itself rather than vice versa. This is the more readily apparent when it is remembered that treenails are made of seasoned wood, whereas the rest of the structure seldom is.

Another point must, however, be considered, when discussing treenails with respect to the durability of the surrounding wood. Many species, such as hickory, blue gum (Eucalyptus globulus), red oak and chestnut oak (a so-called commercial white oak), all of which are sometimes used for treenails, are porous; and, even under a small head of water, will allow seepage through their pores. Such seepage easily might result in the decay of the wood around the treenail, and also of the treenail itself. This condition is not found in true black locust, the true white oaks, live oak and osage orange; so that the matter resolves itself into the selection of proper species for treenail purposes.

Wood Outlasts Iron

With respect to corrosion and decay, this can best be summarized by stating a recent case where fastenings were taken from a vessel then forty years old. The wrought-iron bolts were so badly corroded that the fibrous ridges of the sound metal stood out all over the surface, scarcely any vestages of the original cylindrical form remaining. The composition fastenings in many cases could be crumbled by twisting their remains between the fingers. The locust treenails were as sound as on the day they were driven; and were fit to go into service for an additional forty years. The wrought-iron had been plugged; and it was undoubtedly more resistant to corrosion than the steel now employed for bolt fastenings.

WEIGHT.—Two requisites of good ship design are carrying capacity and speed. For a given size vessel and a stated power both are reduced by any unnecessary weight put into the construction of the ship; and it is the object of all efficient design to make the structure as light as safety will permit.

Since iron weighs 480 pounds a cubic foot and the heaviest of treenail woods will not weigh probably more than sixty pounds a cubic foot in service, it follows that wood has a considerable advantage in the matter of weight, especially when it is considered that a treenail simply adds wood at a place where wood has already been bored away.

200 Pounds of Iron to Ton

According to one writer, it formerly was the custom in this country to figure forty pounds of iron fastenings to each ton of displacements; but if this was true it would indicate that, in modern shipbuilding practice, considerably more iron is being used than formerly. At the present time some builders on the Atlantic Coast figure 200 pounds of iron to every 1000 feet of lumber that goes into the ship's hull. Taking the standard wood steamship of the United States Shipping Board as an example, and forty pounds of iron a ton of displacement as a basis for calculation, the total quantity of iron required would come to, roughly, 100 tons. On the basis of 200 pounds of iron to 1000 feet board measure, and 1,400,000 feet of lumber, the amount required would be 140 tons. The tables of materials for these vessels call for approximately 170 tons of iron; and deducting the weight of the tie rods, strapping and stem bar, 135 tons of iron fastening remains. This closely approaches the basis of 200 pounds of iron to 1000 board feet of lumber.

since the builders who thus estimate made no provision for tie rods of strapping. Taking the gross tonnage at 2100 tons, it is evident that the iron fastening runs between 125 and 130 pounds a ton gross.

Compare these figures with some given by Hall (10th Census Reports, Vol. VIII), which would tend to show also that the estimate of forty pounds a ton of displacement was too low: The Mexico, built at San Francisco about 1880, contained a smaller proportion of treenails than ordinary; was 275 by 36 by 28 feet, or approximately 2100 tons gross; had 900,000 board feet of lumber in her construction; and was fastened with 300 tons of bolts, spikes, straps, etc. This weight of fastening runs about 288 pounds a ton gross, or 666 pounds to 1000 feet of lumber. A Lake vessel of the same date, 278 by 39 by 21½ feet, all iron fastened, required 300 tons of iron; or, on the basis of approximately 1750 tons gross, about 343 pounds of iron a ton gross. The steam barge Columbia, built on the Lakes prior to 1880, required 800,000 board feet of lumber and 125 tons of iron. She was all-iron fastened. She shows about 312 pounds of iron to 1000 board feet of lumber.

The Lake vessels always showed a high proportion of iron; which was due to the fact that thin flitch frame-timbers, scarcely ever exceeding six inches in siding, were employed. This small siding called for the smallest diameter of fastening that could be used safely; hence bolts and spikes were employed exclusively. This practice could be followed with less risk, in that the vessels operated only in the six or seven warmer months; and, in the fresh water of the Lakes, the corrosion of iron was not vital. Later, several of the Lake builders transferred their operations to the Pacific Coast, where they apparently followed and advocated a practice the basic reasons for which had ceased to exist. In one particular case a transplanted Lake builder continued the use of thin flitch frames, widely spaced, when the conditions of the lumber supply and the ocean service for which his vessels were intended made this inadvisable. The history of the wood and steel Lakers which have attempted ocean service is the best argument for adopting Lake practices with caution; which, although satisfactory for inland service, are not successful when carried into ocean construction.

Going farther with the discussion of the weight of fastenings, the standard wood steamship of the United States Shipping Board will be used as a basis for showing how it is possible perceptibly to increase the weight of a vessel through the use of all-iron fastening.

Weight Greatly Increased

The materials list of this vessel calls for 4500 treenails, 1¼ by 26 inches; 12,500, 1⅜ by 32 inches; and 7500, 1⅜ by 36 inches. As a matter of fact, the treenails were considerably longer than as originally specified above. The equivalent diameters of iron planking bolts given in the published rules of the American Bureau of Shipping are 7/8 and 15/16 inch respectively. Upon this basis the weight of the equivalent iron is seventy-five tons; or an increase over the actual weight of the treenails of at least sixty-five tons. Thus, by the use of iron instead of treenails, about 40 per cent would be added to the total weight of all the iron fastenings, and 2 per cent to the total estimated deadweight of the ship.

Unless it be intended to disregard efficient design, the increase in weight resulting from the use of all-iron fastenings is a factor to be reckoned with, especially in view of imminent load-line legislation.

Resistance to Direct Pull

RELATION TO MATERIALS.— It is generally accepted, but, so far as known, never demonstrated by test, that the holding power of iron against direct pull from wood is greater than that of wood from wood. In this connection it is to be noted that wood can be compressed very little in length in the direction of the end-grain and side-grain before it takes a permanent set. The ultimate compressive stress along the grain is reached with only a slight deformation; so that no benefit is gained by driving so as to develop more than the maximum compressive stress in the endwise direction. Across the grain the resistance to compression keeps on going after the material has taken a permanent set; but this resistance to compression cannot be counted upon to an indefinite degree, since at a certain point the resistance of the wood to splitting is overcome and the plank or timber fails in this manner. It is probable, therefore, that considering the increase in diameter of the treenail over that of the iron, the greater friction of like materials upon one another; the ability of the treenail to swell after it is in place; and its lesser tendency to tear and distort the fibers of the timber in driving, the resistance to direct withdrawal, when properly driven, is not less than that of the iron driven in the same proper manner. As a further proof of this, it is a common occurrence, in taking off planking, to pull the latter over the heads of treenails, bolts and spikes; indicating that in any event, all have sufficient resistance to withdrawal. It is further to be noted that cases are not infrequent in which a portion of the treenail in the ceiling requires boring out before the treenail itself can be backed through the frame and planking by the means ordinarily employed for that purpose.

(To be continued.)

New Dutch steamship Ellewoutsdijk

A New Dutch Steamer

WE illustrate above the Dutch steamer Ellewoutsdijk, the latest product of the shipbuilding yards of the A. F. Smulders Company at Schiedam, Holland. This vessel was built for Messrs. Solleveld vander Meer & T. H. van Hattum's Steamship Company, Rotterdam, and held her trials with very successful results during the last week of April, 1920. She is built to 100-A-1 classification in Lloyds and is of the well deck type with a length of 359 feet 3 inches, 50 feet beam and 24 feet 6 inches depth, giving a deadweight capacity of 6300 tons on a draft of 21 feet 7½ inches. Her total capacity for grain is 364,350 cubic feet, bunker capacity is 793 tons, waterballast capacity, including fore and afterpeaks, 1130 tons.

The auxiliary deck machinery has been carefully worked out for rapid turnover of cargo. Nine double steam winches are provided and especially large hatch ways for the four holds.

All living space for the officers and crew have been carefully finished so as to give a maximum degree of comfort and sanitation. The propelling machinery consists of a triple expansion 1800 i. h. p. steam engine and three coal-burning Scotch marine boilers 13 feet 9 inches in diameter and 10 feet 5 inches long. The boilers, propelling machinery and all auxiliaries were built at the shipyard by the A. F. Smulders Company.

Current Conditions in Russia

By Jerome Landfield*

A DISCUSSION of current conditions in Russia at the present time is liable to become controversial, because the whole subject has become so confused in the public mind, not only through the mass of deliberate propaganda that has been put forth, but also because of the ignorance of Russia and lack of background of the numerous well-intentioned writers who have sought to furnish us with information. Yet there is really no reason why the subject should remain confused or controversial, for there is an abundance of reliable data bearing upon it. This data, however, requires careful study and comparison.

A System of Terrorization

Upon the political situation in Russia I shall touch but briefly, and only as it affects economic conditions. It is well known that in November, 1917, authority in Russia was seized by a small group of men who proposed to put into effect in that country an entirely new social and economic system in accordance with the Communist program. A portion of these men were fanatical adherents of this theoretical program, but a far larger number saw in the revolution an opportunity for acquiring power and plunder. Being in a very small minority among the population, they took advantage of the abnormal conditions arising from the war and revolution, as well as the ignorance, idealism and docility of the Russian people, to seize power, and they consolidated this by the formation of a mercenary army devoted to their interests, and by putting into effect a system of terrorization, which has continued to the present day. This, briefly, is the background of the so-called Bolshevik regime.

Almost from the first day the leaders found that when faced with the realities of economic life, the theoretical program would not work, and ever since that time they have endeavored by special decrees to alter and adapt their program so as to make it work. The result has been twofold: first, they have departed far from communism; and, second, they have not been able to achieve anything constructive, but instead have destroyed industry almost completely.

Agriculture Most Important

A study of current conditions in Russia is a study of the developments which have taken place in various lines of activity as a result of the attempt to revolutionize them in accordance with communist doctrine. The main fields with which I propose to deal, and concerning which we have definite and authoritative data, both from Bolshevik and non-Bolshevik sources, are agriculture; transportation; raw material and manufacturing industries; and trade.

The first of these, agriculture, is the most important, for Russia is four-fifths agricultural and all economic life in Russia is dependent upon it. The agrarian question (that is, the question of supplying peasants with additional land) has been the most serious problem of Russia for many years. Satisfactory measures for the break-up of the peasant communes and furnishing peasants with additional land were well under way when interrupted by the war. The Bolsheviks, as a means of swinging to their side the peasant population, proposed simply expropriation of all landed estates by the peasants. This resulted in anarchy and chaos, since there was no ordered program for carrying it out and no peasant felt secure in the possession of the property which he seized. There then ensued an interesting train of economic consequences. The strength of the Bolsheviks lay in the industrial workers of the cities and their problem was to obtain food from the country districts. As they had nothing but worthless paper money to give in exchange, the peasants very soon refused to deliver food and ceased to plant more than they needed for their own requirements. Then followed armed requisitions on the part of the Bolsheviks and the hiding of food on the part of the peasants. The breach between city and country that resulted is one of the most serious difficulties which the future will have to overcome, and among other things it has resulted not only in a shortage of food for the cities, but also in the retention by the peasants of all those raw materials which the Soviet authorities would now like to secure in order to exchange them abroad.

State of Transportation Catastrophic

The state of transportation in Russia is catastrophic. In no country in the world is economic life so dependent upon railways as in Russia. This is due primarily to the climate, which closes inland water transportation for six months in the year, and to the absence of satisfactory wagon roads, owing in large measure to the same cause. Nevertheless, the railways in Russia were woefully inadequate for the needs of the population even before the war. Russia had 46,600 miles of railway as against 261,000 miles in America, or .26 miles per thousand of population as against 2.60 in America. Large projects were prepared for additional railway construction early in 1914 under the direction of the Ministry of Finance, and it was expected to build within ten years some 18,000 miles of new trunk lines and about 7000 miles of branch or feeder lines. Unfortunately not only were these plans for building interrupted by the war, but the existing lines and equipment suffered great depreciation as a result of military operations. Following the revolution there was great confusion and no attention was paid to repair and upkeep, to say nothing of construction. The Bolsheviks completed the ruin of the railroads. Railroad workers seized the railroads, considering that each section belonged to the men engaged on it. All the income was taken by the workers as wages and the deficit made up by paper money furnished by the Soviet government. Finally the Soviet government nationalized the railroads, taking them out of the hands of the workmen, but so utterly incompetent was their management that there was no improvement in conditions. Labor efficiency declined to such an extent that almost no repairs were made on locomotives and cars, and practically all of those available were utilized for military purposes. Of some 10,000 locomotives that finally remained, there were last fall less than 4500 in commission and very few of these were in really good shape. In many cases tracks were taken up from one road to repair another of military importance. The result is that for purposes of trade the interior of Russia is entirely cut off from the outside world. The first essential to starting business with Russia must be the rehabilitation of her transport system. It is manifest that England, France and Germany can play but a small part in this gigantic task. Russia will require at least a billion dollars' worth of railway material and construction to bring her back into anything like a normal position, and the one country that can furnish this material is America. In this lies our greatest opportunity, an opportunity, however, contingent upon the establishment in Russia of a regime that makes such an investment safe. Side by side with the trade opening afforded by this transportation problem comes the opportunity for the rehabilitation of railway supply industries in Russia itself. The time must come when the iron and coal resources of Russia must be utilized to furnish a considerable portion of our own needs in railway construction.

Production of Raw Materials Halted

This brings me to a consideration of the industries which are concerned with the production of raw materials and manufactured goods. I do not need to dwell upon Russia's vast resources. They are very well known. What is less well known is the gigantic strides which Russia was making in the development of these resources just prior to the war. The Soviet regime has put an end for the time being to all production of raw materials except in certain very limited fields. With the removal of this incubus we shall see open to foreign enterprise a practically virgin field, comparable to the American continent of a century ago; with the addition of millions of intelligent white labor. Russia will then furnish to American capital its finest and largest field for profitable employment.

It will be easy, however, to fall into serious errors in thus employing it. In general there are two ways in which American capital may go into Russia. It may utilize French or German intermediaries, or it may go in directly. In the former case, we should be practically nothing but bondholders in the enterprise, placing our money at the disposal of French and German industrialists.

On the other hand, the normal method would be to employ our capital directly. Unfortunately, the Americans have had comparatively little experience in conducting foreign enterprise of this kind and are liable to make the mistake of thinking that such enterprise can simply be transplanted from America. But conditions in Russia are very different from those in America and enterprises which do not take these differences into consideration are doomed to failure. The only way in which to succeed is to enter into mutual relations with experienced Russian industrialists, forming, as it were, a sort of partnership, whereby the special experience of the Russians and their knowledge of conditions can be utilized in connection with American financial power and such American ideas of organization as can be adapted to the special cases. Attention to these considerations will avert many a failure.

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* Formerly [illegible] State Department; executive vice-president, American-Russian Chamber of Commerce; [illegible] the Seventh National Foreign Trade Convention.

Investments Abroad Stimulate Trade

Practically the same thing is true with reference to manufacturing enterprises; indeed, the special technical information necessary for success of such enterprises in Russia is even more necessary than in the raw material industries. In this connection it should not be overlooked that the American capital invested in such enterprises would, for the most part, be expended in America upon the machinery equipment, materials and goods that are required to conduct the Russian operations.

The subject of trade with Russia is a large one; and, had I the time, I should like to go into it in great detail. In the past the Germans have occupied a predominant position in Russian trade. To be sure, they had in their favor certain advantages growing out of the 1905 Russo-German commercial treaty. But these advantages were small in comparison with those accruing to the Germans from their careful study of the Russian market, methods of reaching the Russian customer, credit facilities, methods of transport, knowledge of the language, etc.

The fundamental condition governing foreign trade with Russia is that of the immobility of the Russian merchant, which gives a great advantage to the trader who will offer him his goods delivered, with transportation and duty paid and a bill rendered in his own money. Furthermore, it is necessary to pay attention to his special demands in the matter of dimensions, finish, packing, etc. All of these things the Germans attended to carefully, and Americans must follow the German example if they wish to succeed.

Long-Term Credit Important

The matter of long-term credit played a very important role in securing for the Germans their predominant position. Naturally the German political aims that were bound up with her commercial projects influenced this to a considerable degree, and merchants received extraordinary accommodations from German banks for this purpose. Now, however, the situation is likely to be quite different. Under revolutionary conditions credit operations have practically disappeared, and the population has become accustomed to pay in cash. Furthermore, initial operations in Russia are very likely, to a large degree, to take the form of barter, and this likewise is a corrective of the habit of long-time credit. Therefore it may be taken for granted that American merchants in beginning trade operations in Russia will not be placed in the same position as before the war.

There is no use of thinking of American trade with Russia unless Americans are ready to send there plenty of young men prepared to settle down and learn the Russian language and become thoroughly acquainted with Russian life and customs. We shall certainly lose out if we leave our representation in Russia to foreigners or even to naturalized Russians. The field is worth the effort and I cannot make too strong an appeal to Ameriansc interested in foreign trade that they go about the matter in an intelligent manner with a view to a large future.

I can scarcely leave the general subject of trade with Russia without discussing briefly the present situation in regard to possible trade and the questions raised by the blockade, the Soviet government's overtures, and the European economic situation.

Soviet Government Real Blockade

Concerning the blockade, there has been much misunderstanding. The refusal of our government to grant licenses was based upon the so-called Trading with the Enemy Act, which was considerably stretched in order to apply it to Soviet Russia. The blockade lost its significance with the failure of the national movements in Russia and in reality has served for little else than to afford material for Bolshevik propaganda. The real blockade on Russia is the Soviet government itself and its monopoly of trade. It is to be hoped that the blockade will be speedily lifted, not because immediate commerce is to be expected, but because it will nullify one of the features of Bolshevik propaganda and at the same time expose the real blockade.

In further explanation of what I call the real blockade, I may point out that any trade with Russia depends upon production of foodstuffs and raw materials in the interior and the transportation of them to ports. The breach which has sprung up between the country districts and the city as a result of the oppressive measures of the Bolshevik government and its inability to furnish the peasants anything in exchange for their goods, may be said to constitute the real blockade, and it is this blockade that is starving the cities.

Little Prospect of Trade

If the blockade is lifted, there is little prospect of any considerable commerce for a long time to come on account of the following obstacles:

1. The Soviet government has monopolized both foreign and domestic trade, and therefore all dealings must be had with the bureaucracy, which is both ignorant and corrupt. In this connection it may be pointed out that the Scandinavian countries, for whom no blockade existed, were unable to do business with this Soviet trade monopoly.
2. The fact that the Soviet government has seized and confiscated private property of foreigners as well as of Russian citizens at once raises the question of legality of ownership and this is bound to lead to litigation.
3. The stocks of goods for exchange at ports in the hands of the Soviet government are extremely small.
4. The complete railway breakdown in transportation of commodities to and from the interior.
5. The present situation with reference to the foreign obligations of Russia, both public and private, and the seizure of enterprises, partly or wholly owned by foreigners, makes the granting of credit to the Soviet government out of the question.

The conclusion is, in view of these obstacles, that no real trade is to be looked for until transportation is rehabilitated and production begun again, and there is no hope of either of these eventualities under the present Soviet government.

Regarding Soviet Agitation

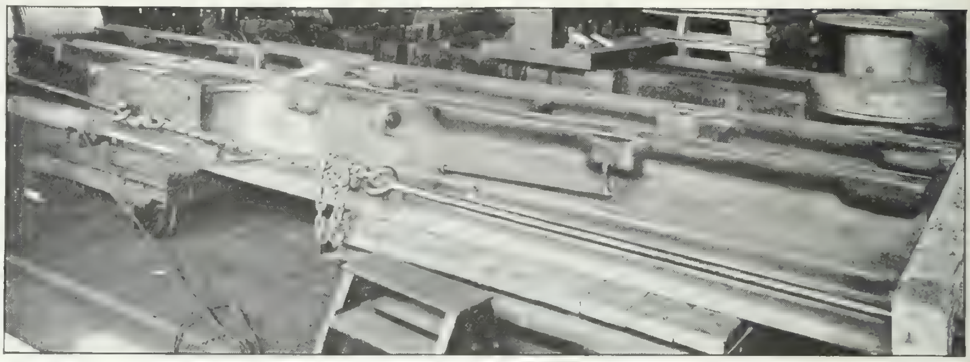
There has been great agitation in this country by the agents of the Soviet government, together with a few speculators of more or less questionable reputation, urging the recognition of the Soviet government and dealings with it. This propaganda has represented that there were vast stores of goods ready to be exchanged and that if America did not at once take advantage of the situation, she would be outstripped by certain European competitors. It is important that all American business men should realize the insidiously false and pernicious character of this propaganda and take a firm stand that they will not countenance the sort of transactions which, for the sake of a little immediate profit for a few speculators, will jeopardize not only our future relations with Russia but tend to undermine our own standards of commercial morality.

In conclusion let me urge most strongly that American business men study Russia, her needs and her possibilities; and that they make the necessary preparations against the time that real trade will become possible. When this time comes, it will be found that Russia will constitute by far our most important customer and an unlimited field for profitable enterprise. Good business sense and foresight demand that we take a keen and active interest in this and that we do not pass it by with the remark that it will be time enough to consider trade with Russia when Russia shall herself be on the high road to recovery. Now is the time to prepare in order that at some future date we shall not be obliged to utter the sad words, "Too late."

INTERNATIONAL OXYGEN

MR. EUGENE SCHOEN, general manager of the International Oxygen Company of Newark, New Jersey, has sailed for Europe to make an inspection of the company's branches in London and Paris and to extend the business of the company in France, England, Belgium, Germany, Switzerland, Sweden and Denmark, where reconstruction following the war has stimulated the demand for oxygen and hydrogen generating apparatus.

Welding a Cast Iron Planer Bed


A large cast iron planer bed repaired by the Weldcraft process

CAST IRON offers many difficulties to the welder and some of the difficulties are incident to the design of the parts welded rather than to the cast iron itself. The job shown in the accompanying illustration is interesting principally on account of the fact that the weld had to be made without appreciable distortion of the parts, and the joint had to be finished so that the weld could not be readily detected.

The job in question relates to a large planer bed twenty feet long and weighing approximately twelve tons. This bed is part of a 60 by 60 inch planer, and was broken into two parts approximately in the middle. The line of the break was eighty-four inches in length and the welding was done from both the inside and the outside, making an external welding line of 168 inches.

In doing this work it was first necessary to assemble the parts in exact alignment and position. This was done by setting up two long inverted "V's" and laying the planer bed upside-down on these "V's"; then the parts were drawn together with screws in a huge clamp, as shown in the illustration. Having cut out the joint with air tools, the welding was done according to usual practice, using a steel pencil and special steel reinforcing plates. When finished, the exterior surface was ground flush with that of the original casting, so that were it not for the chalk put on for the purpose of photographing, the weld would be entirely invisible to the eye.

There are two remarkable achievements in this job: first, the absence of distortion; and second, the strength of the joint. The absence of distortion is proven by the fact that the ways were in perfect alignment when the job was completed, and, furthermore, a spiral gear with its bearings, which was located in the middle right adjacent to the weld and incidentally interfered considerably with the welder, was found in perfect alignment after the job was completed.

As for strength, this was tested at two different times: first, when the welding was about two-thirds done it was necessary to turn over the bed. This was done by putting a sling around the middle at the weld and hoisting which put the maximum strain of the weight of the bed on the weld. During the operation of turning over, the bed was dropped some three or four inches on the floor and was bumped around considerably, all of which put excessive strains on the partially completed weld and yet there was no sign of weakness. The work was done for the Lidgerwood Manufacturing Company by the Electric Welding Company of America, who employ the Weldcraft process.

Shipyards in Recent Canadian Steel Merger

THE Canadian steel merger just consummated will embrace some of the largest shipyards in the Dominion. It is stated that the location of those included is of much strategic importance, placed as they are at different points from the Atlantic Coast to the head of Lake Superior. First in size in the chain of shipyards, and the largest in Canada, is the one at Halifax, Nova Scotia. The company controlling this yard has a capital of $3,000,000 preferred and $5,000,000 common, with 45 acres of yards and 3300 feet frontage at Halifax. There is also a marine slip across the harbor at Dartmouth, where ships up to 3500 tons may be drawn up on shore for repairs. The company expects to launch its first completed ship next month. It is now building four ships, two of 10,500 tons each, and two of 8500 tons each.

At Levis, across the river from the city of Quebec, three ships with a total tonnage of 18,550 are now being built for the Canadian government. Wooden ships for France are also under construction there.

Two large plants are operated by the Collingwood Shipbuilding Company, one at Kingston and the other at Collingwood, the latter being the larger of the two. There is a drydock at each point, and large freighters and passenger ships of high class have been constructed. The company employs about 1500 men. At present seven ships, totaling 26,550 tons, are being built for the Canadian government.

American as well as Canadian capital operates the shipbuilding yard at Port Arthur, Ontario. The greatest achievement of this yard was the construction of the freighter Grant Morden, of 13,000 tons deadweight, with a capacity of 600,000 bushels of wheat. The company has about 1500 employes, and is now building seven ships, totaling 26,650 tons, for the Canadian government. It has a drydock 700 feet in length—Commerce Reports.

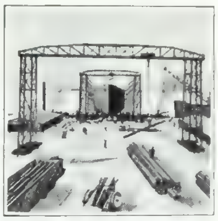
American Shipping at Constantinople

THE most striking advance in the history of the American merchant marine as regards any foreign port is evidenced by the number of ships calling at Constantinople during the past year. A total of fifty-seven, two of them calling twice, practically all steamers, were registered during the year 1919. The record, moreover, is possibly not complete because the American port office and the American consulate general, whose records have been consulted, were not established at the beginning of the year. The latter office was not reopened until April, 1919.

On May 9, 1919, the steamship Susana, of 3710 tons gross and 2354 tons net, entered the port of Constantinople bound for Batum. This date marks the first time in history that an American-owned merchant steamer, registered in the United States and flying the American flag, has called here. According to the records of the American consulate general, no ship of American registry of any description, except one steam yacht in 1887, called at this port between 1878 and 1910.

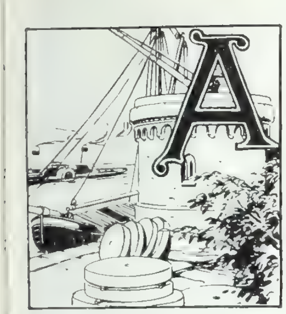
Going back a year further, in 1877 two ships—a schooner and a bark, of 283 and 294 tons, respectively, owned in New York—came to Constantinople, bringing petroleum of a total value of $32,250. In 1878 two brigs, of 334 and 502 tons, respectively, also owned in New York, brought petroleum of a total value of $39,975. All four ships returned in ballast. From 1910 to 1914, inclusive, the local registry records four pleasure yachts, a few oil barges and lighters, and the vessels of the American Archipelago Steamship Company. The latter is a Greek-American concern, with ships of 171 to 772 tons register, owned in Smyrna, operating chiefly between Jaffa, Constantinople and Alexandria, but flying the American flag. In 1915 five American Archipelago ships and one oil tanker called; the last ship registered on March 27, 1915—the last American ship to arrive until the great expansion in 1919.—Commerce Reports.

Material Handling



Problems at Marine Terminals

By A. K. West, General Electric Company



ALL industry is appreciating more every day the truth of the axiom that efficiency increases in direct proportion to the extent that hand labor and haphazard methods of handling are replaced by machines, the more automatic in principle the better. In marine terminals, where this principle would demonstrate its value to a great degree, there has apparently been expensive and casual methods with modern mechanical and efficient devices for no concerted effort to replace time-honored, handling of freight.

The result is that at most of such terminals the congestion both on the piers and in the warehouses and freight yards, is tremendous, and the costs of loading and unloading—in fact, of all the necessary handling—have soared, until it costs as much to load a barrel into a car at Chicago, and unload it at New York, as it does to transport it between the two cities. With the inevitable increase in production, unless something is done to better the terminal conditions at our large ports, the commerce of the country will sustain losses figurable only in millions of dollars.

There are two remedies for this state of affairs, which, if properly considered and intelligently applied, would greatly relieve, if not altogether eliminate, such conditions. One is the proper layout and construction of wharves, storage centers and railroad facilities so that they would be mutually accessible for the handling and disposal of freight; and the other is the installations of mechanical handling devices for moving freight.

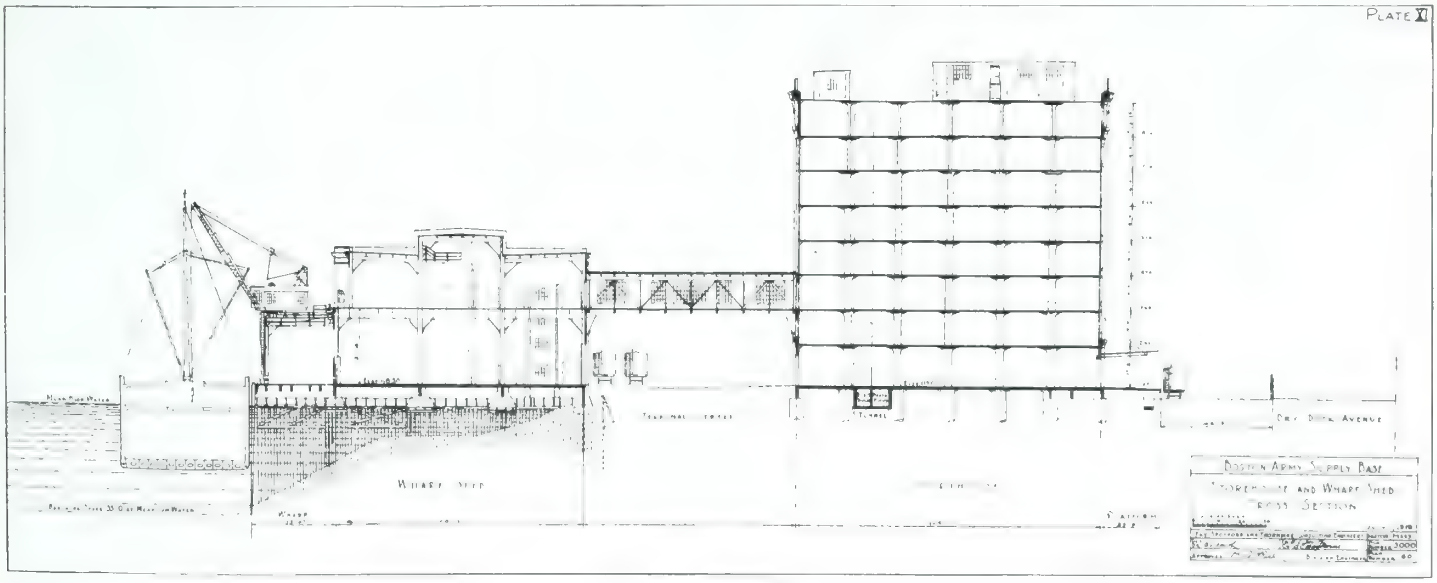
In discussing such mechanical methods it should be born in mind that the requirements of the situation will be flexibility, compactness and accurate, reliable operation. These requirements are most efficiently met by handling machinery which has electricity for motive power, such as cranes, dock winches, tractors and similar devices. This is true for various easily explained reasons. One is that docks being badly congested under the best of circumstances, the mass of pipes, valves, etc., that are necessary for steam-operated machinery, would make confusion worse confounded, to say nothing of increasing the risk of fires and accidents. Furthermore, the characteristics of these devices, weight and the rigid method of supplying their motive power, demand that they be stationary. Lastly, they require constant attendance by trained operators, they are wasteful of power, and the control is none too good. As for the manual method of handling freight, whether about the warehouse or in loading and unloading the ships or cars, its disadvantages, costliness and inefficiency need not be stressed—they are too obvious.

Electric motive power, as applied to the various phases of freight handling, does away with these disadvantageous features to a considerable extent. The wires that supply the necessary energy can be placed anywhere that is convenient without taking up a great deal of room and the apparatus itself can be made comparatively light, without sacrificing rugged construction, and is easily portable.

The remote control feature of electric apparatus is another feature that gives it great value for this sort of work, as does the fact that when it is idle no energy is being lost. Electric motors have been successfully applied to almost every type of mechanical handling device, from those used in unloading the ships to devices for piling bags, etc., in the storage buildings.

The Boston Army Supply Base, built by the government to handle supplies for the A. E. F., but suitable for commercial uses later, is a very close approximation to the ideal marine terminal, both as regards the construction and layout of the various buildings, and the design and efficiency of the handling apparatus installed.

What is known as the Army section consists of a wharf shed of two stories, the floor area being 320,000 square feet, and an eight-story warehouse, parallel, and connected to the second floor of the wharf shed and having a total floor area of 1,651,000 square feet. Between these two buildings are railroad tracks which permit the spotting of cars at the doors, and a roadway for trucks. The waterside landing platform is three-quarters of a mile long, extending beyond the buildings in both directions, and carries two railroad tracks. At one end of the wharf



shed, this platform is spanned by four electric cranes, which handle freight either to or from the landing platform, or the gallery of the second floor. There are also a number of portable electric winches which can be used on the platform if all the cranes should be busy.

The requirements of the internal transportation system of such a terminal are that it should permit the rapid movement of various types and classes of packages from the storage to the ship, and vice versa, with a minimum amount of hand labor. The various units must be easily controlled, occupy the least space possible, and be so arranged that the break-down of any one unit would not tie up or impede the functioning of the whole system.

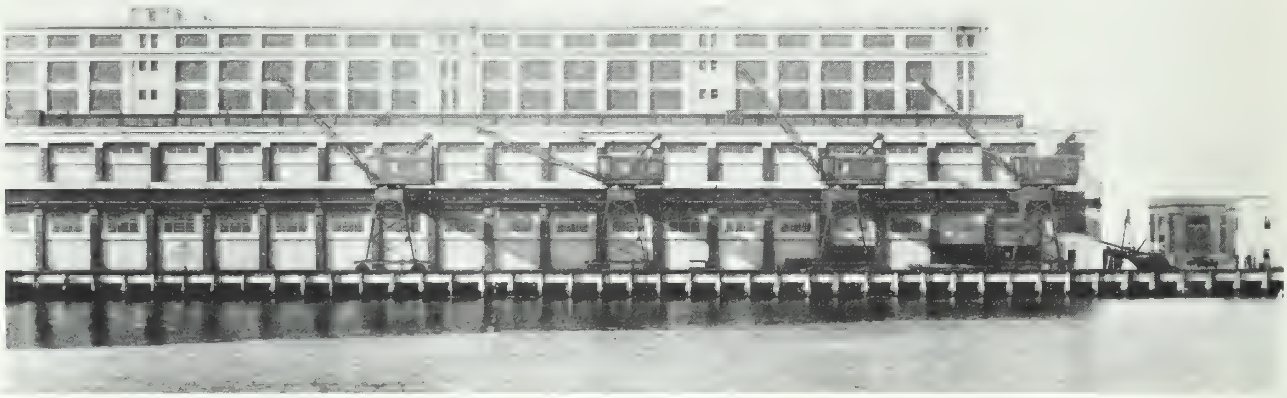
Many types of apparatus were considered, but it was decided that these requirements would be most efficiently met by the system installed, which is almost entirely electrical in character and consists, roughly, of elevators in the buildings, electric cranes, and winches for loading, storage battery tractors and various piling machines for disposing packages in the sheds.

The elevator equipment consists of four elevators a section, or twenty-four for the whole storehouse, five in the wharf shed and sixteen in the warehouse.

The whole operation of these elevators, opening the door, starting, stopping, etc., is entirely automatic, and is controlled from a dispatcher's desk, thus removing the necessity for operators and simplifying the system of operation. The loading and unloading from the ships is done by four semi-portal bridge cranes which span the landing platform in front of the wharf shed. They are driven by 230 volt direct current General Electric motors, controlled by magnetic panels, and have a 5000-pound capacity at 250 feet a minute. In addition there are sixteen electric winches with local, and two with remote, control. The control of a number of these winches is through magnetic panels with portable master controller with flexible armored cable connection, which permit the operator to take a position where he can watch his load, irrespective of the location of the winch.

The movement of packages about the buildings and between the wharf shed and the storage house is accomplished by means of storage battery tractors, pulling trains of from four to eight cars, while actual piling is done by mechanical piling devices, some electric and others not. The electric pilers are the slat conveyor type with an average capacity of forty tons an hour.

The installation of this modern electric type of apparatus, combined with the careful planning of the general layout of the buildings, wharves, railroads, etc., permit the loading and storing of 200 carloads or 6000 tons of freight per ten-hour day, and the loading of an 8000-ton vessel in about two and one-half days. Although this condition is more or less ideal, it could be approached in most marine terminals, even in those which have been in operation for some time.



Boston army supply base, with four Wellman-Seaver-Morgan cranes installed

Some Suggestions on Pier Design

By H. McL. Harding

Consulting Engineer of State of New York Barge Canal Terminal

THE development of the waterfront of a port is to aid commerce and navigation—that is, to facilitate the movements of inbound and outbound cargoes—so that there may be obtained not only the greatest speed of transference between vessel and shore, but in addition the acceleration of all further freight movements on the shore, in the sheds and in the open areas and for further movements in or out. In fact, the chief function of the pier and slip is to enable these movements to be rapid, easy and continuous without congestion.

All piers and slips should be designed so that there may be no congestion points and the removal of such points may be considered as of the greatest importance in the design. In the continuing series of movements from the ship to the final disposition of the freight, or from the beginning of the movement on the shore, whether from the car, from the dray, from within the shed or from the open areas, there must be no place where there is stoppage of the flow. Necessary speed to secure economy of operation can only be attained by a careful study of the flow of freight from the beginning to the end of its movement.

The pier, therefore, should be utilized only for freight movements, with a temporary holding capacity for twenty-four, forty-eight or seventy-two hours, and miscellaneous freight should be protected by sheds against thefts and inclement weather during this temporary holding. The experience of many ports has demonstrated that all available waterfront of a city will be needed, even when every linear frontage foot is intensively utilized.

From the above conclusion that there must be no congestion points, it will be readily deduced that there must be no factories, manufacturing plants or warehouses on piers. Similarly on quays where there are no piers there should be reserved at least 140 feet to 200 feet for freight movements and all manufacturing establishments or warehouses should be outside the 200-foot line.

The number of piers along the waterfront should be such as to secure the greatest number of ship berths possible, while avoiding hindrance to the movement of outbound and inbound cargoes and allowing ample provision for areas on the shore to the rearward of the pier entrance for freight movements, car tracks, dray approaches, warehouses and other facilities. The width of a pier for the miscellaneous cargo freighters of the Great Lakes or ocean ports for one-unit berths should vary from 140 feet to 160 feet, with an average of 150 feet.

This width of 150 feet should be divided as follows: 35 feet for two railway tracks and drayways, then a shed 80 feet in width and then 35 feet for two additional tracks on the other side of the shed. The shed may be 70 feet if desired. To have a temporary holding capacity for the necessary portion of the cargo which usually goes into the shed or upon the open areas, the sheds must be of ample height. On a pier for one-unit length—that is, 600 feet to 700 feet long—there should be two sheds with a height equivalent to two stories in height—that is, about 35 feet clear below the roof trusses—each 80 feet wide and 200 feet long, and there should be, in addition, from 200 feet to 300 feet in length and 80 feet wide for open-area storage. From the average conditions at many ports, besides the dray and car-track areas, there will be a holding capacity of 1,200,000 to 1,400,000 cubic feet.

Allowing 100 cubic feet per ton, which 100 cubic feet includes working areas and other lost spaces, there will be provision for from 12,000 to 14,000 tons from the ships on each side of the pier. Part of the cargoes from these ships is unloaded directly on barges, part upon cars and part taken away upon drays as soon as it is assorted, and another part goes into warehouses.

Experience has shown that a pier of the above width will have ample capacity to take care of the outbound and inbound cargo from two large freight vessels if it be properly equipped with the necessary transferring and tiering cranes and motor trucks. The space between the shed and the edge of the wall on both sides should be spanned by half arch traveling gantry jib cranes and the sheds and open spaces spanned by assorting, distributing and tiering cross-cranes.

The above dimensions are for single-unit length piers, and the width of the slip between such piers should be 280 to 300 feet and the specifications given for equipment contemplate the handling of miscellaneous freight. This 280-foot width is divided into barge 35 feet, ship 70 feet, barge 35 feet, barge 35 feet, ship 70 feet, barge 35 feet, or 280 feet, plus 20 feet clearance. A two-unit length slip should be about five times 70 feet, or 350 feet, the additional 70 feet to provide for the inner ships passing out, clearances having been already provided.

The Use of Demountable Truck Bodies

By Calvin Tomkins

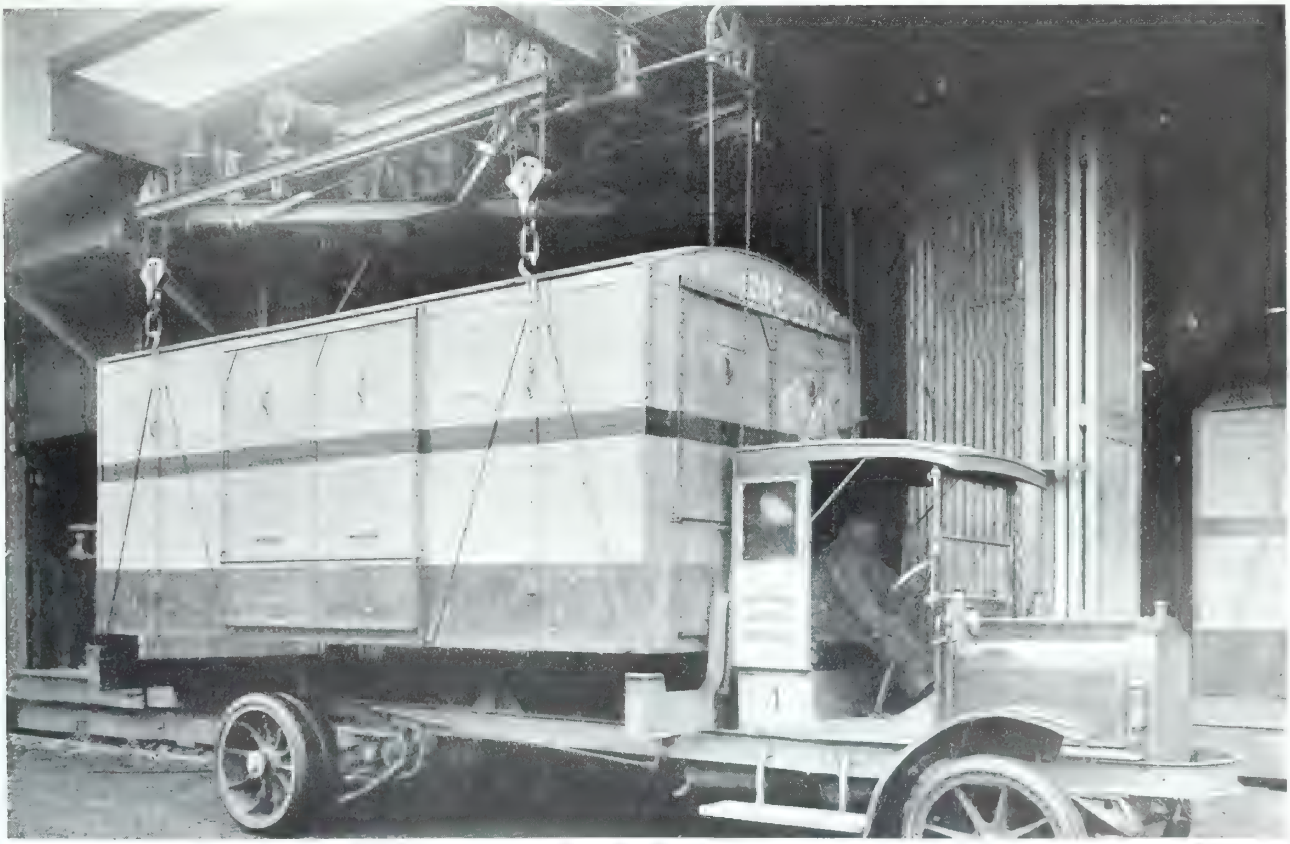
President, The Material Handling Machinery Manufacturers' Association, New York

THE growing disparity between terminal handling and distribution costs on the one hand and the cost of line haul on the other for both rail and water-borne freight, is an economic phenomenon of the present time which deserves more than passing attention. Carriage costs have gone down while terminal charges have gone up. Marine carriers have suffered more from this change than have rail carriers because service by water is more irregular, the units are larger, and the processes of loading and unloading a vessel are more complicated than are the processes of loading and unloading a car.

The scarcity, inefficiency and high cost of manual labor, its more complete organization both for aggression and defense, have caused the suspension of numerous coastwise services and threatened the future successful conduct of the Erie Canal, Mississippi River, and the Great Lakes services, at least in those directions where men rather than machines are necessary. Except for very long hauls, the railroad charges approximate haulage charges, and if the competition of motor trucks for short hauls and the overhead terminal costs which the railroads absorb shall be taken into account, probably terminal costs will be found to exceed haulage costs. The difficulties increase as cities grow in size without corresponding expansion of terminals, and as production and imports increase in volume and as labor becomes more exigent. Modernizing terminals and transfer stations and the substitution of mechanical handling machinery in place of manual labor, are the only remedies.

Little has so far been accomplished towards modernizing terminals except at a few western cities and at some of the war bases of recent construction. However, much has been accomplished by the introduction of freight handling machinery. Instance the tractor and trailer, the micro elevator, belt conveying machinery, hoists, cranes, and tiering machines. I believe that the availability of mechanical handling methods is being retarded more by the lack of standardized unit containers than by any other cause.

At New Orleans, for instance (which is the best organized seaport in the country and which performs its functions better than any other port in the United States), you may observe grain, cotton, coffee, sugar, bananas and a few other articles handled by machinery with ease and at a minimum cost into and out of warehouses constructed for particular terminal uses. Even at New Orleans, however, this is not the case so far as general package freight is concerned. Here labor costs mount rapidly as human intelligence and greater lib-



Demountable body being unloaded from truck at the Baltimore & Ohio General Freight House, Cincinnati erty of movement are necessary to handle the multitude of packages varying in size, form, weight, strength and character of contents and construction. In short, machinery has been successfully designed for special services, but not for the general service of commerce. Factory handling where packages are uniform presents problems comparatively easy of solution, but at water and rail terminals involving transfers between warehouses and the inconvenient holds of ships and interiors of box cars, the problem has not been solved and the rule of hook and hand truck continues.

The way out, in my judgment, will be through the introduction of a standardized unit container in the form of a demountable, closed auto truck body, which can be readily transferred by cranes between railroad flat cars, auto chassis, warehouse floors and vessels. The vertical and horizontal terminal movements involved in handling such containers are simple and capable of accomplishment by equipment now generally in use. Some reorganization of terminals will be necessary, but, as the Motor Terminals Company has demonstrated at Cincinnati, this will be neither complicated nor expensive. Labor costs of handling such standardized unit containers will represent a very small part of the present outlay necessary for the handling of miscellaneous package freight. Twenty-five years since, I observed furniture van bodies being transferred across the channel on to and off English and French railroad flat cars, and off and on horse-drawn vehicles (for this was before the days of the auto truck). The small size of foreign railroad carriages in comparison to those in use here naturally resulted in bringing about a change of practice in Europe before the advantages were recognized in America. But not even in Europe have they reached the point of recognizing the possibilities of adapting the closed auto body to the uses of a standardized container to enclose packages of assorted sizes.

Recent changes in the cost of labor and its inefficiency have brought about conditions which make the adoption of such economies imperative and the motor vehicle facilitates the change. I see no reason why strongly built containers, each made to fit on a chassis and several to fit on a freight car, cannot be made as weather and thief proof as are our present box cars and auto truck bodies. Such containers can be placed lengthwise or crosswise upon the flat car, and I suggest that the roofs should be flat and not rounded in order to facilitate stacking. Tarpaulin covers can be provided for roof exposure. At least the framework and probably the tops and bases should be of metal and possibly the sides also. The doors, fastenings and small containers for enclosing within the outer one, are matters for expert design based upon growing experience, as will also be the method of marking the outer and inner containers to designate ownership. A demountable standardized container can be advantageously used for the temporary storage of commodities in place of car storage and for huckstering distribution of foods and similar commodities. The use of railroad cars for the first purpose has always been a feature of railroad terminal practice, which is most undesirable from the standpoint of the railroad, but most convenient and economical for the receiver of goods.

The latter use is comparatively new and is rapidly being extended for the sale of apples, potatoes and other commodities, and is being objected to because it obstructs terminals and delays the cars, but if storage and retail distribution can be conducted without delay to the railroad flat car, or without obstructing terminal trackage, these objections will be removed and great economies and conveniences effected. The partial elimination of the inconvenient box car will also be a decided gain in terminal convenience. There can be no storage or distribution as convenient and as cheap as this.

Probably the five-ton body will be the container generally used, but smaller containers, one, two, three or four-ton, can be stacked on flat cars and transferred to corresponding delivery truck chassis. Certain kind of materials, such as cement, plaster, etc., can be loaded at the factory direct into the container and transferred directly to point of use; thus entirely doing away with the necessity for expensive packages like bags and barrels.

The Motor Terminals Company service at Cincinnati now uses the demountable body for railroad transfer service between terminals. I propose the extension of this use as above noted, because the adoption of standardized unit containers will result in the greater use of mechanical handling equipment and greater economies and conveniences at terminals.

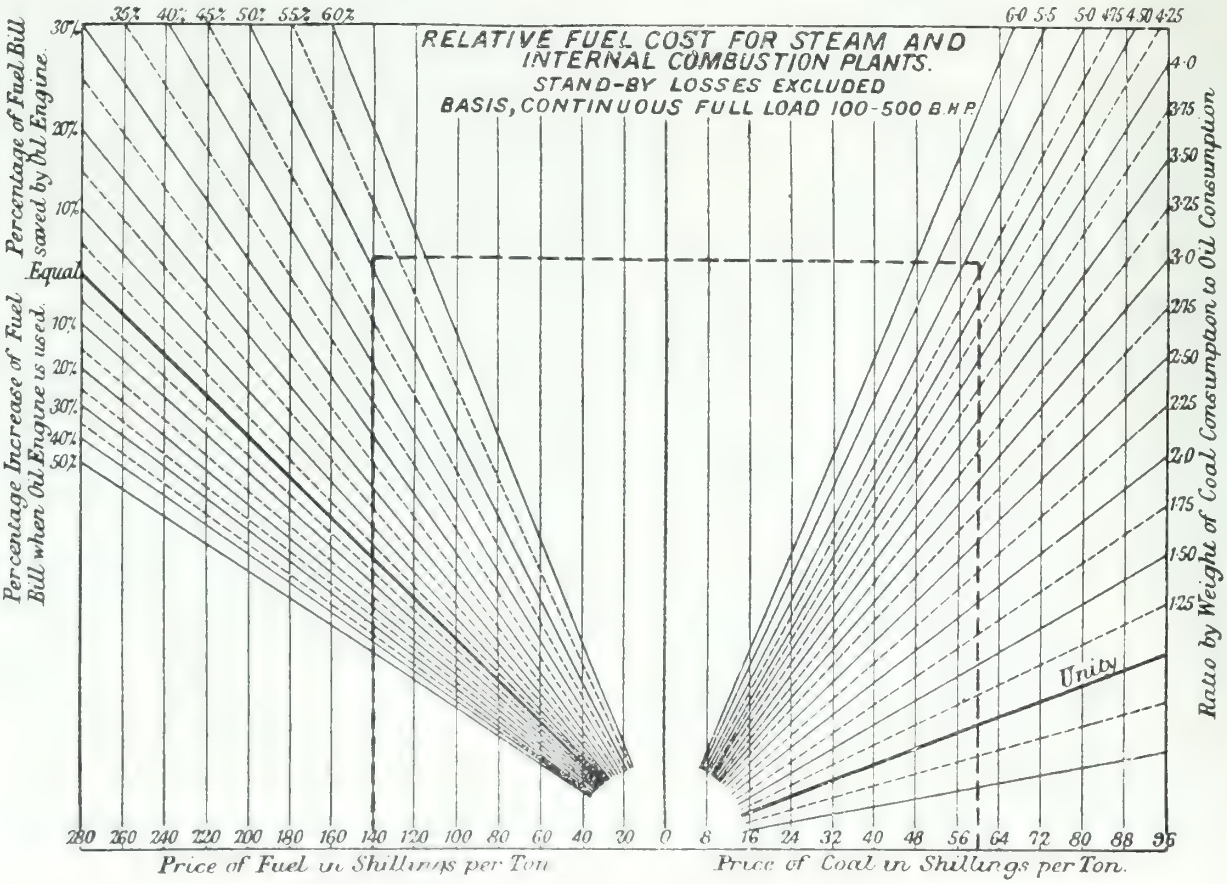
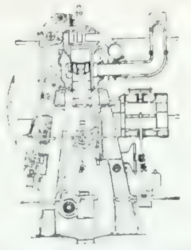


Diagram showing relative economy of steamships and motorships

Oil Engines and Motorships



Motor Shipbuilding in Europe

SIGNS are already here of the influence which the motor ship is likely to have upon future freight wars. That these wars are bound to arise sooner or later is considered inevitable in shipbuilding circles in Great Britain. Mr. Fred Olsen, the well known Norwegian shipowner, is to inaugurate a new service between Scandinavia and California, via the Panama Canal, to be operated by motor ships, the first of which (a 9000 ton deadweight capacity vessel) has just been launched by Burmeister & Wain at Copenhagen. It is hoped that all of these vessels will be ready for commission by the end of the year, although with the existing shipbuilding delays, it is improbable that this anticipation will be realized. When these ships come into service it is stated that reduced freights will be charged and another Norwegian shipowning firm has recently announced its intention of lowering its freights; it is enabled to do this by the purchase from the Norwegian government of three motor ships which during the war have been operated by the Shipping Department of the government. These are three old steamers built on the Clyde which were converted to motor vessels for the East Asiatic Company some time before the outbreak of war, this company then selling them to the Norwegian government.

Scandinavian shipowners are confident that with motorships freights can be cut down nearly 50 per cent below present levels and still enable the owners to run at a profit, while steam ships burning either coal or oil will become unprofitable when this anticipated freight cutting commences. It was definitely stated by the Trans-Atlantic Company of Gothenburg—the owners of steam and motor ships—that the latter could carry freight from America to Sweden at approximately 50 per cent of the cost to the owners of corresponding steam ships. So strong is the belief of the Trans-Atlantic Company in the motorship that, in addition to the orders for eight 9400-ton motorships which they have placed, they have commenced the conversion of their large fleet of steamers to motor power by the installation of a 1700-horsepower two-cycle Polar Diesel engine in one of their 5000-ton steamers, the Bolmen.

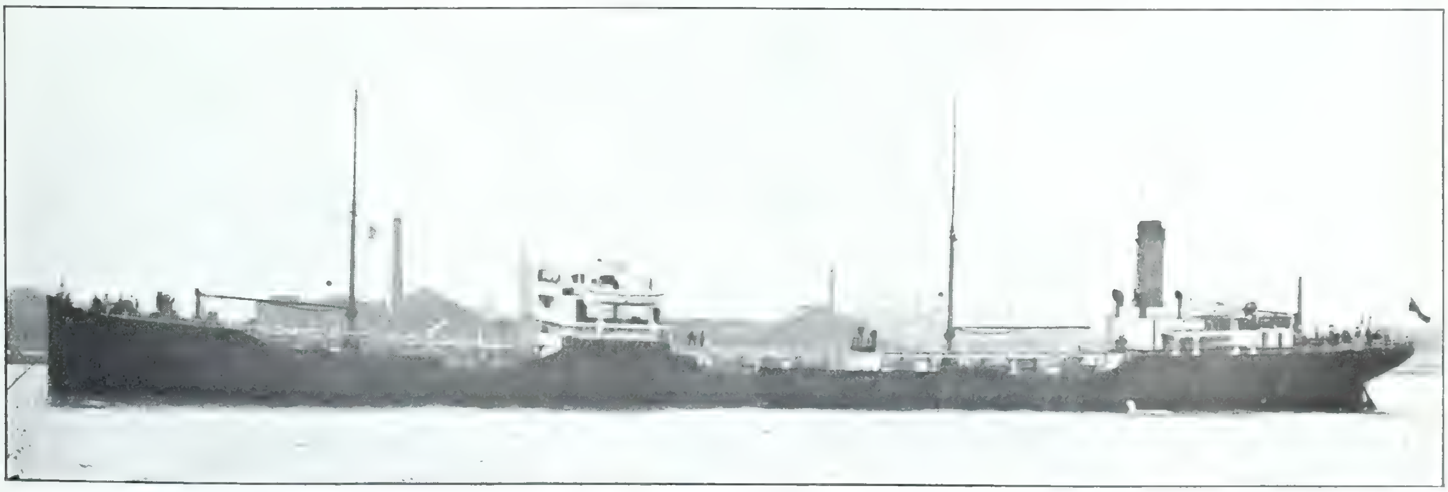
New Oil Engine Builders

As showing the urgency of the motorship position in Europe, no fewer than four of the leading shipbuilding and engineering firms in Great Britain have, during the past month, taken out licenses for the construction of Diesel marine motors. They are forced to this end owing to the fact that shipowners are asking for their new vessels to be equipped with oil engines instead of steam machinery, and as it is impossible for a firm to develop a marine Diesel engine itself without prolonged experimental work, the manufacturers are finding it easier to take out a license from builders who have gained this necessary experience over a long period of operation at sea. Messrs. John Brown & Company, Ltd., the famous Clydebank firm who built the Lusitania and the largest British battle cruiser, the Hood (just completed), have at last come to the conclusion that they must build Diesel engines and have acquired a license for the construction of the Cammellaird Fullagar opposed piston type, of which a description was recently given in these columns.

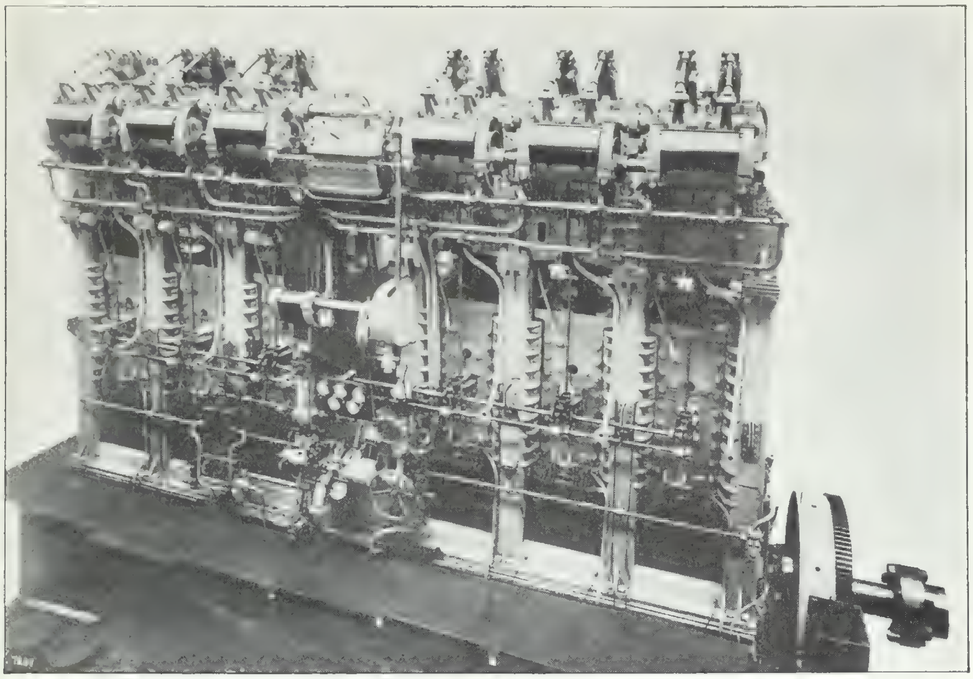
It is an open secret that the reason why this type has been adopted is that it is the most suitable for high powers, as Messrs. J. Brown & Company wish to develop the motor passenger liner for the Cunard and other companies with vessels running between Great Britain and America. Already plans are being prepared for 6-cylinder engines with cylinders 28 inches diameter which will give an output of 5000 horsepower, and preparations are being made for a 6-cylinder 30-inch diameter engine which is to develop 7500 b. h. p. or 15,000 b. h. p. in a twin-screw ship. With such machinery, the Atlantic passenger motor liner is coming within reasonable distance.

Another famous firm which has taken up Diesel engine manufacture within the past few weeks is Messrs. Alexander Stephen & Sons, Ltd., who have acquired a license for the Sulzer two-cycle motor. It is interesting to record that this license was taken up on the advice of the British India Steam Navigation Company, who wished to place an order for a motor vessel with Messrs. Stephens and decided that the Sulzer type would be the most suitable for their purpose. The new ship, which will be the fourth for the B. I. S. N. Co., will carry about 11,000 tons and be fitted with two 1600 b. h. p. engines.

Two other well known Clyde marine engineering firms, who until now have adhered rigidly to steam engine construc-



Tank motorship Narragansett



Front view, 1250 h. p. Vickers solid-injection Diesel engine installed in the Narragansett

tion, have just adopted oil engine manufacture, and it is a matter of special interest that both have pinned their faith to the Cammellaird Fullagar type, so that there are now three licensees for the manufacture of this motor in Great Britain besides one in America.

Among other orders that have been placed for motorships during the past month are four tank vessels for the newly formed oil transportation concern, the Scottish Tankers, Ltd., all of which are to be built by Vickers. They will carry 10,000 tons of oil fuel on a speed of 11 knots and be fitted with a couple of 1250 b. h. p. Vickers solid injection Diesel engines. The Bibby Line has ordered a new motor vessel of 7500 tons gross, named the Somersetshire, a sister ship to the Dorsetshire, referred to last month in Pacific Marine Review, which will be built by Harland & Wolff at Belfast and equipped with engines of their manufacture. This ship, together with the Dorsetshire, will trade to the East. In the course of a few months' time, the Glen Line, the British India Steamship Navigation Company, the Bibby Line and the Ellerman Line will all have motor vessels running between Europe and India and China, which is an exceptionally satisfactory route from the point of view of the internal combustion engined vessel owing to the relative cheapness with which oil fuel can be obtained in the Dutch East Indies and adjacent ports.

A 14,000-ton Motorship

The first 14,000-ton motorship will be completed at Glasgow next month by Harland & Wolff for the Glen Line. She will be the largest ship in the world, carrying nearly 1000 more tons than the Afrika, and, moreover, being equipped with higher powered machinery. The Afrika, belonging to the East Asiatic Company, has two 2250 i. h. p. engines, and the new Glen liner, the Glenogle, is having two 3200 horsepower sets installed. She will thus be the fastest as well as the largest motor cargo vessel afloat, as it is anticipated that a speed at sea of nearly 14 knots will be attained. Three vessels similar to the Glenogle in every respect are being constructed at Glasgow, while in Copenhagen some boats of the same size are being built for the East Asiatic Company to trade between Scandinavia and America.

The Motor Tanker Narragansett

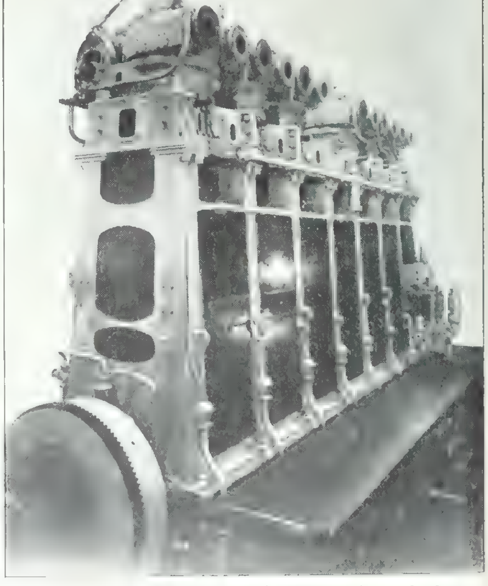
The completion of the motor tanker Narragansett by Vickers for the Anglo American Oil Company is of interest to engineers and shipowners, not only in Europe, but also in America, chiefly on account of the novel principles involved in the construction of the machinery of the ship. As is well known, the Vickers firm have invariably adopted solid injection instead of the use of air compressors, and the saving effected is very noticeable in the engine room of the Narragansett, for there are no compressors on the main engine and only a small steam-driven air compressor for the supply of starting air. So far as one can gather from a prolonged trial trip, there are no disadvantages to this system, since the fuel consumption is satisfactory, being 0.44 pounds a b. h. p. hour and the control and operation of the motors appear as satisfactory as those of the blast injection type.

The Narragansett, which is now on her maiden voyage from Liverpool to New Orleans, carries about 10,000 tons of cargo at a speed of 11 knots and is fitted with two Vickers engines of 1250 b. h. p., running at 118 r. p. m., but capable of maintaining a speed of 125 r. p. m. continuously, when the power developed is 1350 b. h. p. There are six cylinders, 24½-inch diameter by 39-inch stroke, and the engines operate on the four-cycle principle.

The general features of the construction of cylinders and framing can be noted in the illustration, from which it will be seen that the cylinders are supported by cast iron columns in a somewhat similar manner to that adopted on Vickers submarine engines. In each cylinder head is an exhaust, inlet and fuel valve, but the starting air is supplied to the cylinders through a non-return valve in the cylinder head, via a distributing box arranged at the control platform. This obviates the necessity of having a mechanically controlled starting valve in the cylinder cover. The camshaft is near the top of the engine, unlike the Burmeister & Wain design, and operates the valves through levers which are pivoted on a maneuvering shaft. This maneuvering shaft is turned when reversing, thus lifting the levers off their cams, after which, without any further movement of the controls, the camshaft is moved fore and aft so as to bring the astern cams underneath the rollers. Following this movement, the maneuvering shaft has a further rotation which causes the valve levers to drop on to the cams. The whole of this movement is carried out by a Servo motor, controlled by a hand lever on the starting platform.

When the camshaft is in the correct position, the starting wheel, seen on the right low down in the illustration, is rotated, which admits starting air to all six cylinders, the fuel valves being cut out of operation. A further movement causes two fuel valves to be brought into service, cutting off the air on the two cylinders; next four cylinders fire on fuel and finally all six on fuel when the starting air is entirely cut off. The whole of this is carried out by rotating the handwheel and the engine runs up to full speed within a few seconds.

The fuel is supplied from a battery of four pumps, seen on the left of the control platform low down on the engine. These all deliver into one main which supplies the four fuel valves at a pressure of about 4000 pounds a square inch. The speed of the engine is controlled by altering the timing and opening of the suction valves of the fuel pumps, which is a method commonly adopted, and in this way the amount of fuel pumped to the fuel valves is varied according to the speed required. A feature of the engine, owing to the absence of the air compressor and the adoption of the four-cycle principle, is that



Back view, 1250 h. p. Vickers engine of the Narragansett there are very few accessory pumps, these comprising a small battery of three pumps, one of which is for lubricating oil, one for bilge pump, while the third is the cylinder water circulating pump, with a small pump above it for the supply of cooling water to the pistons at rather higher pressure than that to the cylinders.

The fuel consumption of the Narragansett is about 11 tons a day, compared with 50 tons a day for a corresponding coal-fired steamer. A second similar ship is now being built for the Anglo American Oil Company, and will be completed in the course of a few months.

The Effect of Piston Design on Temperatures in a Diesel Engine

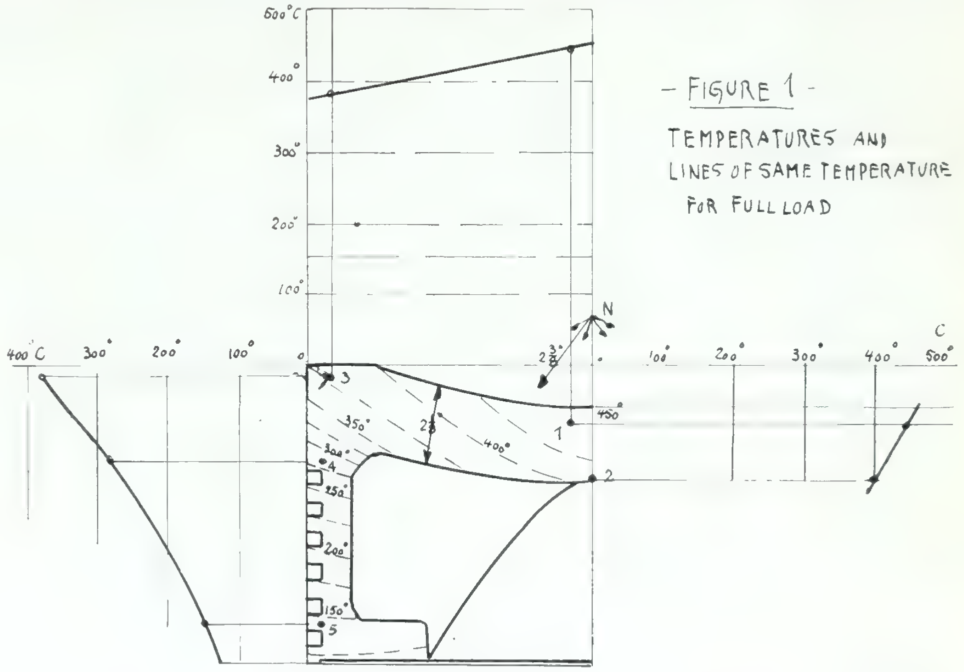
By **Paul Hentschke, M. E.**

ON the occasion of an extended visit to the Augsburg plant of the Augsburg-Neurnberg Engine Works, the birthplace of the Diesel engine, the writer witnessed a number of interesting tests to determine the temperatures in various sections of a Diesel engine piston. Great difficulty was experienced in obtaining reliable figures, which accounts for the narrow range of the tests. However, the subject is of such importance that no apology is necessary in bringing the fragmentary results of these tests to general knowledge in the hope that later material and more comprehensive experiments which may be in the engineering files of this country might become public.

In making these tests a vertical four-cycle engine of the standard Augsburg design was used in which the cylinder jacket and the A frame are cast in one piece. The cast iron liner and trunk piston were of ordinary design, the main dimensions being, bore of cylinder 15⅝ inches, piston stroke 24 inches. The rated load of this engine was 90 horsepower and and it was run at 220 r. p. m.

For all tests a common built-up multiple disk atomizer and a spray nozzle of 5/32 inch orifice were used. Duration of the running periods was for all tests extended long enough to ensure a temperature balance in all engine parts, and the temperature of the overflow water was maintained constant at approximately 120 degrees Fahr. for all variations of load.

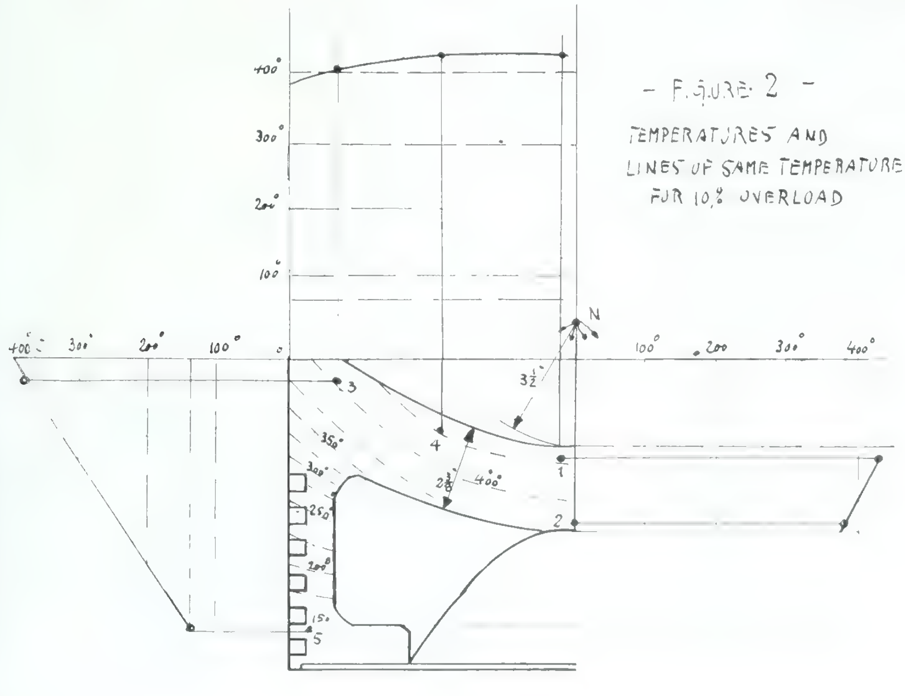
The piston (Figure 1) of the test engine was originally built up, a lower body serving as a cross-head in the cylinder, while the upper part, which is exposed to the heat of combustion, carried also the grooves for the piston rings, six in number. This construction, though higher in initial cost, allows of cheaper repair, smaller spare parts and selection of a cast iron especially suitable for high temperatures. For the test reported in Figure 1, a standard piston head of slightly concave shape and about 2⅛-inch thickness was selected from stock at random; small holes were drilled from the inside in such a way that the ends of a number of thermo electric pyrometers (thermo couple) could be brought in positions as marked 1 to 5 in Figure 1. It may be observed that Couple No. 1 was approached as far as was thought advisable to the top and center portion of the piston where the highest temperature was to be expected. The hot end of Couple No. 2 was applied to the inner surface of the center portion and 3, 4 and 5 were so located on the outside of the head that a fair picture of the heat flow from the piston to the water cooled walls of the cylinder could be expected.


- FIGURE 1 -

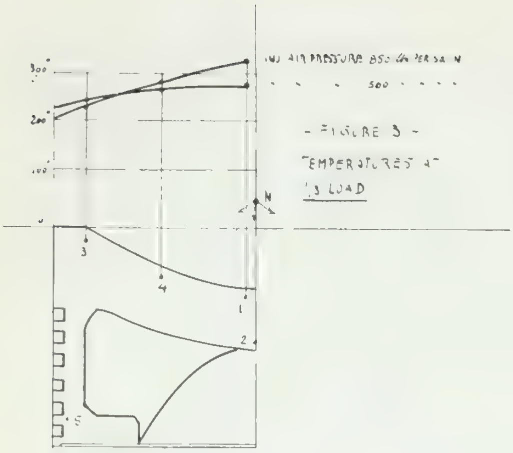
TEMPERATURES AND LINES OF SAME TEMPERATURE FOR FULL LOAD

The relative situation of the fuel spray nozzle in regard to the position of the piston in the upper dead center is indicated in Figure 1 by Letter N, and the smallest spraying distance from the center of the nozzle to the nearest point of the piston was 2⅜ inches. During this test an injection air pressure of 1000 pounds a square inch was employed, and the engine was run at its rated load of 90 horsepower.

A glance at Figure 1 shows that the highest temperature, recorded at 1, is about 440 degrees Centigrade, from which figure the maximum temperature of the piston surface may be estimated at 460 degrees, a temperature which in the dark could be observed as redhot. The lines connecting points of same temperatures, which were drawn in Figure 1 as true as the limited number of measuring points would allow, indicate an almost concentric arrangement in regard to the Nozzle N.


- FIGURE 2 -

TEMPERATURES AND LINES OF SAME TEMPERATURE FOR 10% OVERLOAD



A quick drop of temperature will be notified at the point of intersection of the side wall carrying the piston rings and the top portion of the piston head. The curves show also the temperature near the first as well as the lowest ring and the designer will do well to compare these with the coking temperatures of the customary lubricating oils.

For the continuation of the tests a new piston head (No. 2) was used; it had, as shown in Figure 2, a more pronounced concave shape and also a heavier bottom portion of 2⅜-inch thickness. It was drilled and prepared for the same number of thermo couples in a similar arrangement with the sole exception of No. 4, which here was located between Couples 1 and 3 near the upper surface of the piston head.

The relative position of the fuel spray nozzle to the piston at upper dead center is about 3½ inches distant from the surface of the latter. Injection air pressure was the same as during the previous test, the load carried on the brake was 100 horsepower or 10 per cent overload, the readings are shown in Figure 2. In this figure will be seen that the curves of same temperatures are here plainly parallel to the piston surface and the highest temperatures can be estimated at 440 degrees centigrade, which, in consideration of the overload carried during this test, shows a marked advantage of the deeper piston compared with the one first used. A heavier wall to a certain extent contributes to this favorable condition in so far as a larger amount of heat is conducted from the center through the metal to the cylinder walls. The temperature at 2 near the inside and center portion can be estimated to 380 degrees Centigrade, which figure also compares favorably with 400 degrees of Figure 1. The condition for the first piston ring is less favorable, the temperature there being slightly higher.

Figure 2 shows clearly the advantages gained with a relatively heavy piston head of a shape which permits an unhindered development of the "spray cone," where a uniform combustion is completed before the piston is struck. The piston surface in all Diesel as well as other high compression engines froms almost 50 per cent of the combustion chamber; it cannot, therefore, be considered only from the above viewpoints, a proper form for same has rather to be developed in connection with the form of the cylinder head, which frequently is determined by other factors as valve arrangement, simplicity of manufacture or strength and by the system of fuel injection used. The necessity of producing as perfect a mixture as possible between the charge of compressed air in the cylinder and the injection air fuel vapor charge is of vital importance for the performance of a Diesel engine; the difficulties which are encountered can readily be appreciated by considering the short time (only a few hundredths of a second) available for the mixing process and by considering further the form of the average combustion chamber, where a large portion of the charge of compressed air in the cylinder is entirely inaccessible to the direct action of the fuel spray.

A large surplus of air for the complete combustion of the fuel and therefore considerable heat losses with the exhaust gases are the consequences. Only through extensive research work could be determined the most favorable form of fuel spray and shape of combustion chamber. More light should be thrown into the theory of the mixing process in a Diesel engine which is now understood to be effected by the violent whirls created by the blast of the injection air and the progressing combustion.

The tests with the piston, No. 2, were carried through at one-third of the rated load at various injection air pressures. In Figure 3 are given the temperatures in the Points 1, 3 and 4 at injection air pressures of 850 pounds and 560 pounds per square inch. It will be noticed that the higher pressure increased the temperature at Point 1 by about 50 degrees Centigrade.

RECREATION FOR TRANSPORT CREWS

THE crew of the transport Princess Matoika, which arrived in New York from Antwerp on May 23, were the first civilian seamen to benefit under the new policy inaugurated by the commanding general, American Forces in Germany, for the more extensive entertainment of crews in the Army Transport Service while on shore leave.

Under the Articles of War, transport crews are a part of the Army, and they therefore enjoy privileges not accorded to other seamen while in Antwerp. A recreation center, with boxing ring, moving pictures and similar features, is provided for their exclusive use by the Y. M. C. A., and the recreational service of the Army generally is at their disposal while in the port of supply for the forces in Germany. In addition to this, transportation will hereafter be provided for such seamen who wish to visit Coblenz and other occupied territory along the Rhine in Germany. The overseas Y. M. C. A. will also organize individual sightseeing trips to the battlefields of northern France and Belgium, including Liege, Malins, Ypres and such other points as may be covered in the time available. While without funds to finance such trips, the Y. M. C. A. will lend all necessary aid in planning itineraries and securing accommodations, serving in short as a tourist agency.

Masters of all Army transports have been directed to grant the maximum liberty practicable while in port overseas. Upon arrival at Antwerp, masters are furnished with complete information as to length of stay in port, number of winches to be run in discharging, coaling and ballasting date, etc., so that liberal shore leave may be granted crews.

The overseas Army headquarters has also announced that it will make every endeavor to assist crews of transports in purchasing tickets for the Olympic games to be staged in Antwerp this summer.

DANISH MOTOR SHIP

Notes from the East

By Americus

ALLELUJAH, 'tis done! are the words of a good old Methodist hymn, which fittingly express the sentiments of the American maritime world, at the final passage of the Jones bill, which might otherwise be described as a measure to put life and "pep" into our merchant marine. Attacked as it has been on many sides, unjustly criticised by interests which think they will be hurt by its requirements, it emerges from the legislative mill a little bit scarred, but withal the most constructive and most American bill ever passed by Congress for the interests of all branches of the shipping industry in this country.

All Federal legislation is a matter of compromise, as well it may be from many interests represented in its formation. That this piece of legislation reached final enactment with so few changes from its original inception is certainly remarkable, and too much credit cannot be given to the guiding hands which steered it through the shoals, rocks and cross currents of the congressional seas. Here and there are certain portions of the bill which could have been improved upon perhaps, but taken in its entirety it represents a sincere desire on the part of Congress to place the merchant marine on a sound basis, and to remove it from the bugaboo of government ownership and operation. As has frequently been stated in these letters, nothing can be accomplished by precipitate haste, so the transformation from government to private ownership is arranged to be accomplished without a jar. Some criticism from unthinking sources has appeared regarding the permission to sell ships abroad after all due diligence has been taken to dispose of them in this country. If no one in this country wants certain vessels of our great fleet, and it would not pay for the government to operate them itself, what else could we do with them than to sell abroad if they are wanted there. It's a safe gamble that the most efficient part of the fleet, and in fact the majority of the vessels, will soon be absorbed by American owners.

The Senate requirement of 75 per cent American ownership for vessels in the foreign trade has been changed to read that a "controlling interest" must be held in this country, and for vessels to engage in the coastwise trade the requirements are that 75 per cent of the stock must be held by Americans instead of 100 per cent. The 100 per cent requirement for the coastwise trade was fraught with considerable danger, as it would be difficult indeed to insure that every single share of stock in any corporation should be kept in American hands. The words "controlling interest" for companies operating in the foreign trade are, it has been pointed out, somewhat ambiguous, as the stock might largely be held abroad, and so long as the executives and directors of a company were American citizens it might be held that the "controlling interest" was American. There is, however, no doubt of the intention of Congress in this matter, and the Shipping Board may be relied upon to prevent any such subterfuge.

The fund for shipbuilding was unfortunately cut in half, and the board is not permitted to enter upon any new construction of its own. However, $25,000,000 a year to aid new shipbuilding activities is not to be sneered at, and if judiciously loaned will go far towards the much desired balancing of the fleet.

The extension of the coastwise laws to our insular possessions remains as written, except as to the time of becoming effective.

The permission to carry passengers on cargo vessels has been modified to the extent of making the number carried sixteen instead of twelve. The recognition of the American Bureau of Shipping as the official classification society of the government remains as it passed the House. The apparent attempt of foreign interests to permit of other classification societies not yet in existence to have Federal recognition was anticipated and thwarted by the action of the conferees.

A great deal of unfavorable comment has been heard both in New York and Washington that certain high British shipping officials should have found it necessary to be in Washington at the time the Jones bill was being considered and passed. Ostensibly they were in attendance on a joint meeting of a committee left over from the London Conference on Safety at Sea held in 1912-13, and having to do with bulkheads and division of ships. It really looks as if the "division" of the world's carrying trade, whereby the United States is to get its just proportion, was of paramount interest to these gentlemen. If such was not their mission, then certain members of Parliament and certain British newspapers were mistaken in their inquiries and comments on the object of this visit. To quote Lloyd's List of London, "All are interested in the possibilities of American competition, and they are all going across with definite plans for inquiring into prospects on the other side of the Atlantic." There is a very definite rumor to the effect that this "inquiring into" included a visit of the ambassador to the Secretary of State, where it was made known that the Jones bill, to say the least, did not meet with the unqualified approval of British interests. Be that as it may, it is becoming more and more evident as time goes on, that officials in charge of various branches of our government are considering American interests first, and how refreshing it all is to those of us who have observed the opposite state of affairs on so many occasions!

Now that the bill is a law, it is brought acutely to mind that its enforcement for the best interests of the merchant marine depends largely upon the personnel of the enlarged Shipping Board, which is authorized under the terms of the act. As the board stands today (June 5, it is well to give dates in view of the kaleidoscopic changes which inflict this organization). It consists of Chairman Benson and Commissioners Donald and Stevens. The latter has resigned, effective June 15, thus leaving five new members to be appointed. Although the Senate made no reference to the political affiliations of the members of the board, the conferees insisted that no more than four should belong to any one party. Chairman Benson and Commissioner Donald will more than likely be re-appointed, and that will close the lists for members resident in states touching the Atlantic. There must then be appointed two members for the Pacific Coast, one for the Gulf district, one for the Great Lakes division, and one for the interior, if the requirements of the bill are followed. In addition to Messrs. Shackleford, Blackmore and Scott from the Pacific Coast, former Congressman Humphrey of Seattle has been suggested. His long service on the merchant marine committee and his general knowledge of maritime affairs should make him a strong candidate. Mr. William Allen of New Orleans, the present secretary of the National Merchant Marine Association, may be considered as the Gulf member. For the representative from the interior, there seems to be an almost unanimous desire on the part of the friends of the merchant marine that Secretary of Commerce Alexander may by some means be placed on the board. His unquestioned ability and integrity would make him a most desirable appointee. For the Lake regions, it is quite possible that Mr. Gillan, at present awaiting confirmation by the Senate, may be given a recess appointment if the Senate fails to act before their adjournment. Of course, all these are conjectures, and the final selections may be totally at variance, but let us hope that good men and true will receive the appointments, whoever they may be. Twelve thousand dollars a year, the new salary, ought to attract competent men, now that the cost of living is alleged to be on a downward slide.

In the legislative shuffle and bustle at the end of the session, the Load Line Bill failed to receive action at the hands of the Senate Committee on Commerce. It is probable that it will be slightly amended and passed by the Senate early in the next session.

The leading shipping news item in New York, which is causing much conversation at this time, is the chartering of the cream of the seized German liners to a responsible concern, the France-Canada Company, an American firm in every respect. The deal involves fifteen ships of approximately 200,000 gross tons, and it is generally considered that the Shipping Board has made a wise move in thus disposing of these much discussed ships at an equitable bare boat charter rate of $3.50 per net ton per month. When it is considered that the charterers are to pay for the re-conditioning expense, it looks as if Uncle Sam had made a good bargain. The operating company is to be known as the United States Mail Steamship Company and it is to run ships to various European ports. The charter is to cover a period of five years.

with the privilege of purchasing at the end of that period at such rates as the board may determine, due credit to be given in the purchase price for the reconditioning costs. It is well known that several other large operating companies have been dickering for these ships, but the France-Canada Company was the first, in the opinion of the board, to come through with a fair and properly financed bid. When it is considered that only about one-half of the normal pre-war tonnage is now being operated in the trans-Atlantic passenger trade, whereas the demands for passage probably exceed the 1914 traffic, the opportunity for this company to make good financially, even while operating under the water-wagon restrictions of government ownership, are fairly bright. Unlike passenger rates on railroads, steamships have been allowed to more than double their pre-war rates. For instance, a minimum rate of about $250 to European ports and $425 to Rio Janeiro are fairly exemplary of present-day conditions which confront ocean travelers. At that, these charges are only commensurate with other costs.

The resignation bug, which sooner or later seems to attack every one connected with Shipping Board activities, finally got in its work on that hustling representative from the West Coast, Robert Hague, and out he goes to join the great majority (of Shipping Board executives) on or about July 1. Rumor has his future linked up with about every prominent shipping enterprise in the country, the latest being his possible connection, in an important position, with the United States Mail Line. They could go further and fare worse. New Yorkers seem to think that the west coast has held the construction end of the Shipping Board for a sufficient time, and are hoping to get one of their own in Hague's vacancy. A naval officer is being mentioned, but the strongest rumor just now is centered on another San Franciscan, Mr. A. J. Frey, the present district manager for the Pacific Coast.

The Martin-Gardiner syndicate is about to begin to function in its capacity of looking after all repairs on Shipping Board vessels. This syndicate, it will be of interest to shipyards to know, is to make surveys of all the board ships, to determine what repairs may be necessary; then to write specifications for the work and to supervise it. Their verdict is to be final on all repairs amounting to over $10,000, and they are to have supervision of all bills on repairs amounting to less than that amount. They are also to approve requisitions for all ship chandlery and engineers' stores used on the board vessels. The main office is to be here in New York, but they are to have agents in all the principal American ports. It is highly probable that Captain Pillsbury will be placed in charge of all the syndicate's offices on the Pacific Coast.

Within a very short time it is expected that announcement will be made by the Shipping Board of its agreements with the underwriters' syndicate to take over in American companies the great bulk of marine insurance, both on publicly and privately owned vessels in this country. If these function properly, as there seems to be every prospect of their doing, we will soon have the extreme satisfaction of keeping at home the greater part of $250,000,000 every year, which we now have to pay to foreign insurance companies on our ship properties.

"Oils Well" and Other Base Sediment

By Max H. Dyer

WELL, is all well with the oil well? "No!" says the ship operator, his recent unpleasant experiences in obtaining bunker oil at Pacific Coast ports fresh in his mind. "Yes!" says the oil producer, calling attention to the fact that California oil production is three per cent greater in 1920 than for the corresponding period last year. Then what is the matter with the oil fuel supply and why are operators tearing their hair in a vain effort to get bunkers for oil burning craft? The answer is obvious—two many horses for the bale of hay, or, in other words, there are three ships requiring oil fuel bunkers to one ship just a short while back. The remedy for the present condition is not so obvious, either more oil must be produced, other fuel used, fewer ships operated or one barrel of oil made to do the work that now requires three barrels.

The prospects for any great accession to the fuel oil production in California are remote, neither is there any immediate available supply from contiguous countries and we must needs worry along with the present stocks of locally produced supplies. To turn to other fuel leads to coal bunkering and local operators will take this step only as a last resort, for it means retrogression instead of progress, and in the marine world, we go forward, not backward. Fewer ships? No! We must keep our present fleet in operation and instead of a lesser number of steamers we are insistently crying for more boats. How then can we make the barrel of oil do triple duty? Had our ship owners and designers kept pace with European progress we would not now be in such a critical condition. Internal combustion engines offer the logical cure and while we are now pioneering along these lines, the day is not far distant when shipowners in this country will be placing orders for Diesel engined craft with the same assurance of successful operation as they now feel with the old faithful reciprocating engine and Scotch marine boiler. Don't blame the oil well for our present situation.

The eternal fitness of things natural is exemplified in the fact that the same old ocean, upon whose surface our steamers ply, furnished the source of the present oil fuel supply, for the accepted theory informs us that our fuel oil came from the countless myriads of minute marine animal growth accumulated through countless centuries of time and finally deposited upon the old ocean floor, then extending from the eastern border of the San Joaquin Valley westward, so it is—"Ashes to ashes and oil to soot."

The individual responsible for the euphonious names supplied to Emergency Fleet Corporation craft is hereby commended for a niche in the Hall of Fame. What could be more symbolic and appropriate than the West Cajoot? Let's have also the North Goshoot, the East Galoot and the South Cheroot; however, shooting the cheroot is landsmen's pastime.

Presidential candidates should be pledged to keeping the few remaining departments from interference with matters marine. We now answer and obey the Treasury, Commerce and Labor, State, Navy, Army and goodness knows what not and the next bet will be to have the Secretary of Agriculture assume jurisdiction over the food supply and the Secretary of the Interior the bowels of the ship.

The prohibition act put the lock on the locker and the gentle feat of splicing the main brace, has, with piracy, become a lost art. Imagine a pirate's song running "Yo-ho and a bottle of lime juice." Shades of Israel Hands!

Load line regulations are coming. Probably just as well, for the only limit now seems to be the funnel mark on the stack, and at that quite often a diver is needed to locate it.

Jones Bill—now that this measure has escaped the ignominy of a pocket veto and has become a law, we can look for some bargain counter sales. Dollar down and a dollar a week ought to bring a flock of bargain hunters to the big store, and we may witness the sight of satisfied customers trailing home with Ferris, Hough, German and other brands tucked under their arms. Prospective buyers of this stock, should, however, look well at the animal's teeth. Caveat emptor!

Progress in marine development is a slow growing critter. In the happy days of forty centuries ago, more or less, the prime mover of craft consisted of a wooden oar affixed to a galley slave. This answered admirably for sundry centuries until some semi-civilized boatman hung his fur undershirt on a pole to dry and made the happy discovery that the wind had other than drying virtues. So wind gradually supplanted armstrong power, iron succeeded wood, steel supplanted iron and lately we have had a fling at stone boats. A concrete corroboration of the fact that

Mother Shipton didn't know it all when she made that historic prophecy some centuries back.

Apropos of Pipe Line Transportation—most of us are somewhat familiar with marine transportation, some more or less familiar with surface lines, but no so many of us know about oil transportation by pipe lines and some day if you care to come along we will go on a hunting trip and pursue the drop of oily gob from the well in the desert to the seashore, not a pipe dream, a pipe line.

It has come under the writer's observation that there is a lot of room for improvement with respect to the bunkering arrangements on oil-burning vessels. A number of our Pacific Coast ships have absolutely inadequate facilities for receiving fuel cargo, thereby causing needless delays in bunkering ships and congestion at loading berths. Four-inch loading connections allow the passage of but 45 per cent of the volume that will pass through six-inch connections and the saving of over one-half the time consumed in bunkering ought to be worth while.

Workmen's Compensation Statutes and the Admiralty

By Harold M. Sawyer

ON May 17, 1920, the Supreme Court of the United States handed down a five to four opinion in the case of Knickerbocker Ice Company vs. Stewart (1), which marks an epoch in the development of admiralty and maritime law in this country.

This decision ends the long and futile contest waged by state legislatures in an effort to make workmen's compensation statutes applicable to cases of injuries suffered by maritime workers during maritime employment. It sets at rest a vexed question which has developed great contrariety of opinion not only in the state and lower Federal courts, but even in the Supreme Court itself.

The history of the struggle, which covers a period of several years, is interesting as an illustration of the perenially unsuccessful attempt to limit the Federal government by the assertion of "state rights." It is also necessary to a grasp of the full significance of the decision.

The effect of workmen's compensation statutes has been to withdraw these cases from the admiralty jurisdiction of the Federal courts, with the result that awards have frequently been made by compensation commissions under circumstances which would have precluded the worker from any recovery in the admiralty courts. This substantial invasion of the admiralty jurisdiction has been the question at issue in all of the recent cases involving maritime workers.

The admiralty jurisdiction of the Federal courts rests upon the Constitution of the United States and acts of Congress. The Constitution defines the judicial power of the United States as extending to "all cases of admiralty and maritime jurisdiction" (2), and vests that power "in one supreme court and in such inferior courts as the Congress may from time to time ordain and establish" (3). In 1789 Congress passed the Judiciary Act (4), the ninth section of which provided that the Federal courts should have "exclusive jurisdiction of all civil causes of admiralty and maritime jurisdiction, saving to suitors, in all cases, the right of a common law remedy, where the common law is competent to give it."

The uniform construction of these provisions of the Constitution and of the Judiciary Act has been that the saving clause of the ninth section gives him who has a maritime cause of suit his choice of proceeding either in the common law courts or in the Federal courts of admiralty, depending upon the form of remedy desired. Thus when he desired the peculiar remedies known only to the admiralty courts he brought his suit there, or, if satisfied with the forms of relief afforded by the common law courts he had recourse to them.

On July 13, 1915, the New York Court of Appeals held in the case of Jensen vs. Southern Pacific Company (5) that an employe is none the less within the scope of the New York Compensation Act because his employment is such as to bring him within the admiralty jurisdiction of the Federal courts, and affirmed an award made under the act.

This case was then taken to the Supreme Court of the United States, and on May 21, 1917, the court handed down a five to four opinion holding that in so far as the New York statute purported to cover cases within the admiralty jurisdiction it was unconstitutional and the award was void (6).

The reasons assigned were that the peculiar rights and remedies created by the New York statute were unknown to the common law and hence were not within the saving clause of the ninth section of the Judiciary Act, and that Congress alone had power to legislate with respect to maritime law. Consequently that portion of the New York statute which attempted to cover maritime cases was state legislation affecting maritime law and therefore void.

The saving clause of the ninth section of the Judiciary Act, which had remained unchanged since its adoption in 1789, was promptly amended by Congress on October 6, 1917, by adding the words "and saving to claimants their rights and remedies under workmen's compensation laws of the states."

It was the opinion of Congress that the amendment was a valid exercise of its exclusive power to legislate with regard to maritime law. It was also thought that the effect of the amendment would be not only to leave the injured maritime worker with his existing choice of an admiralty or common law remedy, but to give him in addition a further choice of remedy under the compensation statutes (7).

But no sooner was the amendment adopted than grave doubts as to its meaning and effect developed in the lower Federal courts, though none of them questioned its constitutionality.

Judge Hand, sitting in the district court for the Southern district of New York, ruled in an admiralty case brought by an injured maritime worker that the amendment practically incorporated within itself the New York compensation statute (8). The New York act made the right to appear before the Compensation Commission exclusive of any other remedy. Judge Hand thought that the statute stood on the same footing as if it had been enacted by Congress. Consequently he took the position that the right to proceed in admiralty had been destroyed with the consent of Congress, and dismissed the suit. On the other hand, Judge Bean and Judge Wolverton, sitting in the district court for the district of Oregon, adopted the view of the Senate Judiciary Committee (9). They held that the amendment had done nothing more than to give the injured maritime worker the three-fold choice of proceeding in the admiralty, in the common law courts or under the compensation statutes. They therefore sustained the worker's suit in admiralty.

With the law in this chaotic condition it is fortunate that an authoritative ruling has just been made by the Supreme Court in the Stewart case. This case, which was decided on May 17 of this year, was initiated before the Compensation Commission of New York and was carried to the Supreme Court in substantially the same way as the Jensen case. The facts in the two cases are practically parallel, the only material difference between them being that the Jensen case arose before and the Stewart case after the adoption of the amendment.

The court has now decided in the Stewart case that although Congress itself has power to legislate with regard to maritime law, it cannot delegate that power to the states, and that the amendment is unconstitutional because it amounts to a delegation of legislative power.

The result is that compensation statutes have no application to injuries sufplicable to all maritime workers in such employment. Until Congress acts these cases will remain within the admiralty jurisdiction of the Federal admiralty courts as provided in the ninth section of the Judiciary Act.

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(1) Not yet reported.

(2) Const., Art. III, Sec. 2.

(3) Const., Art. III, Sec. 1.

(4) 1 Stat. at L. 76, 77, Chap. 20; Judicial Code, Secs. 24, 256; 36 Stat. at L. 1091, 1160, Chap. 231.

(5) 215 N. Y. 514; 109 N. E. 600.

(6) Southern Pacific Company vs. Jensen, 244 U. S. 205; 61 L. Ed. 1086.

(7) Report No. 139, Senate Judiciary Committee, Oct. 2, 1917.

(8) The Howell, 257 Fed. 578.

(9) Rhode vs. Grant Smith Porter Co., 259 Fed. 304; same case, 263 Fed. 904.

(10) State statute giving lien upon a vessel for repairs at home port, there being none under maritime law. The Lottawanna, 21 Wall. 558; 22 L. Ed. 654. State statute fixing pilotage fees, Cooley vs. Port Wardens, 12 How. 299; 13 L. Ed. 996. State statute giving right of recovery for death caused by maritime tort, there being no such right under maritime law, The Hamilton, 207 U. S. 398; 52 L. Ed. 264; La Bourgagne, 210 U. S. 95; 52 L. Ed. 973.

This decision has, it is submitted, sown a crop of dragon's teeth and will doubtless give rise to much litigation. Heretofore the states have enacted considerable legislation with respect to maritime matters which has been sustained as constitutional by the Supreme Court (10). The specter of these previous decisions troubled the court in both the Jensen and the Stewart cases, and it found itself obliged to admit that there is something in the nature of a "twilight zone" in maritime matters wherein state legislation is valid. The Jensen and Stewart cases held that state compensation statutes are not within that zone. As a matter of fact, these two cases really create the zone. Before they were decided the respective spheres of state and Federal legislative power in maritime matters were thought to be clearly defined. But the principle of the Jensen and Stewart cases, unless limited by subsequent decisions, will, it is submitted, support a similar attack upon much state legislation of a maritime character which has been assumed to be constitutional.

The Roanoke Decision

In the United States District Court, Northern District of California, in admiralty, Judge Maurice T. Dooling on June 4 rendered an oral decision for the libelant in the case of James Jerome, libelant, versus James Crosby Brown, et al., doing business under the designation of United States Lloyds, respondents. This suit was for recovery of insurance on chartered freight of the steamship Roanoke on a voyage from Antofagasta to San Francisco. The Roanoke foundered on the outward voyage, from San Francisco to Valparaiso and Antofagasta; and the question at issue was whether the insurance on the homeward-bound freight had attached at the time of the foundering.

Policy Had Attached

In brief, the court's decision meant that there was an insurable interest in the freight that would have been earned on the homeward voyage and that the policy had attached at the time of the loss, which occurred on the outward voyage. The interest, it may be noted, was "freight on board or not on board," a phrase that was used to describe the chartered freight, homeward voyage. The amount at stake was $30,000.

Judge Dooling's decision, as stated, was oral; but, in absence of a written opinion, a brief of McCutchen, Willard & Greene, proctors for libelant, will elucidate the points at issue and the contentions of the libelant, which were upheld by the court.

"It is not disputed that libelant's assignor had a contract with the Selby Smelting Works for the carriage of ore from Antofagasta to San Francisco That contract was made, as appears from the libel, long before the vessel sailed from this port for South America. Under it freight money would have been earned by the charterer of the vessel. The existense of that contract gave it an insurable interest in that chartered freight money."

Had an Insurable Interest

After citing decisions of different courts the brief continues:

"It is obvious, therefore, that libelant's assignor had an insurable interest in the chartered freight that the vessel would have earned by the carriage of ore from Antofagasta to San Francisco.

"The ability to earn that chartered freight in the language of Section 3 of the Marine Insurance Act, was, during the voyage at and from San Francisco to Antofagasta 'endangered by the exposure' of the ship 'to maritime perils.' An application therefore was made to respondents to insure the chartered freight of the vessel against the usual sea perils which would be encountered on the outward voyage south.

"At the time of the application and when the contract with respondents was concluded, the vessel was at her dock in San Francisco loaded with cargo and ready to sail for the ports of South America. This fact was made known to respondents' agents, and is evidenced by the language of the insurance documents, including the policy of insurance. " . . .

Interest Intended to Be Insured

The brief defines the "interest intended to be insured" (the freight on the homeward voyage) as follows: "The respondents intended to and did insure, on the voyage from San Francisco to Valparaiso, and thence to Antofagasta, the chartered freight money that the charterer would earn by the carriage of ore from Antofagasta to San Francisco."

The interest was described as "freight on board or not on board," which is defined as follows:

"Obviously, if there is no charter, there cannot be freight payable on goods not on board. The ordinary policy only covers freight that is being earned on the voyage upon which the ship is then engaged. But to insure such freight the goods must be on board the vessel. These words, then, indicate that there is no charter and that the goods to be carried under it are 'not on board.' It follows, therefore, that the words were intended to cover chartered freight."

Authorities are cited to show that the words mean that chartered freight is covered.

Knew She Had Cargo

"Can anyone be heard to say that that language does not clearly indicate that the vessel was to proceed to various ports in South America, and thence to Antofagasta and there load a cargo, and that during all that time the freight money to be earned on the voyage back to San Francisco was at risk? Certainly not. Why any provision as to covering the risk until the vessel was loaded at Antofagasta? Does that not clearly negative any thought that it was intended, or that respondents were covering bill of lading freight that was being earned by reason of the carriage of cargo from San Francisco to South America? Furthermore, the provision permitting the vessel to proceed to various ports before touching at Antofagasta, her port of loading under the charter party, makes it apparent that the respondents contemplated and knew that the vessel was bound for those ports with the purpose of discharging cargo that she had or would have on board. . . .

Related to Chartered Freight

"These self-evident facts prove conclusively that the insurance desired and agreed upon had nothing to do with the vessel's cargo on her outward voyage. The whole matter related to one interest — chartered freight, which fact is demonstrated by the series of documents issued. . . . On the outward voyage the chartered freight money insured was not being earned because 'not on board.' Hence, it was not insured simply as freight, as it would have been stated were it intended to cover freight money that the vessel would earn by the carriage of cargo on the outward voyage. Being intended to cover on the outward voyage the chartered freight money that would have been earned in the performance of the charter party on the return voyage, the risk was properly described as 'freight on board or not on board,' or, as the House of Lords says: 'Chartered freight.'

"It is simply absurd for respondents to contend that the interest covered related to the cargo on the outward voyage. . . . We have shown, then, that the word 'freight on board and not on board,' is a short way of saying to an underwriter 'you are requested to insure chartered freight.' . . .

Can the Interest Be Insured?

"Having an insurable interest in this chartered freight money, and it being correctly described in the policy, it becomes pertinent to inquire whether the interest may be insured on an outward voyage to the port of loading where the goods to be carried under the charter party are to be loaded on the vessel. Inasmuch as the ability to earn that chartered freight is endangered and at all times at risk on the outward voyage, Section 3 of the Marine Insurance Act above quoted should be sufficient to establish that right. The decisions, however, leave no room for doubt on that subject."

After quoting decisions, the memorandum continues:

"When did the policy on chartered freight attach? In the exceptions it is stated that because of the matters therein set forth the policy did not attach. In fact, it was contended, on the argument, that no policy would or could attach until the vessel reached Antofagasta. . . .

When the Risk Commenced

"The commencement of the risk is stated in the policy itself. It is there said that the insurable interest under con sideration was insured 'at and from San Francisco,' etc. The duration of the risk is there expressed. The policy being on chartered freight, and, inasmuch as the vessel was, at the time the contract was concluded, at San Francisco, the policy attached immediately . . . .

"If, therefore, a loss occurred through a peril insured against, while the vessel was at her dock in San Francisco, which prevented the charterer from earning the chartered freight, liability would attach. Otherwise the word 'at' would be meaningless. For the same reason liability in this case attached when the vessel, because of a peril insured against, foundered while on a voyage 'at and from San Francisco to Valpariaso,' etc., the risk of which, during the time described, respondents were quite willing to assume.

"The parties agreed that the risk should attach at San Francisco and continue until the vessel reached Antofagasta 'while there and until loaded.' There is no law that prohibits such an agreement, and no authority has been cited which prohibits the court from giving it effect."

Opposed to Modern Authority

Having cited authority to prove that such a risk can attach at once, the brief continues: "Despite the rule just cited, it is urged that until the vessel reached Antofagasta and was ready to load the cargo for which she was chartered, or until something was done under the charter party, the policy did not attach.

"That contention is not only opposed to modern authority as set forth in the above-mentioned rule and as pointed out by Lazarus, but it is not sound for the additional reason that an act done for the purpose of one voyage (the outward voyage) may also be an act of preparation for the next voyage, or the homeward voyage.

"The attachment of the risk was not dependent upon the Roanoke sailing to Antofagasta in ballast. . . . It matters not that the vessel was not proceeding to Antofagasta in ballast, and the respondens 'most assuredly . . . cannot complain when they well knew such was to be the case, and the policy was issued with such knowledge.'

"The respondents, with their eyes open, were quite willing to write the risk on this chartered freight and accept a premium therefor. They were familiar with all of the facts at the time the application for insurance was made. They should, therefore, pay the loss, the risk of which was openly assumed. . . ."

COSGROVE - CLEVERDON, INC.

W. T. Cleverdon and J. E. Cosgrove have formed the insurance, brokerage and average adjusting firm of Cosgrove-Cleverdon, Inc., San Francisco. Mr. Cleverdon is well known in Pacific Coast average adjusting and marine insurance fields; and Mr. Cosgrove has been president of C. B. Sloan & Company and formerly assistant secretary of the California Insurance Company. Mr. Cosgrove will have charge of the fire and loss departments, and Mr. Cleverdon of the marine and average adjusting departments.

Large Contract for Seattle

THE Doran Brass Foundry Company of Seattle has recently been awarded a contract to make sixty large propellers for ships building at Hog Island. These propellers are to be of the built-up type with cast iron hubs and manganese bronze blades. There are four blades for each propeller and one spare blade, making a total of 300 blades. Each blade will weigh two tons and each hub four tons, so that in producing these propellers something like 1,400,000 pounds of manganese bronze and 480,000 pounds of iron will be cast and approximately 140,000 pounds of steel will be needed in making the studs and nuts which fasten the blades to the hubs.

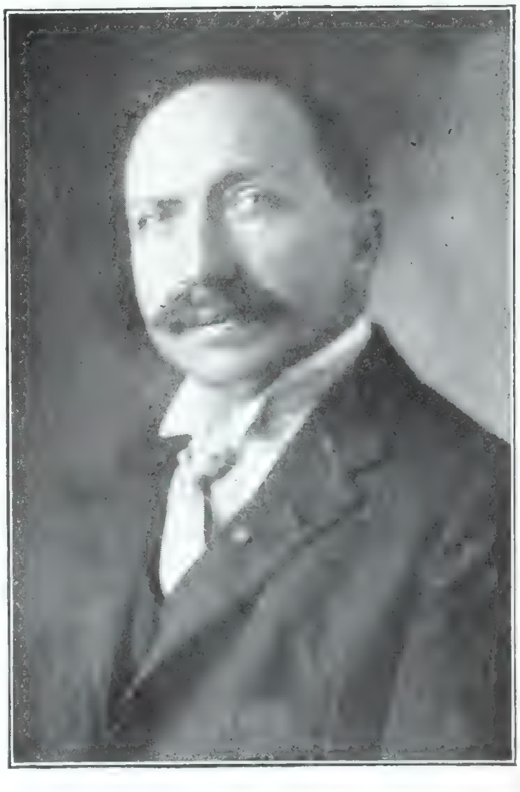
This contract was secured in competition with the greatest foundries of their kind in the United States and with an added handicap of the long freight haul across the continent and the added expense of delivery. It means over $500,000 worth of work for Seattle shops. The Doran Brass Foundry Company will cast the blades in their own foundry, the subcontract for casting the hubs has been let to the Olympic Foundry Company, and that for the machine work to the Hendricks Manufacturing Company, both of Seattle.

Change in Yale Organization

EFFECTIVE July 1, 1920, Mr. Willard L. Case has been elected treasurer of the Yale & Towne Manufacturing Company in place of Mr. John B. Milliken, resigned. Mr. Case brings to this position a long and very varied experience which should prove of great value. After graduating from the Brown University about 1906 he spent two years in a banking office and then took up the study of industrial engineering, becoming advisory engineer to the Audit Company of New York. His work in this connection brought him into close contact with problems of operation, management and accounting. In 1910 he opened offices as consulting industrial engineer and more recently has had considerable experience in certified public accountants' work, acting in the capacity of a special engineering member of a firm of accountants. He thus brings to his new position a long and varied experience in lines of work closely allied to those which he will now take up.

Mr. Edward C. Waldvogel has been elected a director of the company, having been in its employ for fifteen years and having occupied the position of general manager for four years.

Louis Steinberger



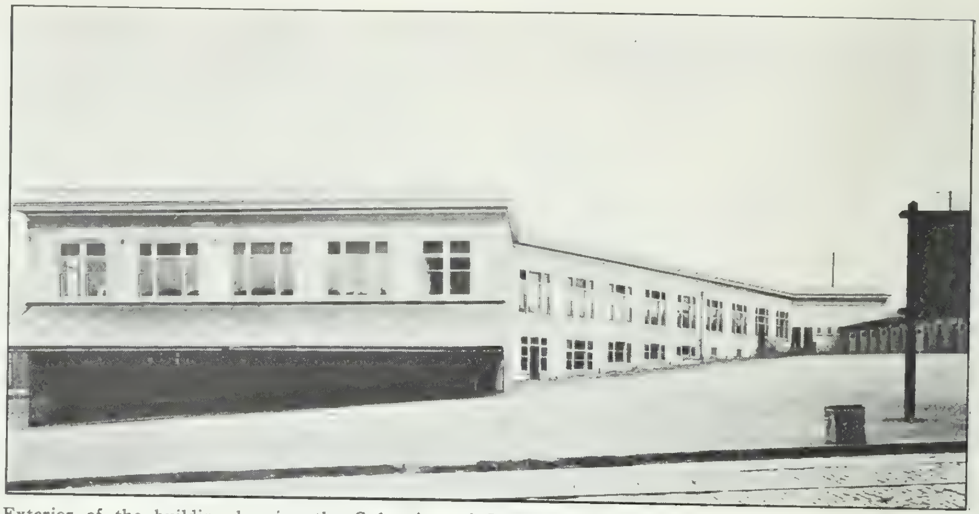
Louis Steinberger

ONE of the greatest problems in the field of Electrical Engineering is that of insulation, and a tremendous amount of experimental work and research has been carried on to discover materials suitable for this purpose.

Among others who have gained considerable fame in the search for insulating materials, the name of Louis Steinberger stands out very prominently. Louis Steinberger, a Hungarian by birth, emigrated to America is his early youth, thereby through deliberate selection becoming a patriotic American citizen. In his youth he was a figure and landscape painter and all of his instincts are of an artistic character.

In the year 1892, having discovered a material which he called Electrose, which combined the insulating properties of glass and porcelain, with a much higher tensile and compressive strength, he organized the Electrose Manufacturing Company in Brooklyn, New York, and has retained the presidency of that company ever since. Through untiring energy and hard work he developed the business to a point where the sales reached the very respectable figure of over $1,000,000 a year. It is claimed that this is the largest volume of sales ever attained by any concern in the world in making and selling insulators and insulating parts exclusively.

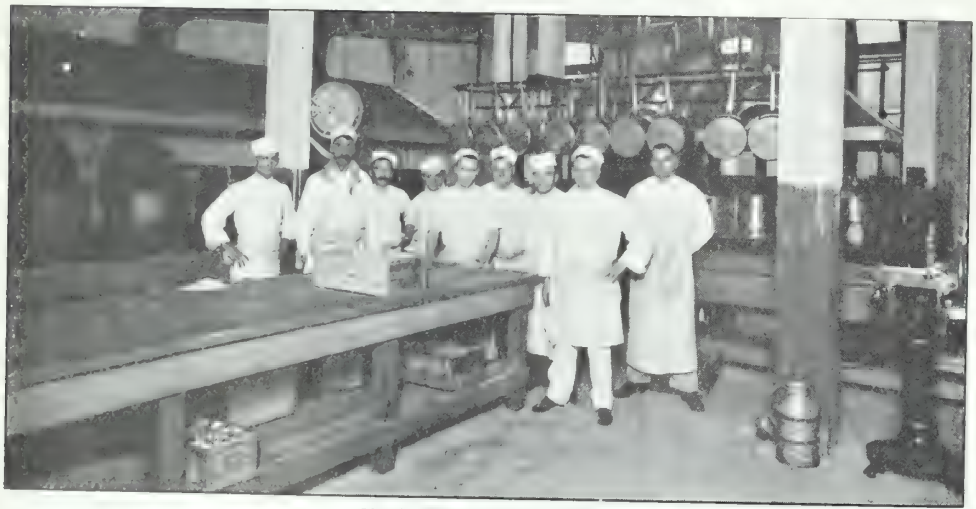
Bethlehem Hits H. C. L.


Exterior of the building housing the Cafeteria and Store at the Potrero Works of the Union Plant of the Bethlehem Shipbuilding Corporation

A SIMPLE and efficacious means of reducing the cost of living has been adopted by the Union plant of the Bethlehem Shipbuilding Corporation. This is the operation of grocery stores, at which foodstuffs are sold to employes of the company at invoice prices. The stores were opened in May, and during that month a total business of $15,000 was done. By invoice prices is meant the actual cost to the Bethlehem Corporation, so that the cost to the employes of groceries on the whole is less than what retail shops would have to pay jobbers. That the cost of living is reduced very materially, probably 20 to 25 per cent, can be seen quite easily.

Discounts Pay Expenses

In their basic principles of operation these stores are quite different from the ordinary retail shops maintained by large industrial corporations, for usually such establishments are intended to return profits. For the cost of operation the Bethlehem management relies upon the cash discounts given by jobbers for prompt payment of bills, so that there is no loss resulting, while at the same time employes are able to purchase at remarkably low prices.


Head Chef and his Assistants

Order slips bearing the list prices of foodstuffs are printed by the stores. Employes are encouraged to take these lists home, so that the wives themselves may decide what they wish. When an employe fills out a slip he pays cash for the whole of the order, and as a receipt is given a detachable slip, which is stamped with the same serial number as the order itself. Orders are accepted only before the whistle blows in the morning and during the noon hour; parcels are ready for delivery at the stores at 4:40 o'clock in the afternoon. For a time a delivery system to the homes of employes was maintained, but it was found expensive and not worth the cost.

Some of the Prices

Such is the general outline of the system in use at the two yards. The savings effected for employes may be gathered from the following prices, as they appeared on the list of June 1: Beans, fancy navy, five-pound bags, 40 cents; butter, company store fancy creamery, 58 cents; coffee, extra fancy, 39 cents; Crisco, one pound, 31 cents; Drifted Snow flour, ten-pound sack, 81 cents; Carnation milk, six-ounce can, 5 cents; Quaker oats, 56-ounce box, 35 cents; Sunsweet dried prunes, five pounds, $1; Sunmaid raisins, fifteen ounces, seeded, 19 cents; rice, Bethlehem fancy, two-pound package, 27 cents; hams, Eastern sugar-cured, 39 cents; bacon, sugar-cured, 41 cents; Ivory soap, large, 11 cents; tea, Bethlehem black, sixteen ounces, 47 cents; tomatoes, Del Monte solid pack, three for 42 cents; Calumet baking powder, sixteen ounces, 22 cents.

At the Alameda store two clerks are employed, and at the Union three. Many staple articles are branded with the Bethlehem's own name, in order to inspire confidence among the men; among such are rice, tea, coffee, and butter. The average daily sale of coffee, under this plan, is 200 pounds. A stock worth approximately $20,000 is carried on hand for the two stores, which is turned over each month. Officials of the company, as well as the employes, buy their foodstuffs of the company stores.

At the Plant Also

In this manner the Bethlehem Corporation assists the men to reduce the cost of living in their homes. Turning to the plants, one finds large cafeterias, which have advanced much farther in general use than have the corporation stores, and have become more familiar to the public, especially since the war brought new industrial needs and equipment; nevertheless, the Bethlehem cafeterias are of great interest to employers, as showing what can be done.

At the Union plant, San Francisco, is

Interior view of the Cafeteria Dining Room

A corner of the Store

a cafeteria seating 2000 persons; that at the Alameda seats 1200. There are five entrances into the Union cafeteria, each of which can receive about twenty-five men a minute, an aggregate of 125 each sixty seconds, or more than two a second. Thus, only a few minutes is required to serve all who come.

The dining space is divided into three parts: 35-cent luncheon; 25-cent luncheon; and a la carte. The first-named is the most popular, so that three entrances are provided; while the second and third have one each. The food served for these prices is: 35-cent luncheon—soup, meat, two vegetables, bread and butter, pie, coffee or milk; 25-cent luncheon—soup, three sandwiches, coffee or milk. But in the other section one may order what he wishes, which serves to attract those men who, although taking their luncheons from home, still wish hot coffee or other drinks and a clean place in which to eat. A studied effort is made by the management to assure cleanliness; bread being wrapped in tissue paper, for example, with the butter between the slices.

Cafeteria Loses Money

Because the cafeteria experiences the problem of the "peak load" at noon, it is not a profit-making venture; in fact, it loses money, the receipt being less than the expense. To atone for this loss, however, there is a profit on the two canteens operated in conjunction with the cafeteria. At these canteens are sold sandwiches, milk, ice cream, soft drinks, cigars and tobacco, and even overalls, caps and shirts. These profits counterbalance the losses of the cafeteria proper. Two meals, breakfast and luncheon, are served, but of course the great rush is at noon, when the cafeteria and canteens feed approximately two-thirds of the employes.

In addition to these eating places, there are dining rooms for officials and foremen and a room for women employes. These latter receive soup, coffee and milk free of charge, which makes it possible for a girl to take her luncheon from home, and still have hot soup and coffee without additional expense, or to buy sandwiches at the canteens. Another unusual feature of the service is that an employe may get a meal ticket, good for one week, on credit, so that the new employe without funds finds the management ready to aid him until he can get on his feet.

Withal, the management believes that the two establishments, the company stores and the cafeterias, are working out very successfully indeed. The worth of these departments is evidenced by the extensive manner in which both are patronized by the men, which, after all, is the real proof of the pudding.

Honolulu Notes

WITH passenger congestion so great that hundreds have been on the booking list of the various steamship companies for many months, Honolulu is anxiously and enthusiastically awaiting the arrival of the Shipping Board's combination freight and passenger liners, known as the 535-type, two of which have been allocated to the Matson Navigation Company. This port has been losing much valuable travel from the United States mainland because of the inability of steamship companies to give any reasonable assurance when travelers may obtain accommodations from Honolulu to San Francisco. Because of this condition of affairs many delegates of the recent foreign trade convention in San Francisco were discouraged from essaying their proposed sightseeing trip to Honolulu, and only a handful arrived where more than 100 were expected. Although the Matson company is operating the Maui, Matsonia, Wilhelmina, Manoa and Lurline on regular schedules, these vessels are unable to take up the "slack" in the long line of bookings at the steamship office, and the liners of the Pacific Mail, China Mail, T. K. K. and Oceanic are coming through here from their Oriental and Australian destinations with practically no available accommodations for Honolulu passengers desirous of reaching the coast. The new 535's, reported as allocated to the Matson company and the Pacific Mail, will relieve the situation materially, but according to latest advices from Washington these will not be available till the spring of 1921.

Another serious situation here, greatly hindering the schedules of freight vessels plying between the Orient and the Pacific Coast via Honolulu, is the oil shortage. There were on June 8 seven freighters lying in Honolulu harbor unable to get oil and outside the channel two others awaited a chance to come inside for fuel. Three of the vessels had been in port for more than a week without any chance to get oil. In the majority of cases the lines or agents had contracts with the Standard Oil Company and were unable to get any fuel whatsoever until the arrival of the tanker Dilworth. She brought only 65,000 barrels and after 30,000 of these had been given to four vessels, the company shut off the supply to ships and gave the fuel to the plantations for operating the mills. The situation on June 8 was a matter of waiting until the Dilworth returned to the coast and back again with another cargo.

The Canadian-Australasian liner Makura bade Honolulu temporary farewell on June 18 on her arrival from Australia and departure for Vancouver. She will go from Vancouver to San Francisco to be converted into an oil burner and while she is undergoing the transformation she will be replaced by the Tahiti, to take up the regular schedule with the Niagara.

Arrival of the Shipping Board freighter Mulpua from Balboa, en route to the Orient, on May 11, automatically sent a call to the Honolulu fire department to assist in extinguishing a fire that had been raging in the steamer's hold for more than a week. The blaze was found to be among a cargo of barrel staves in the forward hatch and after the removal of other cargo was quickly quenched.

Captain James Rasmussen, who made two trips on the Matson steamer Lurline, has been named port superintendent for the Matson company, here succeeding Captain John N. Pettersen, who has gone to Seattle to take a similar position for the same company. Captain Pettersen took the Lurline out of here on her last trip on his way to Seattle.

Presaging the arrival in the Oriental trade of a line of freighters of the Los Angeles & Pacific Navigation Company, the steamer West Hika, the first of four ships due to arrive during June and July, came to anchor off Honolulu harbor June 8. She was held up outside awaiting the opportunity to get oil, and in this trouble she shared the fate of about eight ships during the same week.

Pacific Port Notes

THE chief topic of conversation along the waterfronts and in the shipping offices up and down the coast during the past two weeks has been the effect which the passing of the Jones bill is likely to have on trans-Pacific commerce. Many well-informed shipping men seemed to be very dubious about Section 28 of this bill, which makes the present favorable export rail rates applicable only to the goods carried in American bottoms.

Inasmuch as the great bulk of freight passing through Seattle and San Francisco is for reshipment by rail or trans-Pacific carriers, and as a large proportion of this business has been carried by steamers owned and operated under foreign flags, these shipping men see only one alternative, and that is the establishment by these foreign lines of new through lines direct from the Orient by way of the Panama Canal to the eastern seaboard of the United States. We do not, however, see this matter in the same light. We have seen during the last two months the establishment by American capital of a number of coast to coast services in American-built ships, and we see no reason why these lines and others which are now in the embryo stage should not give a much more reasonable service than the trans-continental freight lines are now giving and on practically the same time schedule. It is very noticeable, in view of the Jones bill, that the new line of the United States Steel Products Company is just opening its Atlantic-Pacific and Oriental service with a line of fine steamers which will make San Francisco and probably Los Angeles and Seattle ports of call.

We must all remember, in thinking of navigation routes on the Pacific, that the short route from Panama to Japanese and Chinese ports, in attempting to approximate the great circle, parallels the coast of California and brings any vessel on that route so close to the Golden Gate that a call to San Francisco can be taken almost as a matter of course.

Victoria

ON May 31 the Grand Trunk Pacific Railroad called for bids for the construction of a large shipping wharf at Prince Rupert.

The industrial commissioner of British Columbia, Major Martin, is initiating plans for the establishment of trawler fleets for deep-sea fishing along the coast. Major Martin is making this attempt in the interests of returned soldiers and hopes to create a profitable line of employment for the soldiers and at the same time supply fish to local consumers at 10 cents a pound.

It has been announced that work will be started on a new Esquimalt dry dock early in September. The building of this dock will involve the expenditure of between $5,000,000 and $8,000,000.

On June 7 the longshoremen of Prince Rupert went on a strike to enforce demands for the 25 per cent increase in wages. Local business men and Grand Trunk Pacific employes are acting as volunteer stevedores to unload ships in the harbor.

The British Columbia Yacht & Boatbuilders, which was recently organized with assistance of the provincial government and which is composed wholly of returned veterans, has been recently awarded a contract from the Dominion government to build two 75-foot motorboats for buoy and beacon duty on the British Columbia Coast.

Vancouver, B. C.

DURING the last week in May the Blue Funnel Line's Tyndareus took out of Vancouver for Hong Kong, China, 7750 bags of mail. This probably constitutes a record cargo of this character.

Canadian-Australian shipping is beginning to move again. The Canadian government freight steamers are making the run in about twenty-seven days.

On June 21 the auxiliary schooner Ruby, under command of Captain Grant Whitlam, will sail from this port with supplies for the Hudson Bay Company's station on the Arctic Ocean. She will make the long fight around Point Barrow through the summer ice to the mouth of the Mackenzie River, Herschel Island and points eastward and will probably start her return trip in September. Captain Whitlam is one of the most experienced Arctic navigators, having been in the Hudson Bay Company's services on this route for nearly four years and having previous experience in these waters.

Seattle

DURING the month of April deep-sea vessels arriving at Seattle numbered 328, with a total net tonnage of 331,921. Three hundred and forty-eight vessels departed on deep-sea voyages with a total net tonnage of 334,540.

During the last week in May the work of converting the Phyllis Comyn from a Ferris type hull to a five-masted barkentine was completed at the Patterson-McDonald's yard and she was moved to the plant of the Todd Dry Dock & Construction Company on Harbor Island, where her bottom was cleaned and painted.

The Pacific Steamship Company has been appointed agent of the North Atlantic & Western Steamship Company, which is organizing a line of steamers between Boston and Philadelphia and Los Angeles, San Francisco, Portland and Seattle. The Artigas, first steamer of this line, sailed from Philadelphia May 20 and arrived at Los Angeles harbor about June 7. This company intends to have weekly sailings and, with proper co-operation on the Pacific Coast and the protection afforded by Section 30 of the Jones bill, it should find no difficulty in obtaining full cargoes.

On May 23 J. F. Duthie sent the 8800-ton steel steamship West Mahwah out on her official eight-hour run, and on the return of the vessel to port she was delivered to the Shipping Board and turned over by them to the General Steamship Corporation, who are operating her in the Puget Sound-Australian trade. This is the twenty-fourth ship built by Duthie for the Shipping Board and is the last item on their government contract. The delivery of this vessel completed the entire Shipping Board building program in the Seattle district.

The budget recently passed by Seattle's Chamber of Commerce calls for a three-year program of advertising with an annual expenditure for that purpose of one hundred thousand dollars.

The total business transacted over Seattle's wharves in April, 1920, shows an increase of nearly four million dollars over that of the same month in 1919.

The Alaskan Steamship Company has begun its summer activity, getting four ships away to Alaskan waters in three days, beginning with the Victoria on June 4. All of the sailings of the vessels of this company are booked well in advance for both passenger and freight, and it is expected that the tourist travel to Alaska by way of the inland passage will be the heaviest on record.

At a test carried out on the wharves of Seattle's public terminal, the port commission estimated the saving of eight hundred dollars in the handling of one ship's cargo by the use of an electric stacking elevator. This elevator was designed and patented by the port engineer, George F. Nickolson, and his assistant, G. W. Whitestone. These gentlemen have granted to the port of Seattle the perpetual use of their patent.

The steamers of the Harrison Direct Line of London continue to make regular calls at this port. The steamship Magician of this line recently cleared for Liverpool, carrying 600 tons of whale oil, 100 tons of arsenic, canned salmon and canned milk and 1,600,000 feet of lumber.

The school ship Vicksburg of the Washington State Nautical School is now en route for Honolulu, having made several calls at California ports. From Honolulu she will return to Seattle by way of Alaska. The cadets live on board the Vicksburg while she is moored at the State University pier in Lake Washington and on this cruise they put into practical application the lessons they have learned in their class room work.

At the present time there are only two steel vessels under construction at Seattle, both of them in the shipyard of J. F. Duthie & Company. Nearly all of the shipyards, however, are busy on repair work and some 3400 men are kept employed.

Tacoma

THE report of the collector of customs of the district of Washington shows that exports from Tacoma for March, 1920, were valued at $9,803,720, and imports were worth $2,125,830. This is a gain in exports of over $4,000,000 in comparison with the same month last year.

Official permission has been obtained by the Tacoma Rotary Club to change to Rotarian the name of the last government steamer now under construction at the Todd Dry Dock & Construction Corporation yard.

There has been a general decline in lumber freight rates to Australia and to the west coast of South America, the Australian rate dropping $2.50 and the west coast rate $1.

The steamer Javary sailed from Tacoma on June 8 on what is said to be her last voyage out of this port. From Shanghai she will go direct to New York and will be used in short routes on the Atlantic service. The Justin will also be taken off the Tacoma-Shanghai run and placed in the Atlantic service. These two steamers will be superseded by a large modern motorship to handle the oil trade from Shanghai to Tacoma.

During the month of May ninety-nine deep-sea vessels visited the port of Tacoma, with a total tonnage of 149,152 gross tons.

Grays Harbor

LUMBER shipments by water to coastwise, eastern and foreign ports since January 1, 1920, with the close of May, totaled over 141,000,000 feet, or 1,00,000 feet more than was exported in the same length of time in 1919. Since the beginning of the year 171 vessels have entered Grays Harbor and cleared with lumber cargoes, or thirty-five more than during the same period of the previous year. May lumber exports by water aggregated over 30,000,000 feet, as compared to 23,000,000 feet shipped in May, 1919. April and May, 1920, were the heaviest shipping months of the year, both months aggregating around the 30,000,000 mark. From January on, which started the year with shipments of 25,000,000 feet, export figures have continued to increase, indicating that the heaviest export period for the year will be during the summer and fall months. Among vessels entering the harbor for lumber cargoes during May were the schooner Alert, from Honolulu, and the Henry T. Scott and J. B. Stetson of San Francisco.

The trolling fishermen and shipping interests of this section are petitioning the light house department that a sound producing buoy be installed at the inner edge of the Grays Harbor bar. The buoy, known as the Black Tank No. 1, is located there at present, but it is not a sound producer and cannot be seen in a fog. Material for a new radio station at the lighthouse reservation at Westport has arrived from Puget Sound, being brought down from the Bremerton navy yard by the United States mine sweeper and tug Tatnuck. Construction work has been begun with a view of having the project completed by August 1. Material for the tower was cut at Bremerton, and will only have to be fitted into place at the site. The quarters of the crew of five will be located near the main station, with the tower close by. The compass station will be farther out. The station is to be complete in all details and capable of sending and receiving messages without relaying them.

The Elinor H., launched the last of May at the Dockton Shipbuilding Yards near Tacoma, has the distinction of being the first five-masted schooner to claim Hoquiam as its home port. The vessel is the second to be built at the yards for Grays Harbor interests, the Ella A. having been launched several weeks previous. Both carriers will be used in the lumber trade from Grays Harbor. The Elinor H. was towed from Puget Sound to Hoquiam and is now at the Eureka Lumber Company's mill, where her quarters will be completed, after which she goes to the Endresen yards in Aberdeen for installation of five masts and the necessary spars. The vessel is 254 feet over all, has a beam of 40 feet and a draft when loaded of a little more than 23 feet. She will have a carrying capacity of about 2,000,000 feet of lumber. Captain Chris Endresen, Jr., of Hoquiam, will have command.

Astoria

THE report for the month of April shows that 5754 tons of freight in cars and 5000 tons in vessels were handled at the terminals in excess of the amount handled during the corresponding month of last year.

At the meeting of the Port of Astoria Commission held May 25, preliminary work for the extension of the belt line railroad was authorized by the commission, and the engineers' department was directed to immediately make location surveys.

Reports submitted at this meeting showed that practically every logging camp in the lower Columbia River district is increasing its machinery and equipment, the bulk of the transfer of this freight coming over the port terminals. Among recent shipments of this character were sixty logging trucks and several logging engines for the Lewis & Clark Company.

The lighthouse tender Manzanita, which recently laid the submarine telephone cable to Tillamook Rock lighthouse, is now engaged in laying a similar cable from the shore to the lighthouse at St. George's Reef.

Portland

DURING the first four days in June deep-sea cargoes handled out of Portland totaled $2,138,726, an average of $544,081.50 a day. This is a high record for this port. During the first ten days in June the Columbia Pacific Shipping Company handled at Portland twelve ships with an aggregate deadweight tonnage of more than 100,000.

It is expected that over 3,000,000 bushels of flour and wheat will be dispatched from Portland during June and July .

Record time was made in the repairing of the Admiral Line steamer Pawlet by the Pacific Marine Iron Works' floating repair barge. The barge followed the big freighter to Wauna where work was carried on at the same time that the vessel was loading lumber for China. Three boilers were overhauled, the high pressure cylinder and piston repaired, and forty nine other items of repair work handled. Eight days had been allowed for the job in the contract. The work was finished in four days.

Late in May the G. M. Standifer Construction Corporation laid the keel for the first of the 12,000-ton tankers which they are to build for the Standard Oil Company. This is said to be the largest steel ship ever built in the Pacific Northwest. Work is progressing very rapidly on the two 9600-ton freighters which still remain of the five that Standifer is building for the Green Star Line of New York.

Max H. Houser has refused to accept the chairmanship of the port commission because he is out of sympathy with the elaborate scheme which has been approved by the majority of the commission for the development of what is known as the Swan Island project.

Captain G. F. Matthews who is now building at the Peninsula Shipbuilding Company's plant a 220-foot steam schooner for the Hart-Wood Lumber Company, is of the opinion that prospects for future steam schooner business are very bright and that many contracts will be forthcoming.

The Grant Smith Company and their associates have finished the six-masted schooner Oregon Pine and she has been chartered by J. J. Moore & Company of San Francisco to carry lumber to Australia. The Oregon Pine is of 4150 gross tonnage.

The first ocean-going log raft of the season is now under construction at the mills of the Hammond Lumber Company and will leave for California early in July.

Several Portland capitalists have organized a million dollar corporation for the pressing and refining of cocoanut oil and are developing plans for a large plant to be erected at Linnton. It is hoped to develop a large copra trade in Portland so that vessels loading in the Columbia River with lumber for Australia and the Philippines will be able to depend partly upon this freight for return cargo.

San Francisco

THE strike of the metal trades unions, which since the first of October, 1919, has been in force in the San Francisco Bay region, is now officially ended. Since the first of the year all of the shipyards have been running on the American plan, and while more or less handicapped by the lack of skilled labor, they have been able to function quite well and to finish and deliver quite a respectable quota of vessels. With the strike over shipbuilding should resume great activity, as there is an immense amount of new work on hand and of repair and alteration work waiting to be done.

At the Union plant of the Bethlehem Shipbuilding Corporation during the month of May there were launched one 10,100-ton tanker, the Halo, and one 12,000-ton freighter, the Hannawa, for the United States Shipping Board, and one torpedo boat destroyer, the Bruce, for the United States Navy. This plant made no deliveries in May, but delivered during June two tankers from the Alameda works and one freighter and three destroyers from the Union works, and launched in June two tankers at the Alameda works and one destroyer at the Union works.

The Moore Shipbuilding Company has finished the oil tanker Vacuum, winning out in the contest with the Sparrows Point plant of the Bethlehem Shipbuilding Corporation. They have also launched several Shipping Board vessels and have delivered one ship to the Shipping Board. A full detailed description of the activities of the Moore plant will be found in a special article elsewhere in this issue of Pacific Marine Review.

The Union Construction Company and the Schaw-Batcher plant have launched and delivered one vessel each during June. The Hanlon Drydock & Shipbuilding Company is busily engaged on its program of 5500-ton steel vessels for the Shipping Board and on quite an extensive amount of repair work. This company has released Mr. David Young, its efficient manager, who is joining the Pillsbury & Curtis organization. Mr. Thomas Mooney, who more than any other one man under David Robers was responsible for the magnificent tonnage record made by the Skinner & Eddy Shipyards during the war, has been appointed general manager in place of Mr. Young, and the Hanlon organization promises to make bidding on repair jobs very interesting for the large shipbuilding and drydocking companies on San Francisco Bay.

The San Francisco Chamber of Commerce has determined upon a large extension of its policy of exploiting San Francisco. Among other methods to this end they have begun the publication of a 32-page weekly magazine, to be known as "San Francisco Business." They have also appointed a number of representative committees for the active direction of this program. Very properly they have included among these committees one to be known as "The Maritime and Harbor Committee of the Chamber of Commerce." This committee is made up as follows:

H. W. Poett, chairman; C. H. Bentley, Almer M. Newhall, J. H. Rosseter, Miles Standish, H. Clay Miller, F. H. Meyer, Paul Shoup, Robert C. Reid, C. W. Cook, R. B. Hale, Captain J. H. Bennett, Charles C. Moore, Leon G. Levy, Mortimer Fleishhacker, and Captain John Barneson.

One of the first active developments under this new program of the Chamber of Commerce was a tentative survey of the port of San Francisco by B. F. Cressonn, Jr., a recognized authority upon all questions bearing on port developments. Mr. Cresson, after intensive study for one week, during which time he held consultation with all of the shipping interests of the port and made a careful analysis of the character and extent of its shipping business, recommended that a complete port survey be made under the approval and with the support of all the affected interests in the entire San Francisco Bay region. He declared that San Francisco's chief need was the development of the industrial activities of California and adjacent states, that she must not be content to act merely as a trans-shipment point between rail and water carrier.

San Francisco is now the leading exporting and importing rice port of the United States, and California has come to be second in rank as a rice producing state. The rice yield this year will aggregate 170,000 tons, so that rice in volume will rank next to barley as the premier crop of this state. This remarkable development in the production of rice has come about in a very few years, and it is to such development and to the fostering of manufacturing plants and industries along with it that Mr. Cresson is pointing the way in his report.

Following the recent Foreign Trade Convention, a permanent council of the Pacific Coast has been formed by the various foreign trade organizations. Presidents of the foreign trade clubs are vice-presidents of the council. J. Fred Larsen, vice-president of the Pacific International Company, Portland, has been named president of the council, and Ben C. Dailey, of the Overseas' Shipping Company, San Francisco, is secretary.

A record was made recently by the Haviside riggers in stepping the five masts of the barkentine Monitor in two hours. Usually this job would have taken at least two days, but the masts and top masts were assembled on the wharf alongside the ship and lifted into place as one piece by the big Haviside derrick.

During the last week in May, contract was awarded by the harbor commissioners for the lengthening of Pier 20 by 160 feet. This additional length will cost $44,199.

Captain Martin Sivertsen, formerly master of the Shipping Board steamer Western Ocean, has been appointed superintendent of barges and derrick barges for the Crowley Derrick Launch & Tugboat Company. The recent work of Captain Sivertsen in the salvage of machinery and boilers from the wreck of the Girlie Mahoney has created quite a reputation for him as an expert wrecker, and it is predicted that under his direction the derrick barge fleet of the Crowley Company will have an even greater success than it has had in the past.

During the last two weeks in May more than 20,000 tons of sugar arrived at San Francisco, part of this being 2024 tons brought in by the Pacific Mail freighter West Niger from Hongkong, where California canneries are said to have purchased 25,000 tons, of which this shipment was the first installment; the balance of the sugar was all from Honolulu.

Although the British embargo on copra has been lifted at Australian ports, there has been no perceptible effect on the San Francisco market. The huge stocks of copra which had been accumulating at Sydney during the period of the embargo are already absorbed by the British demand and have largely been loaded in British bottoms for direct shipment to the United Kingdom. It will be some weeks or even months before there will be any copra cargo available for American vessels at Australian ports.

The new state vegetable oil terminal on Islais Creek functioned very successfully in taking its first cargo of vegetable oil. This cargo came in on the steamship Eastern Importer and this vessel was able to enter the channel and moor alongside the oil wharf, thereby, is is estimated, saving about $2 a ton over the cost of handling by lighter. Importations of vegetable oil to San Francisco now total about $40,000,000 annually, and it is predicted that this business will be very largely increased as a result of the facilities offered by this new terminal.

Los Angeles

On May 25 the Shipping Board steamer West Notus, seventeenth Shipping Board steamer built at the Southwestern Shipbuilding Company, was launched. On the next day the Southwestern Ship Yards delivered their fifteenth steamer, the West Nomentum, which has since been loaded out of Portland for China. The Bakersfield, tenth steamer built at the Southwestern yard, has successfully completed her maiden voyage to Europe and return under charter with the Williams-Diamond Company.

On June 12 the Los Angeles Shipbuilding & Drydock Company launched its twenty-sixth Shipping Board hull, the Topa Topa. Early in June the Crown City, twenty-fourth hull at the Los Angeles Shipbuilding & Drydock Company, was completed and delivered to the Shipping Board and is now being operated by Dant & Russell in the lumber trade between Portland and China.

The Long Beach Shipbuilding Company launched early in June their seventh Shipping Board hull, the West Kedron. On June 4 this company ran the trial trip of the Domingo Mazdel, a small freighter built for the Cuban Company of the same name. This ship is now on her way to Havana via the Panama Canal with a cargo of rice from San Francisco. She is officered and manned entirely by Cubans and is said to be the first vessel ever built in California for a Cuban concern.

Los Angeles foreign traders were electrified on June 2 by the arrival from Singapore of the Los Angeles Pacific Navigation Company's steamer West Montop with a cargo of crude rubber and other merchandise from the Orient. On June 4 the World Traders organization of Los Angeles celebrated this event with a dinner and dance aboard the West Montop, in which some 200 guests participated.

During the past month the increase in large fishing boats in Los Angeles harbor has been very rapid and some trouble has been caused on account of the fishing launches interfering with the docking of vessels at the piers, with the result that a special anchorage has been provided for these boats in the outer harbor.

The incorporation of the Los Angeles Steamship Company was completed about the first of June. This company is to have a capital stock of $5,000,000, and was formed for the purpose of purchasing the steamers Yale and Harvard from the government and operating them between Los Angeles and San Francisco. Fred L. Baker is president of the organization and associated with him as officers and directors are some of the strongest capitalists of Los Angeles. It is announced that the Yale and Harvard will arrive at Los Angeles harbor about July 1.

SHIPOGRAMS

The Shipping Board Conferences

IN order to prevent cutthroat competition between vessels of the government, the United States Shipping Board recently has adopted a policy of fostering and requiring the organization of rate conferences by all companies operating board ships. On the Atlantic and Gulf approximately twenty-five of these conferences have been formed; on the Pacific there are three: the Pacific Coast European Conference, the Trans-Pacific Conference, and the South American Tariff Bureau. Of these, the Trans-Pacific Conference was formed first.

All Tariffs Cancelled

On February 26 the Shipping Board cancelled all tariffs, effective March 1; and placed in the hands of the managing agents the fixing of both outward and homeward-bound rates, subject to the Shipping Act of 1916. The direct control of the board over rates thus was relinquished; but, in order to prevent unreasonable rate-cutting, the board gave its formal approval to rate conferences and instructed district representatives to cooperate in organizing them; and in addition advised operators that they would be required to respond to complaints made to the board regarding their rates and practices. Emphasis was placed upon the necessity of conservatism and consideration of the interests of all American steamships, including vessels privately owned.

In additions to instructions issued at this time, the board has taken other steps to insure the organization of conferences and adherence to their rates by managing agents operating government tonnage. Rates on Shipping Board vessels, allocated to certain routes, must be made in conjunction with the managers of other Shipping Board steamers, both outbound and inbound, and with private corporations handling American tonnage in the same trade. Rates must be decided upon unanimously by all the interests represented in the conference, and must be maintained until the conference changes them. An additional proviso is that any agent operating government vessels shall not charge for any privately-owned vessels, either American or foreign, which he may be operating in the same trade, rates lower than those fixed by the conference for government vessels; in other words, a corporation operating both privately-owned and Shipping Board tonnage over the same routes must apply the conference rates to both classes of ships.

Tramp Steamers Affected

These provisions apply to vessels plying on regular routes. As for tramp steamers, they also must become members of the conferences within whose territorial jurisdictions they are operating. The fact of operating a vessel over a given route makes the manager a member of the conference, but only for the period during which his steamships are engaged in that service. These provisions are made so that operators would have available information regarding rates and conditions in particular trades to guide them in fixing rates for tramp and full-cargo business; and also so that the Shipping Board conferences might be advised as to the acts of tramp operators, particularly as to tariffs, etc. Further, in order to prevent cutthroat competition between board operators and to protect the individual operators against the necessity of making public his business secrets at conferences, managing agents of tramp tonnage are required to inform the local representatives of their prospective business and of rates and conditions.

South American Traffic Bureau

One of the conferences formed on the Pacific Coast under these instructions from the Shipping Board is the South American Tariff Bureau, the members of which are W. R. Grace & Company and the General Steamship Corporation, both of which are engaged in trade to the west coast of South America, and Swayne & Hoyt, who are managing agents of the new Shipping Board line to the east coast of South America, known as the Pacific-Argentine-Brazil Line. This conference has jurisdiction over rates to ports south of Panama only, inasmuch as no Shipping Board steamers are engaged in the Mexican and Central American services; consequently, the board has no reason for organizing a bureau of companies operating on these routes.

In the Pacific Coast European Conference are E. C. Evans & Company and Williams, Dimond & Company, both of which are operating United States Shipping Board vessels. Formation of a conference was mandatory on these corporations, but not on their competitors; the latter, however, who are principally foreign companies, are working informally with the Americans.

Trans-Pacific Conference

Of the Pacific conferences, the first organized was the United States Shipping Board Trans-Pacific Conference. The San Francisco group comprises the Admiral Line, Los Angeles Pacific Navigation Company, the Matson Navigation Company, the Pacific Mail Steamship Company, the Robert Dollar Company, Sudden & Christenson and Struthers & Dixon. In the Seattle group, including Portland, are Struthers & Dixon, the Admiral Line, Columbia Pacific Steamship Company, and Frank Waterhouse & Company, all of which are operating Shipping Board vessels. Conspicuously absent from this list are the large foreign operators. They are not operating Shipping Board tonnage, and so the board has no direct means of bringing about a condition of rate equilibrium so far as they are concerned; but most of the important trans-Pacific shipping companies, American as well as foreign, are members of the Pacific Coast Oriental Tariff Bureau, and with this older organization the Shipping Board conference is working, accepting its rates and seeking changes only when certain rates appear to be in need of readjustment. Some corporations are members of both conferences, as the following list of San Francisco companies in the Pacific Coast Oriental Tariff Bureau will show: Pacific Mail Steamship Company, Admiral Line, Los Angeles Pacific Navigation Company, Struthers & Dixon, Toyo Kisen Kaisha; Trans-Oceanic Company, agent of the Ocean Transport Company (Taiyo Kaiun Kaisha); Dodwell & Company, agents of the Blue Funnel Line; China Mail Steamship Company, Java-Pacific Line, represented by John D. Spreckels & Brothers Company. In the Seattle group of the Pacific Coast Oriental Tariff Bureau are: Osaka Shosen Kaisha, Canadian Pacific Ocean Service, the Admiral Line, Struthers & Dixon, the Trans-Oceanic Company, Nippon Yusen Kaisha, Dodwell & Company, Frank Waterhouse & Company, James Griffiths & Sons, A. M. Gillespie, Inc., and W. C. Dawson & Company.

Eastbound Rates Fluctuate

Westbound rates, thanks to the different conferences and the state of trade, are stable; eastbound rates, on the other hand, have been subject to violent fluctuations and determined cutting. The Shipping Board took steps, when the Trans-Pacific Conference was organized, to form a bureau in the Orient. Such a governing body could prevent severe competition among operators of Shipping Board tonnage; how it could stop rate cutting by foreign lines is much more difficult to understand. As an example of the situation with which American operators in the Far East have to deal may be cited the marked reductions made in hemp from Manila in April: $2 United States gold by the Japanese lines; $1.50 by the Blue Funnel and Dutch steamships; whereas at that time the Shipping Board rate was $3, or double the Blue Funnel tariff. During May the general cargo rate from Japan was as low as $4 a ton, although it rose at the beginning of June to $6. These rates are one-fourth or one-third those obtaining from Shanghai to the Pacific Coast, or $17.50. One factor that has brought about the extremely low freights from Japan, as compared with those from China, has been the construction in Japan for the Shipping Board of thirty vessels, of an aggregate deadweight tonnage of approximately 250,000, as against four vessels, of an aggregate of 40,000, at Shanghai. Several of these have been delivered at Pacific Coast ports.

Bureaus in the Far East

Accordingly, the Shipping Board, at the time the westbound conference was organized in the United States, moved to establish similar bureaus in the Far East. The program, as drafted, was for the location of the central authority in Shanghai. In addition to being headquarters, Shanghai would have authority over North China; and other sub-committees would be established as follows: Kobe, the whole of Japan; Hongkong, French Indo-China; Singapore, the Straits and Dutch East Indies; Manila, the Philippine Islands.

In organizing these conferences the policy of the Shipping Board operators has been not to disturb the present working arrangements of the trans-Pacific bureaus; but they desire to co-operate with the foreign conferences to assure the maintenance and general stability of rates.

As between the Pacific on the one hand and the Atlantic and Gulf on the other, complete co-operation has been the ideal of the board. The United States Shipping Board Trans-Pacific Conference is represented in the North Atlantic Far East conference, initiated by the Shipping Board; and the tariffs and other information are exchanged between the various conferences for their mutual benefit and guidance.

535'S ARE ALLOCATED

IN the field of Pacific Coast operations during the month, there have been two developments of more than ordinary importance. One is the definite allocation of twelve of the new 535 combination freight and passenger vessels of the Shipping Board to Pacific services: five to the Pacific Mail Steamship Company, five to the Pacific Steamship Company, both for the Orient, and two to the Matson Navigation Company for the Hawaiian Islands. Indications now are that none of the vessels will be ready for delivery on the Pacific until late in the year, probably in December.

The other development is the improvement of the coastwise trade via the Panama Canal. The Luckenbach Steamship Company has resumed its sailings, abandoned four years ago; the North Atlantic & Western Steamship Company has opened a new line; and the Isthmian Steamship Line also has entered the field.

LUCKENBACH SERVICE RESUMED

WITH the sailing of the steamship Eastern Pilot from New York for Los Angeles and San Francisco May 29, the Luckenbach Steamship Company resumed the service between the East and West coasts via the Panama Canal that was suspended in May, 1916. Other vessels will follow the Eastern Pilot at intervals of about three weeks. The former service had offered four sailings a month, and, as conditions in the Eastern ports improve, more vessels will be placed on the run, so that a service better than that of four years ago will be given. East-bound sailings also will be resumed. In resuming west-bound sailings the Luckenbach line has had to contend with an unusual situation created in the East by railroad strikes.

Since the suspension of the coastwise trade four years ago, several noteworthy vessels have been added to the Luckenbach line. Only one of these has been seen in ports of the west coast. The list of eighteen vessels totals 192,240 tons deadweight, the Andrea F. Luckenbach and the Lewis Luckenbach, 14,400 tons each, being the largest; the others ranging from 12,650 to 6300. The newer and larger vessels embody many advanced elements of design, conspicuous among which are an unusual number of cargo-booms, hatches and winches. In this respect, few other steamships can vie with the Luckenbach vessels. With one exception, the newer freighters are turbine-driven, with reduction gearing, and have a maximum seaspeed of fifteen knots.

Pacific Coast headquarters are in the Merchants' Exchange Building, San Francisco.

The following is a list of the Luckenbach steamships, name, deadweight tonnage, where built and in what year being given: Andrea F. Luckenbach, 14,400, Quincy, 1919; Dorothy Luckenbach, 12,100, Chester, 1919; Edgar F. Luckenbach, 12,650, Newport News, 1916; Edward Luckenbach, 12,250, Quincy, 1916; F. J. Luckenbach, 11,555, Quincy, 1917; Florence Luckenbach,,8340 Glasgow, 1910; Frederick Luckenbach, 4500, South Shields, 1888; Harry Luckenbach, 12,100, Chester, 1919; Hattie Luckenbach, 6450, Sparrows Point, 1901; J. L. Luckenbach, 6750, Glasgow, 1886; Jacob Luckenbach, 12,130, Chester, 1919; Julia Luckenbach, 12,250, Quincy, 1917; K. I. Luckenbach, 11,555, Quincy, 1918; Katrina Luckenbach, 11,555, Quincy, 1918; Lewis Luckenbach, 14,400, Quincy, 1919; Lillian Luckenbach, 12,100, Chester, 1919; Pleiades, 6300, Sparrows Point, 1900; Walter A. Luckenbach, 11,555, Seattle, 1918.

NORTH ATLANTIC & WESTERN

A NEW coast-to-coast service via the Panama Canal was established in June by the North Atlantic & Western Steamship Company. The first vessel, the steamship Artigas, arrived at Los Angeles June 7, at San Francisco June 12, with cargo from Boston and Philadelphia. She will be followed by the steamship West Togus; and the latter, in turn, by another vessel sailing from Boston about July 1, Philadelphia July 10, and calling at Los Angeles, San Francisco, Portland and Puget Sound. For the first few months there will be a sailing each three weeks; later, there will be two a month.

Shipping Board Vessels

Vessels for the service are being obtained from the Shipping Board, but not all those that go west will return east. The Artigas will load for Philadelphia and Boston; the West Togus, however, probably will take export flour at Portland. The line, organized by Boston and Philadelphia capitalists, will remain in the coastwise trade; and, when the present situation has clarified, will buy vessels. The Pacific Steamship Company is acting as agent on the Pacific Coast.

An auspicious beginning was made by Artigas. She is a standard 7500-tonner of Hog Island; is the ninetieth vessel launched by the American International Shipbuilding Corporation at that yard; and on her first voyage performed admirably. Her speed at sea averaged almost 11½ knots. There was no engine or boiler trouble of any nature, the only difficulties being with winches and oil feed, and those of a minor nature; on the entire voyage the Artigas did not slow down at sea.

Seven Days to Canal

The Artigas departed from Philadelphia May 18, from Delaware Breakwater May 19, and arrived at the Panama Canal via the Windward Passage after 6 days, 18 hours and 34 minutes, during which she averaged 11.49 knots on a consumption of 55,080 gallons of oil, as measured by soundings, and 62,880 gallons by meter. Soundings were regarded as more accurate than the meter, however. Her run was 1868 miles by observation and 1964.5 by engine; and her revolutions totaled 147,300.

On the northward voyage to Los Angeles the Artigas averaged 11.40 knots for 10 days 13 hours, the time of her passage, arriving at Los Angeles at 10.14 a. m., June 7, eighteen and three-fourths days out of Philadelphia. On the voyage from the Canal to Los Angeles her revolutions totaled 294,270; her fuel oil consumption was 89,270 gallons by soundings, and 91,140 by meter; the run by observation was 2942 miles and by engine 3118. The Artigas' engines are Cutris turbines with reduction gears.

On her trial May 19 the Artigas ran for six hours at an average of 87 revolutions. Her average speed over a measured mile was 11.59—12.58 with the tide and 10.2 against. During the six-hour trial her fuel consumption was 2250 gallons. Her draft was 17 feet 10 inches forward and 20 feet 6 inches aft. Captain G. G. Mitchell expressed the conclusion that she was a "wonderfully behaved" vessel. E. A. Cummings is the chief engineer.

ON THE LOSS SIDE

THE steamship City of Omaha, en route from New York to the Orient via Panama, was damaged while passing through the Canal and put into Los Angeles and San Francisco. Seven feet of concrete was placed in the forepeak as a temporary repair to damage met in the canal. In addition to this, work was done on the boilers at Los Angeles before she proceeded to San Francisco.

When the Admiral liner President was docked at the Todd yard four blades of the propeller were found to be bent and the fairwater was missing, all caused by striking a floating object, and repairs were estimated at $5000. Later it was discovered that the tailshaft had been cracked, increasing the estimated cost of repairs to $30,000.

The schooner Irmgaard, owned by Balfour, Guthrie & Company, was wrecked in the Fijis June 3. When Captain John Turloff and the crew arrived at Levuka they reported the vessel a total loss. She was bound from Eureka for Sydney. A few years ago the Irmgaard was rescued from a typhoon in the Eastern Sea by a United States Army transport, when she probably would have been lost without assistance.

With the Exporters and Importers

FREIGHT REPORT

June 11, 1920.

SINCE our last report, dated May 20, three United States Shipping Board steamers have been chartered to load brewing barley from San Francisco to the United Kingdom at $30 one port and $31 two ports of discharge, freight prepaid, for August / September loading. Charterers are Strauss & Company.

This same firm has also chartered the Edouard Bureau, a French sailing vessel from San Francisco to the United Kingdom, Havre, Antwerp, Dunkirk, at 150/- for August/September; also the Buffon at 150/- for October/November, both barley from this coast. They are also said to have the option of loading wheat at Portland at 160/-.

Balfour, Guthrie & Company chartered two French sailers, one the Ville de Mulhouse and the other the Dougeay Trouin, both at 150/-, barley from San Francisco, options of Portland at 160/-.

The prospects for a good crop in Oregon and Washington are excellent, and prospects for our barley crop are said to be fairly good; hence we look for a good chartering business from this coast for the months from August to January, and perhaps later.

There have been no sales to report since the Henry T. Scott, mentioned in our last circular.

Quite a lively business has been done in chartering vessels from Australia with coal to the west coast of South America, Hind, Rolph & Company having chartered Annie M. Reid at $17 to a nitrate port, and the Edward May at 95/- to Callao direct.

J. J. Moore & Company chartered the sailer Monitor at 85/- to a nitrate port, and the motorboat Malahat at 100/- to Callao, and Elinor H. at $17 to a nitrate port.

A. O. Andersen & Company chartered Kate G. Pedersen at $17 to a nitrate port, for account of Andrew Weir & Company.

W. L. Comyn & Company, Inc., chartered three of their sailers at 86/- to nitrate ports, to London charterers, and the Alicia Haviside, just a few days ago, at 90/- to a nitrate port, and 102/6 if ordered to Callao.

For Australia with lumber from the north, J. J. Moore & Company closed the sailer Narwahl at $38.50 to Melbourne, and the schooner Fort Laramie at $40 from Eureka and San Francisco to Melbourne; also the steamer Egeria at $35.50 from Columbia River to Sydney, and the schooner Forest Pride at $35 from Grays Harbor to Sydney; also Lahaina at $35 from the north to Sydney.

The schooner Eric has been chartered at $35 on vessel's pine capacity, from Eureka to Sydney, by A. F. Thane & Company.

The Western Fuel Company has withdrawn the Norwegian steamer Tancred from the Oriental trade with the Robert Dollar Company, owing to the lack of cargo caused by the recent financial crisis in Japan, and they have berthed her through Balfour, Guthrie & Company from this port to Australia. The major part of her cargo to Sydney and Melbourne will be case oil, put on board by the Vacuum Oil Company on the basis of 90 cents a case. She will, no doubt, be chartered back with coal from Newcastle to Honolulu.

The steel sailer Dunsyre has been loaded with coal at Savannah for owner's account to Buenos Ayres.

Andrew Weir & Company have chartered steamer West Magwah with coal from Newcastle to Honolulu, and J. J. Moore & Company have chartered the steamer West Holbrook for the same business; also the schooner Vigilant, coal to Honolulu; all reported to be at $9.50. The demand for vessels, both to Honolulu and to the west coast, continues.

For lumber to the west coast, Balfour, Guthrie & Company chartered the steamer Agylla at $35, two ports discharge, one of which is said to be Valparaiso.

The steamer Henry T. Scott is also chartered to two Chilean ports by the Slade Lumber Company, presumably at the same rate, while Grace & Company chartered the steamer Siskiyou at $35 to Callao and Antofagasta.

The demand for the nitrate vessels has fallen off very much, the only charters reported being the Spokane, chartered some time back, at $17.50 to Honolulu, and the schooner Columbia at $10 for the same business. This vessel, unfortunately, arrived at Valparaiso unfixed and on account of the scarcity of nitrate was obliged to take the above low rate.

Captain Woodside succeeded in getting a return cargo of copra from Sydney to San Francisco, at a reported rate of $16. This appears to be the first vessel, for many months, loaded at Sydney with copra, and we hope it may continue.

The schooner W. F. Jewett is reported to have been chartered for copra from the South Seas to this port at $15.

As we close we must admit that the tendency of lumber freights to different parts of the world is lower. The price of lumber has dropped recently, and this always has the effect of making buyers hold back from purchasing, with the result that vessels wishing to charter are forced to take lower rates.

PAGE BROTHERS, Brokers.

A NEW SHIPPING BOARD LINE

IN furtherance of its policy of opening and developing trade between the United States and other countries, the Shipping Board has added another to the lines radiating from the Pacific Coast. This is the new Pacific-Argentine-Brazil line, of which Swayne & Hoyt, San Francisco, are managing agents. The title of the line is fully descriptive, but it is worth emphasizing that Brazil and the Argentine are on the east coast of South America; in short, that the Pacific Coast of the United States will have immediate trade connections with the Atlantic countries of South America. Steamship lines to the west coast of Central and South America have been developing and growing for many years, and tramp services have been added as trade demanded; but at no time has a line bound the Pacific Coast with the Atlantic. Probably the nearest approach to such a service was in the clipper days, when sailers, plying between New York and San Francisco by wap of Cape Horn, frequently put into ports on the east coast. In a commercial sense, however, these calls meant little or nothing.

To Maintain Monthly Service

Swayne & Hoyt will maintain a monthly service with Shipping Board vessels. The first to sail was the Pallas, a 7500-tonner, built by the Todd yard at Tacoma, which departed in June. The new steamship Rotarian, also a 7500-tonner, will follow in July, and a third, the West Notus, in August. A fourth steamship, the name of which is not yet known, will follow in September. These vessels probably will be supplemented by an occasional tramp as freight offerings require.

The most interesting detail of this new service is that the vessels will make the outward voyage by way of the Straits of Magellan. Since the opening of the Panama Canal the long voyage around South America has been heard of more and more infrequently, with the exception of a few voyages by steamships that found themselves blocked by slides in the Gaillard cut. All the ships will be oil-burners and will be able to take enough fuel at San Francisco, it is believed, to carry them almost to Panama, after calling at the Eastern ports, although bunkering at Rio may be necessary.

Through Canal Northbound

On the Pacific Coast the ports of call will be Seattle, Portland, San Francisco and Los Angeles. From Los Angeles the vessels will steam for Magellan, and having rounded South America will call at Bahia Blanca, Buenos Aires, Rosario, Montevideo and Santos, and later at Vistoria, Rio de Janeiro and any other ports at which there may be business. In order to attract the vessels, the amount of business offering will not need to be large, so Swayne & Hoyt have emphasized. On the northern leg of the voyage the ships will pass through the Canal.

Cargo already offering for the ships is diversified: canned and dried fruits, salmon, sardines, paint, varnish, rubber belting and packing, rice, tea, California redwood and sugar pine and Northern Douglas fir, and silk from the Orient transshipped from San Francisco.

In the beginning the rates will be those in effect from New York and other Atlantic and Gulf ports to the east coast of South America, although there may be readjustments later.

To the business houses of the Pacific Coast the important phase of the new line is that direct and dependable connections will be made with the richest portions of South America.

GEORGE S. DEARBORN DEAD

By the death of George S. Dearborn, president of the American-Hawaiian Steamship Company, the American merchant marine has lost a commanding figure. Not only was Mr. Dearborn head of the great organization, but he also was one of the founders, which speaks much for his enterprise and foresight, for, in the days when he and Mr. Lapham created the line, the American merchant marine was at its low ebb and the American flag seldom was seen on the high seas.

Despite the existence of conditions that had driven American capital to enroll its vessels under other flags, the American-Hawaiian, protected by the coastwise laws, built up a fleet that, when the war broke out, was the largest under the American flag, numbering, as it did, almost thirty excellent steel vessels. For size, speed and general design there were few ships in the world that surpassed this fleet. The vessels continued in the coastwise trade, between New York and Philadelphia and San Francisco, Seattle and Honolulu until 1916, although for a few months thereafter sugar cargoes were transported from Honolulu to San Francisco.

For many years water communication between Hawaii and the Atlantic Coast depended upon sailing vessels: at first on the old-time clipper ships, and afterward, when the export of sugar became important, on other sailers. On the foundation thus laid the American-Hawaiian was founded. Under Mr. Dearborn's management it grew steadily larger, until it became, as stated, the largest company operating under the American flag and a factor of great importance when the governments of the United States and allied nations found themselves in urgent need of vessels.

INTERNATIONAL COMMERCE CORPORATION

Mr. GEO. B. CARPENTER, manager of the foreign trade department of the Merchants' National Bank of Los Angeles, has been the guiding spirit in the recent organization of the International Commerce Corporation. Realizing the great necessity in Los Angeles of an exporting and importing house to stimulate trade in and out of Los Angeles harbor, this new firm has opened trade connections with many Oriental and South American points, with a view of extending trade for Southern California commodities. The exports of the new company will include canned fruits, vegetables and fish, case oil and other petroleum products, automobiles, trucks, oil and gas engines, machinery, etc. Imports will include tea, hemp, kapok, crude rubber and other Oriental and South American products.

The officers of the International Commerce Corporation are:

Mr. R. R. Schweitzer, president. Mr. Schweitzer heads the Western Machinery Company, manufacturers of oil engines, stationary and marine.

Mr. J. D. S. Nahapiet, the vice-president of the company, is a very prominent shipping man of Calcutta. Mr. Nahapiet heads a shipping firm of India which owns and operates ships and handles a very large exporting and importing business in the Orient.

Mr. J. P. Bustamante, treasurer of the International Commerce Corporation, is also president of the Los Angeles Mercantile Company.

Mr. M. Carasso is secretary and general manager. Mr. Carasso has had a broad experience in South American and European trade and with his associates a successful business is assured for the new exporting and importing house.

HARRISON DIRECT SAILINGS

The Harrison Direct Line steamship Statesman sailed from Liverpool May 22 for San Francisco, Balfour, Guthrie & Company, agents, with a full cargo. She will be followed at an interval of about a month by the steamship Crown of Toledo. During the war the Harrison Direct Line maintained a service between the Pacific ports of the United States and the United Kingdom, despite the fact that its vessels, in common with those of other important British companies, were largely used for war needs. These sailings, however, were not nearly so frequent as those of pre-war time. At the first of the year the Harrison Direct Line began monthly sailings.

The Statesman, Crown of Toledo and the following vessel, probably the Craftsman, will load canned and dried fruits for the United Kingdom. Freights at the present time from Europe to San Francisco are principally rough cargoes.

ISTHMIAN LINE SERVICE

The Isthmian Line will operate a fleet of 10,000-ton vessels between New York and other Atlantic ports and Los Angeles, San Francisco, Portland, Seattle, Vancouver and other Pacific Coast ports, and will reload at these ports for Philadelphia, Baltimore, New York and Boston, or elsewhere on the Atlantic as cargo offers. The first vessel dispatched from the East was the Steel Trader, which will load at Pacific ports in August. Norton, Lilly & Company, San Francisco, are general agents.

Trade Notes

American Association Formed in Manchuria

It was noted in the North China Star that the American Association of Manchuria, recently organized by the American residents, will act in the capacity of an American chamber of commerce until a separate body is formed, in fostering and safeguarding American commercial and other interests, gathering and distributing information of value to its members and promoting cordial relations between the various nationals in Manchuria.

Improvement of the Harbor of Chinwangtao, China

The Kailin Mining Administration is credited by the Far Eastern Review as being largely responsible for promoting the improvements to be made in the harbor facilities of Chinwangtao. It is reported that work will be commenced this spring on a new breakwater 2500 feet long, to be built outside the present breakwater. When this with other lesser improvements are completed, there will be berths for twenty-six steamers, some of which will have a depth of thirty feet at low water. It is estimated that 20,000 tons of coal per twenty-four-hour day can then be shipped.

American Freight Cars for Chinese Railway

The recent signing of a contract for the purchase from an American firm of twenty standard American freight cars for use in transporting coal from the Pinghsiang collieries to Wuchang on the Yangst River marks a return by the Chuchow-Pinghsiang Railway to the use of American equipment. Although the road was built of American materials and originally operated with American equipment, subsequent purchases were primarily from German sources, as the directing engineer of the road and the technical staff of the mine were nearly all of that nationality.

Proposed Opening of Tsiningchow, China, to Foreign Trade

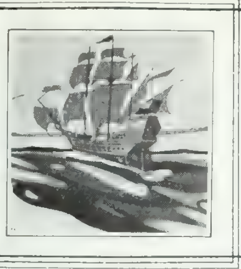
The desirability of opening to foreign trade the city of Tsining has been set forth in a petition sponsored by prominent citizens of Shantung Province. This city occupied an important position on the Grand Canal until the overflowing of the Yellow River silted up the canal. Being the center of a fertile region, it still is visited by foreign traders seeking native products for export. It has connections by rail through Yengchow and by water with commercial centers to the north and south, and it is believed that if the plan for the restoration of the Grand Canal is carried out and the proposed foreign settlement established, it would again become an important trade center.

Uruguay Grants Submarine Cable Concessions

A concession has been granted a French company to lay submarine cables between Monteviedo and Rio de Janeiro, and Monevideo and Buenos Aires.

Railroad Equipment Needed in Lima, Peru

Copies of a set of specifications for two locomotives and a number of flat cars and coaches needed on local railways in Peru, as well as the name of the local business house to which communications should be addressed by American firms interested in the project, may be obtained from the Bureau of Foreign and Domestic Commerce or its district and co-operative offices upon reference to file No. 41936. It is recommended that quotations on such orders be made either f. o. b. steamer New York or c. i. f. Callao for cash against delivery of documents. Trade Commissioner Jackson suggests that the Callao quotation would doubtless meet with more favor.



Marine Insurance

Recent Developments

By Charles F. Howell

ENCOURAGING progress is being made at Washington in the development of a working understanding between the Committee on Merchant Marine and Fisheries of the House of Representatives, the Shipping Board and American marine underwriters, that will admit of the organization of an effective pool for the coverage of American hulls. During the closing days of May at a conference of these committees it was decided to endorse the plan of having three syndicates, and the United States Shipping Board approved the making of suitable contracts with these three syndicates. Syndicate A is to take care of surveying, inspection and loss services for the Shipping Board in respect to all steel vessels owned by the board and as to vessels sold by it on a part payment basis, and to perform similar services for any other shipowners and for other marine underwriters upon payment of reasonable charges for such services. Syndicate B is to insure the mortgage interest of the Shipping Board in such steel steamships as it may hereafter sell to others, and such other steamships as the board has sold and are mutually agreed upon. The underwriting capacity of Syndicate B is to be not less than $2,000,000 upon any single hull. Syndicate C is to take care of all approved American steel, ocean-going hulls owned by private persons or corporations or in which they have an insurable interest. This syndicate is to have an underwriting capacity of not less than $2,500,000 upon a single hull. Of these three syndicates the first two are to be composed of American companies exclusively; the third permits of participation by admitted foreign companies to a limit of one-third of the capacity of the syndicate. As has been announced, the sum of $1,000,000 is to be appropriated by the Shipping Board for the purpose of organizing the Service Bureau and assisting syndicates in inspection and supervising work in prominent ports in all parts of the world.

Lake Fleets Written

The fleets on the Great Lakes have been written for the ensuing year at the same figures as the 1919, in spite of the effort made by underwriters to secure such an increase in the tariffs as is justified by conditions. The hull valuations have gone up from $60 per gross registered ton to $70, and this is the only change for 1920. There is a feeling of bittnerness among underwriters for brokers on account of the way the latter have opposed the efforts of the former to secure an improvement in rate and so give some chance of achieving a slight profit where there has been a steady loss for years. One of the complicating features of the situation is the power that is wielded by the vessel agents of the Great Lakes. These men manage ships for their owners, arrange shipments, take care of forwarding, etc., etc. Their hold is so strong and the interrelation of their interests is so complicated and vital that the mere matter of insurance is more or less of a by-play with them. It is not so to the underwriters, however; $200,000,000 of value are involved in the underwriting of these fleets.

Plan a Credit Bureau

A systematic canvas is being made of the marine offices of New York City to discover their inclination toward the organization of a credit bureau that shall compile information regarding the standing of prospective clients, both brokers and assured, and aid in the collection of premiums. Definite action is expected soon. The idea of such a bureau has developed out of the situation brought about by war conditions. When the lure of big profits from war risk coverage attracted new agents, brokers and companies to the marine field there sprang up an undesirable element both with respect to responsibility and promptness in payment. A plan for co-operation along the line of credit was suggested a month or so ago, and this has been worked out in detail and is being presented at the various offices for approval.

Promptness in Settlements

Among the chief causes of delay in the payment of marine claims is the matter of irregularity in their presentation. A prominent authority suggests the following outline of procedure as being the wisest for the policyholder to follow so that he may make out a claim in the least possible time and enable the insurance companies to make payments with the utmost speed:

1—Upon first advices of a loss or damage, notify the broker or insurance company, or underwriters' agent indicated on the policy, or Lloyd's agent, and see that a proper survey or other recognized proof of loss is drawn up. In the event of any captain's protest.

2—File claim at once against the carrier for the loss. This does not prejudice your rights, but protects the interests of yourself and underwriters for possible recovery.

4—Whenever possible send the claim to the broker who procured the insurance. His name almost always appears on the policy, and it is part of his service to the assured to collect claims.

3—Carefully examine the policy and be sure that it covers your loss in each case. Present a detailed statement of the claim, basing the loss or depreciation of the merchandise on the insured value thereof. Accompany your statement with the following documents as far as possible:

(a) Insurance certificate or policy.

(b) Original shipping invoices (in shortage claims the affidavit of the packer of the case also).

(c) Proofs of loss: i. e.,
  (1) Survey report.
  (2) Captain's protest.
  (3) Customs reports.
  (4) Gauger's or weigher's returns.

(d) At least one signed bill of lading.

(e) All correspondence concerning the claim made against the carrier and any other evidence bearing on the cause, nature or extent of loss.

The French "Sworn Broker"

Interesting intelligence comes from France to the effect that active agitation is under way there to do away with the archaic system known as "sworn brokers"—the sole survival of the old French method of government licenses. This system retards business, gives rise to questionable practices, and serves very few useful ends. At the present time all policies on French hulls and cargo are required to pass through the hands of sworn brokers, of whom there are but thirty in the whole of France and only eight in the city of Paris. The brokerage of these middlemen is said to be no les than 7½ per cent on France's total marine insurance of 500,000,000 francs per annum, although the companies themselves average but 4 per cent. It is said that fully one-quarter of the premium funds are unnecessarily held up by these brokers, presumably for the fine interest earnings. Complaint on the part of the companies on account of slowless in payment is said to be generally followed by retaliation through discrimination on the part of the brokers.

How Shippers Can Help

In his admirable address before the Seventh National Foreign Trade Convention's recent San Francisco meeting, Hendon Chubb expressed his confidence in the ability of the American marine underwriter to take care of the peace-time promlems of his business, and indicated some important ways in which exporters could be of assistance both to themselves and the insurance companies. Said he: "I know of no other important commercial country where the merchants are will-

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FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

ing to accept freely and for a moderate consideration in the way of reduced rates, insurance with underwriters having no domicile in the same country as the merchants, and where suits, if any, must be brought in other courts, and I believe that this policy in the end is not a wise policy; it is not a policy that has been followed by other nations important in world commerce." With regard to cargo insurance Mr. Chubb said: "The situation is that any importer or exporter can, except possibly in a few unusual cases, obtain in this market full protection on terms and under conditions that compare favorably with those obtainable by any foreign competitor, using either American companies or foreign companies domiciled here and in all ways subject to our laws; the choice of the shippers being represented by the fact that this premium income is divided 64 per cent American companies, 36 per cent foreign companies." This market covers about 95 per cent of the business placed by American importers and exporters. The situation as to hull insurance is different. "A large portion of this business," said Mr. Chubb, "is placed in foreign markets with companies who pay no tax to this country and are in no way subject to our state regulations.

Banning Theft and Pilferage

The most absorbing subject at the present time among marine insurance men of our eastern seaboard is theft and pilferage, and the best minds of the business are being devoted to discovering the most effective way of combating these prominent sources of loss. At a recent special meeting of the American Institute of Marine Underwriters a committee was appointed to inquire into the whole subject, and it has held several long sessions and gotten its work well under way. The membership of this committee is as follows: Samuel Bird, chairman; William H. McGee, W. J. Roberts, W. A. W. Burnett, H. H. Reid, S. D. McComb, and E. T. Barry. This committee has been in correspondence with such prominent commercial bodies as the Merchants' Association, Chamber of Commerce, National Association of Manufacturers, Tanners' Council of United States of America, and the National Association of Exporters of the United States. The purpose of this correspondence has been to secure a conference with these bodies to the end that there may be co-operation for the improvement of conditions with respect to wholesale theft and pilferage, and to punish the culprits. Already a number of these important bodies have signified their desire to participate in such a conference, and it is proposed to have a general meeting soon. Just what insurance form our underwriters will adopt to meet the crying demands of the situation is not indicated by the committee as yet, but it is generally believed in the street that it will, in the main, follow the new English form, with the possible improvement of forcing the insured to actually carry one-quarter of his theft risk.

In this connection it is of great interest to note the standard form of theft clause recently adopted by British marine underwriters for attachment as a policy endorsement or for issuance as a separate policy; a special premium being chargeable in either case. The full text of this important clause is as follows:

We hereby agree that we will not as from May 10, 1920, cover risks of theft, pilferage and short-delivery except on the following conditions, viz.: Only by a separate policy or by endorsement on the marine policy and for a separate additional premium to be shown in the slip and policy;

(a) In consideration of an additional premium of — per cent it is hereby agreed that this policy covers the risk of theft and of pilferage irrespective of percentage but only to pay 75 per cent of the insured value of any goods so lost.

(b) In consideration of an additional premium of — per cent it is hereby agreed that this policy covers the risk of short-delivery for which the liability of the shipowner or other carrier is limited, reduced, or negatived by the contract of carriage by reason of the value of the goods, but only pay 75 per cent of the insured value of any goods so lost.

Underwriters to be entitled to 75 per cent of any amount recovered from the carriers or others in respect of such losses (less cost of recovery, if any), up to the amount paid by them in respect of the loss.

NOTE.—In the event of the liability provided for under paragraph (a) or (b) as above, not being covered, the superfluous paragraph should be deleted.

When separate policies are issued, the word "additional" should not be used.

The above agreement does not apply to the following interests: Specie, bullion, precious stones, precious metals, jewelry, bonds, papers of value, pictures, works of art, quicksilver, rubber and personal effects.

In the event of any underwriter wishing to withdraw from this agreement, thirty days' notice in writing must be given to the secretary of the Institute of London Underwriters, or to the secretary of Lloyd's Underwriters' Association, or to the secretary of the Liverpool Underwriters' Association.

Motorboat Coverage

There appears to be difficulty in getting adequate insurance on pleasure boats in the Geat Lakes district; indeed, many companies will not write them at all. The chief reason is because of the inexperience of the people who run them—that is, their owners. Statistics show that little money has been made on this class of business. One of the most serious causes of loss arises out of the tendency of feed pipes to clog, and the saturation of the surrounding wood by the overflow. A live cigarette or smouldering match will bring a fire instantly. It would be to the advantage of both boatowner and underwriter if an experienced engineer were either continually on board when the boat is out, or else the future operator were thoroughly instructed in the use and care of his engine. This is shown in the cases of the higher-priced boats—those running from $10,000 to $25,000—which always carry competent engineers, and for which there is no difficulty in getting full insurance protection at reasonable rates. Underwriters are practically a unit in declining to cover motorboats that are used for commercial purposes; the profit to the owners is too small, and the moral hazard, in consequence, is too serious.

Poor Marine Prospect

One of the highest marine insurance authorities in England, Sir Edward M. Mountain, chairman of the Eagle, Star & British Dominions Insurance Company, entertains decidedly gloomy opinions regarding the present outlook for marine insurance. In his address before the recent annual meeting of the company's shareholders he warned them that they must expect a very considerable reduction in marine premiums, and went on to enumerate some of the unfavorable conditions now prevailing. The chief cause for anxiety has been the further increase in the cost of repairs; also the fact that, al-

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though justified, there has been no advance in hull rates. Owing to war conditions, steamers have not been kept up to their usual standard, and to this handicap must be added the large increase in new war tonnage.

For the first quarter of the year the losses of tonnage for vessels over 900 tons, both steam and sail, exceed the losses for the first six months of last year by about 30,000 tons. The case of cargo insurance is particularly bad. Losses for the first four months of 1920 have been especially serious and have affected all classes of business. Fortunately, cargo values are steadily increasing, which is a good thing for the underwriters, as it supplies more commodity for insurance, and also has a favorable effect where there are any claims for particular average as against a falling market. The tendency, however, is toward a reduction in rates. Brokers, unfortunately, are pressing for more onerous conditions, even at the old rates, and too frequently getting them. Another cause for alarm is the continued congestion at so many ports; there have, happily, been few large fires from this source, but the danger is great and always present.

Theft, pilferage and non-delivery losses grow steadily and have been extremely heavy during the past year; it is felt that the new theft agreement will soon serve to reduce outgo from this source, as the insured will be able to recover only 75 per cent of any loss of this character. As for non-delivery losses, it can be said that under the wording of bills of lading the shipowner is practically free of his liability as a carrier. The contention of the underwriters is that if the carrier is held to his proper liability he will take steps to see that a closer watch is kept on goods passing through his hands.

Conference Report on Pool

On the 2nd instant the House and Senate conferees, on reporting the conference conclusions on the merchant marine bill, wrote a new provision in the bill as a substitute for the Senate amendment affecting marine insurance. Under this new provision American insurance companies can combine without violation of the anti-trust laws to take large marine risks. Senator Jones, chairman of the Senate Commerce Committee, declared this protection against the anti-trust laws necessary because no single American company could afford to assume responsibility for the insurance of vessels in large sums.

UNIQUE SALVAGE METHOD

When the steam schooner Fred Baxter, of San Francisco, was caught in a tide rip off Marrowstone Point May 21 her deck cargo of piling shifted. She arrived at Port Townsend that evening with a list of 40 degrees; the next morning she turned on her side; and in the evening rolled completely over, breaking off both masts when they struck bottom.

After the deckload had been removed, the Washington Tug & Barge Company entered into a contract with J. H. Baxter, the owner, and the San Francisco Board of Marine Underwriters to right the ship. Captain J. C. Brownfield, manager of the tug company, having discovered that the hull could not be righted with any floating equipment on Puget Sound, devised a novel plan, which under his direction was completely successful.

On the starboard side of the Fred Baxter he built a crib, into which was dumped sand and gravel,, this weight forcing the hull to starboard. Planking kept the sand from being washed out. Another crib thereupon was built on the same side, but closer to the keel, and this, when filled with more sand, gave the hull a list still greater. By building a third crib, and using, in all, about 500 tons of sand and gravel, Captain Brownfield pulled the starboard side into the water until the list was 40 degrees.

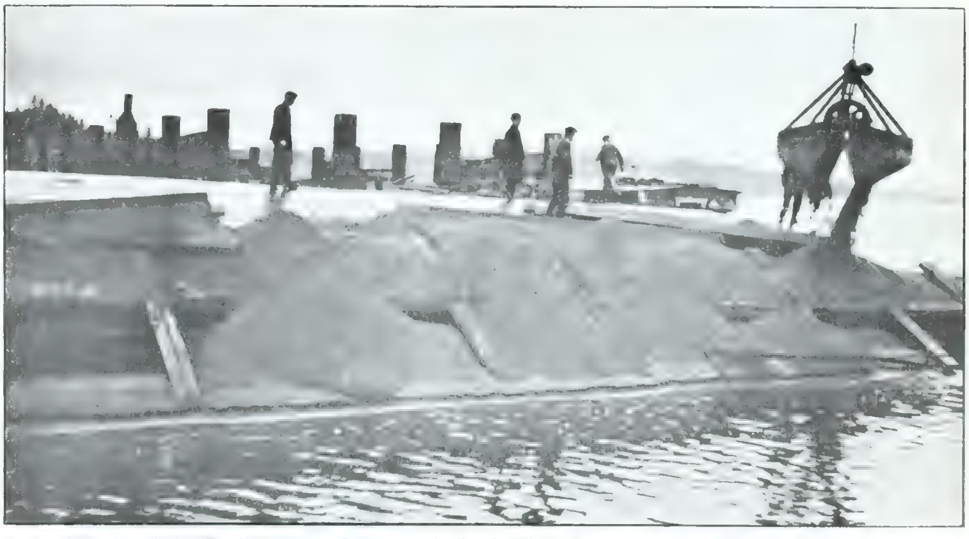
By this time, he estimated, a pull of only fifty tons additional would be required to right the Baxter. In order to apply this pull he had three great bolts fitted into holes in the keel; to each bolt was attached a cable; the cables were passed down the starboard side and under the ship; so that any pull exerted upon them would be in the same direction as the weight of the ballast in the cribs.

Two of the cables were run to donkey engines on a barge, but the third was held ready to prevent the hull from rolling too far. When the donkey engines took up on the two cables, the Baxter righted herself immediately.

The total cost of the salvage probably will not exceed $15,000. Among marine men Captain Brownfield's plan occasioned much discussion because of its unusual nature.

FIREMEN'S FUND REGISTER OUT

The Firemen's Fund Register, a list of vessels documented on the Pacific Coast of the United States and Hawaii, issued by the Firemen's Fund Insurance Company, has been completed for the current year, and copies are obtainable at any marine agency of the Firemen's Fund Insurance Company or at the head office, California and Sansome streets, San Francisco.



Salvage of the Fred Baxter. Lower half of midship crib submerged; filling upper half

Industrial Training In China

By Frank A. Foster

THE writer, an American engineer, has been a resident of China for the past ten years and as a result of his observations is impressed with the opportunity which exists for the enlightenment of the Chinese in industrial and educational matters. He believes that a great service could be rendered in this direction by American engineering societies, which would benefit not only China but America as well.

At present the Chinese have very little knowledge of what can be accomplished by the use of the best engineering processes and with modern equipment of tools and machinery. In the case of machine tools, which are at the foundation of manufacturing, a large number of those in common use are poor Oriental copies of ancient European types. The Chinese believe these to be as good as any, or the best to be had, and that the work accomplished on such machines is the best that can be done. They are broad-minded and willing to learn, but can be taught the value of up-to-date methods and machinery only by actual demonstration that new methods will pay them better than those in present use. They have had no opportunity to learn that such a benefit will result from the use of modern equipment.

China also needs to be shown what good engineering schools really are and how they should be managed. In the present condition of the country it is almost inevitable that such schools should be undervalued by those in governmental power and made more a matter of political jobbery than a factor in the upbuilding of the country. Concrete examples are needed of good American technical and trade schools, controlled by Americans with American capital and equipment; for technical education has not yet come to be so highly appreciated by those in political control of China as to gain the financial support necessary for the large outlays for equipment and maintenance which such schools require.

A suggestion for help in this direction might be taken from the activities in China of such institutions as Yale, Princeton, Harvard and Oberlin. These have selected certain lines of helpful work out here and are carrying them on successfully in certain large and definitely determined sections of the country. Why should not some large, representative society or societies undertake to help in this technical education?

A step in this direction has been taken by British engineering societies and firms through the establishment of Hongkong University, which is well equipped with machinery and tools contributed by numerous far-seeing manufacturers. The Germans equipped a technical school out here before the war. The French are now making a very successful effort to reach the engineering student class of young men here. There is a very energetic and well-organized society in France promoting such efforts. Special low rates of passage are offered and great friendliness shown to graduates of Chinese trade schools of what would correspond to the American high-school grade. Living wages are paid these men who, in most cases, would not otherwise be in a position to take advantage of such an opportunity.

An effort to establish an American trade and technical school is being made by Peking University, an American missionary institution controlled by broad-minded men with practical and far-sighted vision. They realize that one of the greatest needs, perhaps the greatest, for the upbuilding of China today, morally as well as materially, is such industrial development as will put the great mass of the people as many steps as possible from starvation.

This university would like to co-operate with some such institutions as the A. S. M. E. and other engineering bodies connected with and interested in the promotion of engineering in its various branches. They are at present planning to include in the university a really great American technical school which shall have as great an influence in shaping the engineering progress of China as possible. The proposed enlargement of scope contemplates a far-reaching plan and requires a broad and substantial foundation in the way of equipment, staff and endowment. They wish to make the instruction the most thoroughly practical kind possible.

Chinese technical students working in the foundry

Another phase of the educational situation is that of the Chinese students who study abroad. From one school in Paotingfu alone, fifty or more students have gone to France in the past two years to get further technical training and experience. Some six thousand Chinese students are expected to go to France under these conditions this year, and this is only the beginning. The students from Paotingfu receive 15 francs a day for their work and have to work continuously for two years before they can attend school. They have training in the French language before leaving China. Students who are willing and anxious to earn their way in such a manner are the kind who will do constructive and important work on their return home.

The students going to France, in a great majority of cases, would prefer to go to America, if they were permitted to earn their way. Considerable effort is being made to make this possible. There should be some well-organized society for encouraging such a condition in America, as there is now in France. It would have most beneficial effects on both China and America. The writer holds invitations from thirteen of the leading machine-tool manufacturers of America for some fifty Chinese students to come to their shops for practical experience, and at the same time continue their studies. The students who wish to fill these positions are anxiously waiting for some decision of the State Department which will allow them to enter the country. They have had some shop experience, have studied English and are graduates of what would correspond to the American high school. Can American manufacturers' associations use any influence in bringing about a change or modification of laws permitting the entrance of such men to America? The obstruction at this point seems to be the fact that such students work for wages. The American commercial organizations over here are all anxious to see such a modification brought about as will permit the admission of such students. The sooner that can be accomplished, the sooner the tide will be directed in our favor.

During the past summer the National Machine Tool Builders' Association has contributed to Chinese industrial schools over twenty machine tools, either as gifts or sales at half price. Such things as this contribute vastly to good feeling between the two countries. The students who have the use of these superior machines will naturally have a great appreciation of the generosity of the givers which in years to come will react favorably for the country and firms contributing. There is room for much more good work of the same kind, not only in machine tools, but in small tools and other equipment in the various lines of industrial training, such as textile work, tanning, agriculture, mining, etc.

PACIFIC MACHINERY

The Modern Shaper

By E. N. Moor, Jr.

THE shaper on short work completely outclasses the planer. It is approximately one-third faster, work may be more readily set up and the machine does not occupy the amount of floor space taken by a planer. The statement as to speed does not apply to shapers of the belted friction type, as these are much slower than the crank type. An excellent comparison showing the development in machine tool building may be obtained in Figure I and Figure II.

Figure I is a shaper built by H. Gould & Company, Newark, New Jersey, in 1875. This tool has been improved and developed by the Gould & Eberhardt Company into their present line of up-to-date "High Duty" shapers which they place on the market today. Two points of similarity will be noticed by comparing Figures I and II. One is that the present-day machine uses the "V" slide way for the ram. The other is the vertical slotted column face with through bolts for clamping the cross rail to the column. With the "V" type of gibbing for the ram, wear may be taken up with one adjustment. There is less chance of misalignment and fewer number of wearing parts than are found in other constructions. There is not only the simplicity of adjustment of the "V," but when the pressure is up there can be no side play, which is the case with square gibs when worn or not properly adjusted. Bolting the cross rail through the column of the machine provides a more rigid support than the back gib construction commonly in use. The bolts are provided with springs which prevent the rail dropping forward and allowing chips and dirt to work between the surfaces when they are loosened to raise or lower the rail.

The patented "Double Train" gear drive used in Gould & Eberhardt shapers enables a wider range of cutting strokes to be obtained and with a quietness and smoothness not possible with any other construction. It is the number of strokes of the tool per minute and the power behind these strokes that counts in removing metal and determines capacity for all kinds of work. The "Double Train" gear drive consists of a double main or bull wheel, one being smaller in diameter than the other. This combination permits the working of high speed cutting steel to a maximum and provides slower gear speed at high ram speed, which insures long life of parts, quietness of operation, more power and a maximum output at the least cost.

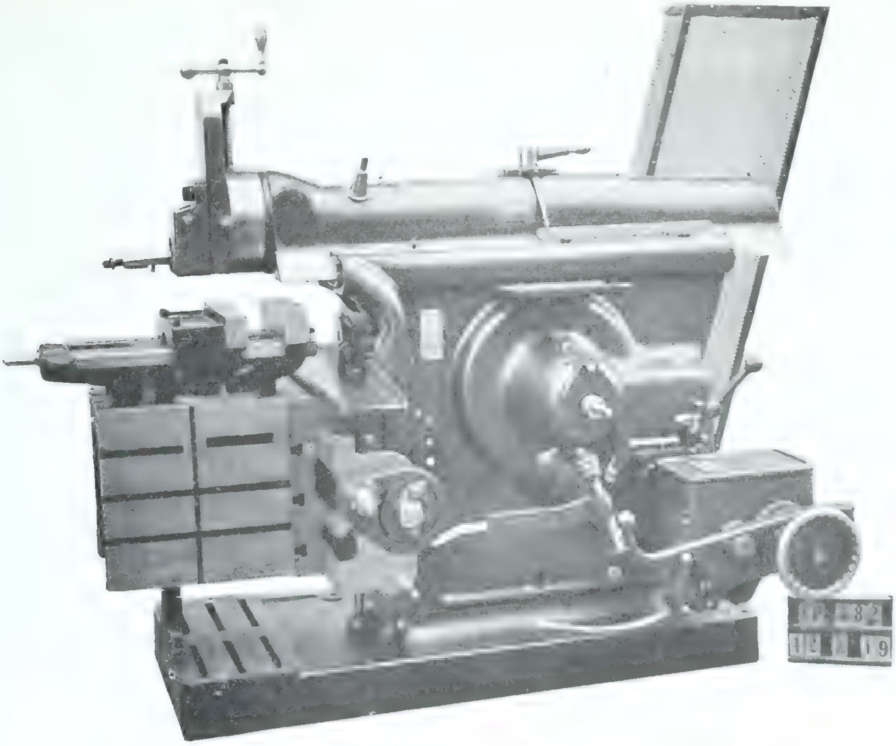


Figure II

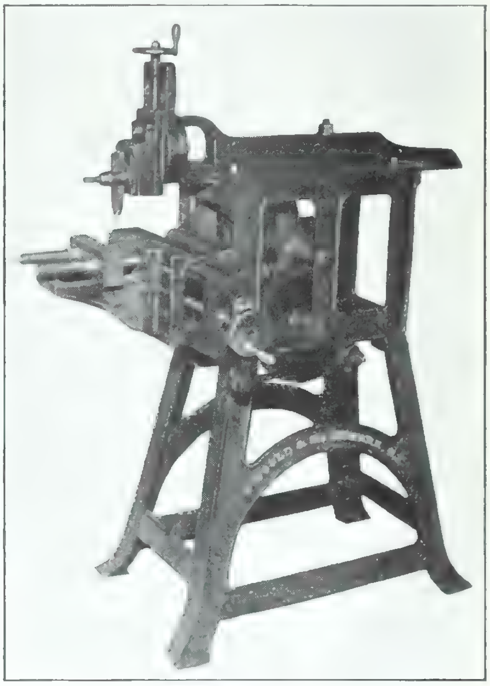
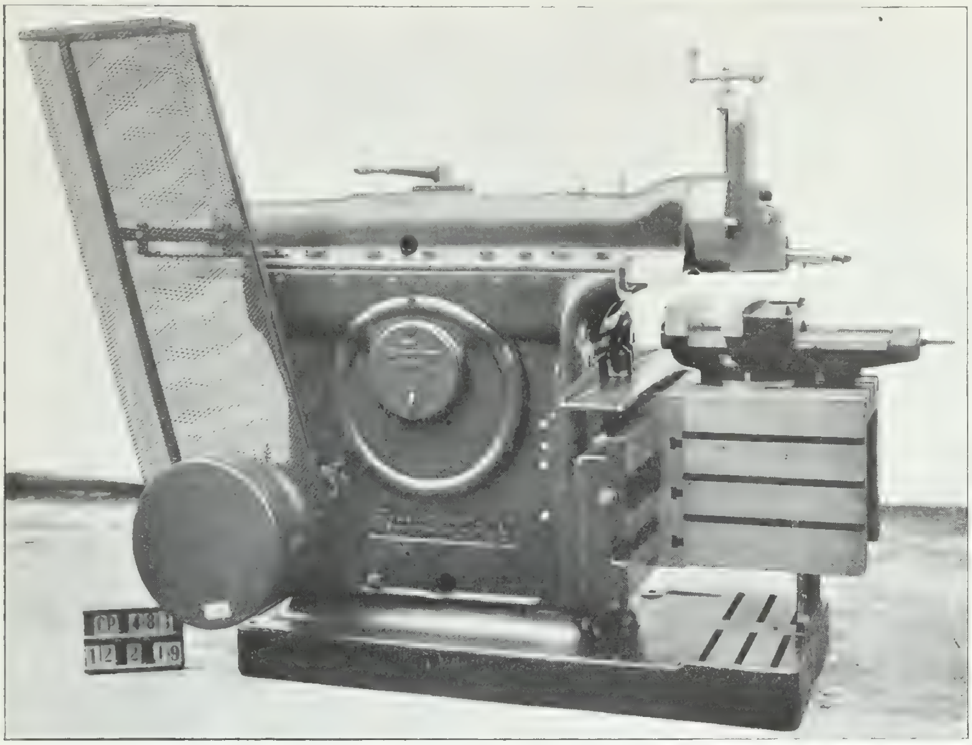


Figure I

Figures II, III and IV give various views of the 28-inch "Invincible" shaper. Frequently there is a question as to whether certain jobs should be done in a shaper, milling machine or planer. Each has its own special field. There are many jobs which are done on a planer that could be handled to better advantage on a shaper. This class of work would be that requiring a short stroke, such as die blocks, special dies, irregular shaped pieces that are hard to mount on a planer table and only need a short stroke. This machine fills the gap between the ordinary shaper and the planer and has been designed with these points in view. It is a particularly powerful machine, and yet with all its power it is not cumbersome or difficult to operate. The action is smooth and the ram may be run



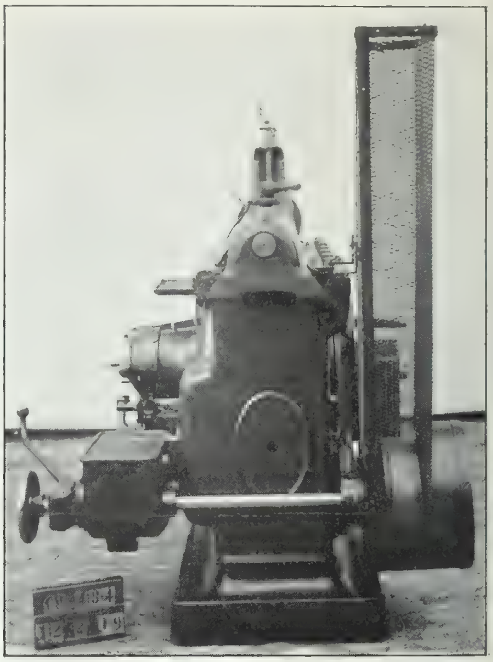


Figure III at the Left, Figure IV at the Right

as fast as 115 strokes a minute without injury to the machine. There are many jobs that can be done at this high speed to advantage, and for heavy cuts in tough steels the ram may be run as slow as nine strokes a minute, with great power.

Referring to Figure IV, giving a rear view, it will be noticed that a hole is provided through the column for carrying shafting when the keyseating is done. By setting this hole to the side and eliminating the fork under the ram, the construction is strengthened, also it allows the bull gear center to be raised nearly four inches closer to the ram, thereby increasing its power.

Regular equipment with this line of shapers consists of the single pulley gear box drive with belt guard furnished. The gear box is selective speed type and permits eight speed changes in conjunction with the double train gear drive. This type of drive is simple, foolproof, and permits the user to set the machine under the lineshaft, as all speed changes are made on the machine.

An Adaptable Boring Mill

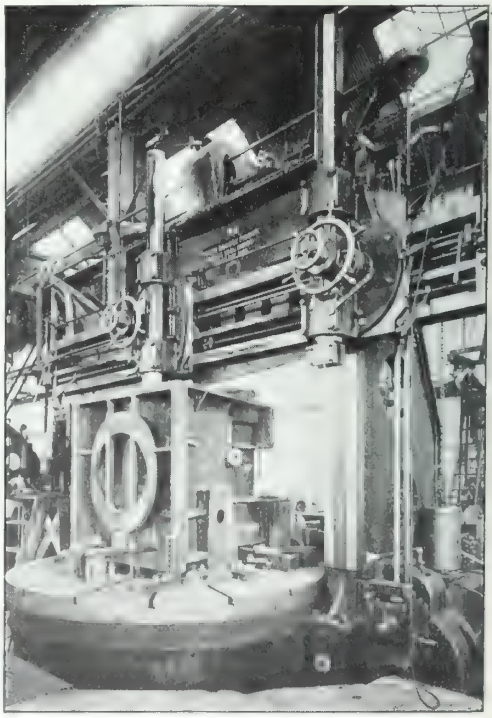
THE 10-16 foot, extension type, Niles-Bement-Pond boring and turning mill which is installed in the Llewellyn Iron Works of Los Angeles, was recently used to machine a very large circular casting which measured 18 feet 3 inches in diameter. This work was accomplished by moving the housing traverse shaft on the Niles mill and jacking the housing to the extreme limit by hand. The work was mounted on a special sub-face plate which was designated and built in the Llewellyn shops. This sub-face plate measures 16 feet in diameter and is fastened to the regular table with T-slot tongues and bolts. One of our illustrations show this big Niles mill turning the ring casting with the use of the sub-face plate and the other illustration shows the same mill machining a low pressure cylinder on the regular face plate of the mill.

The one-man control of this large machine is very easy, rapid and convenient. The housings, which are adjusted by power, are of box girder form, double webbed and without opening in front. The cross-rail elevating screws are located between the housings.

The table spindle is long, of large diameter and has upper and lower bearings. The upper bearing is bored out of the solid bed and is bushed with a taper split sleeve adjustable to take up wear. The lower bearing is made self-contained with the bed by a large cone-shaped brace bolted to the under side of the bed. It is bronze bushed and the lower end of the spindle rests on a step bearing of alternate bronze and steel washers, flooded with oil. This latter provision enables the table to be raised from the annular bearing when boring small holes and operating on light work at high speeds.

The cross-rail is of the three-track type, having narrow guide at the bottom, with saddle traversing screw located between the guiding surfaces. This is an ideal construction for accurately guiding the saddles and keeping them in alignment under severe strains. Cross-rail is of box girder form, broad faced, and of great depth to effectually resist the strains due to heavy cuts. It is fitted with clamps to securely hold it to the inner and outer surfaces of the housings. Cross-rail is elevated and lowered by power and is conveniently controlled by a lever on the side of the housing.

The boring bars are octagon in section, a form which has proven superior both in points of rigidity and adaptability. The bars are scraped to a bearing on four sides, and means provided for taking up wear in all directions. A binder bolt in the lower bearing cap locks the bar when the saddle is feeding. The tool holders are steel forgings with provision for readily clamping tools for boring, turning and facing operations. They have taper shanks and may be easily removed for the insertion of special boring bars or cutters.

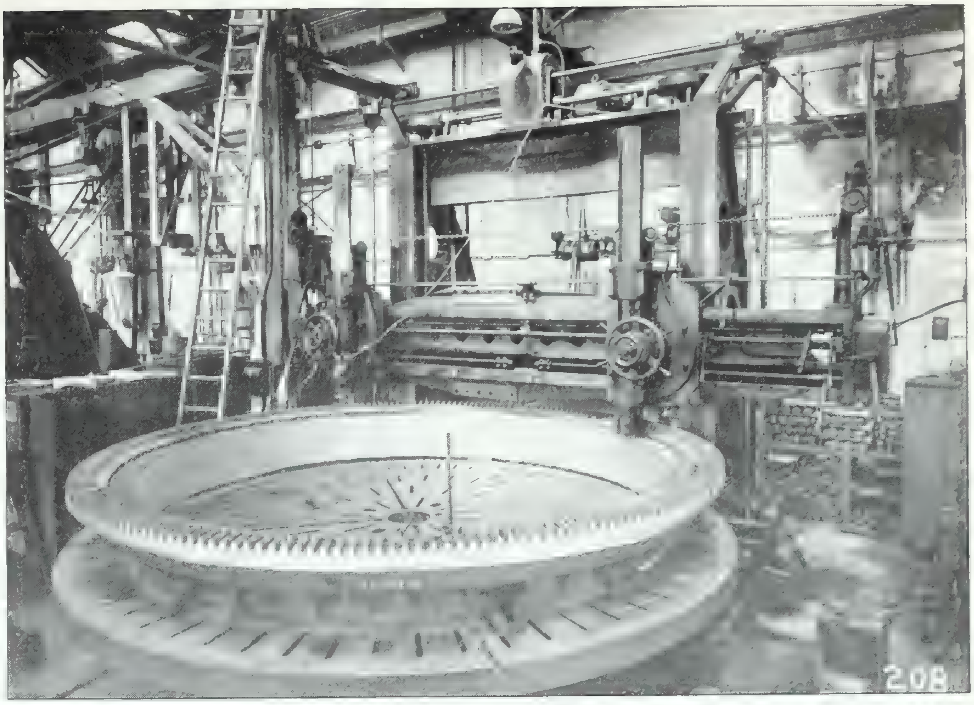


Niles-Bement-Pond boring and turning mill machining a low-pressure cylinder for a marine engine

All feeds are positive, continuous and independent for each head, both in amount and direction. Eight different feeds are provided for down, cross and angular feeding, any one of which can be quickly obtained by two levers on the feed box on each side of the mill. A safety friction clutch located on the horizontal feed shaft at the end of the rail prevents accident in case the head or bar meets with obstruction.

The fine hand adjustment of the bars and saddles is conveniently operated by releasing ratchets located on the saddle cross feed screws, and bar feed spline rods. The ratchets may be operated in any position between the end of the rail and the saddles.

Rapid power traverse and feel control is independent for each head, the controlling mechanisms located at each end of the cross-rail being identical. Control of each head is by means of a duplicate set of levers, one set near the end of the cross-rail and the other attached to the saddle. Therefore, the operator has complete control of the feed and fast traverse from a position near the tools, as well as from the end of the cross-rail.



Niles-Bement-Pond boring and turning mill machining casting for a large gear

Some of the specifications on the 10-16 foot Niles-Bement-Pond boring and turning mill are as follows:

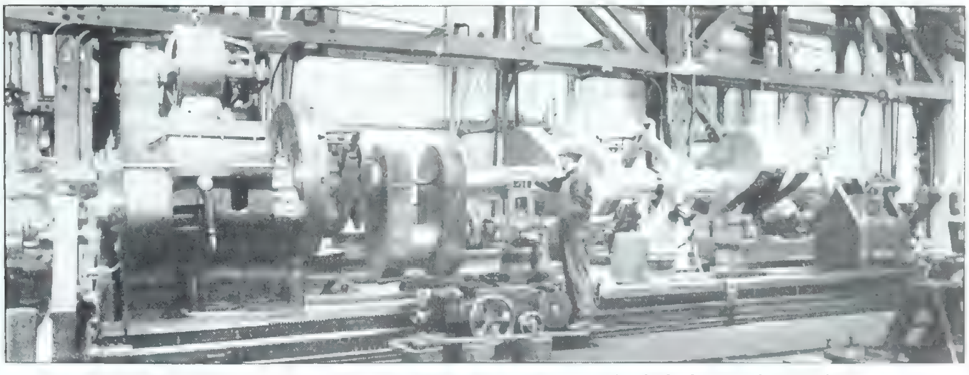
Actual swing, housings forward	122 ″
Housings back	194 ″
Maximum height under tool holders	66 ″
Maximum height under cross-rail	67½″
Bar travel, main heads	48 ″
Reach arm head	36 ″
Table—diameter	116 ″
Bars—smallest hole each will enter	12½″
Min. distance between centers	24 ″
Tool holder—diameter of shank	3 7/16″
Size of tool steel	1½″
Feeds—to bars and saddles, No.	8
Per revolution of table	1/32 to 1

Engine Lathe for Heavy Duty

THE 60-inch - 36-foot bed, Niles-Bement-Pond engine lathe, which is illustrated herewith, is in use in the shops of the Llewellyn Iron Works, Los Angeles. Our illustration shows the big lathe turning journals on a built-up shaft for use in the 2800 - horsepower triple expansion engines now building at the Llewellyn Iron Works.

Niles-Bement-Pond engine lathes are designed primarily for heavy duty manufacturing service. In their construction ample strength, power and rigidity are provided to meet the demand of present-day high production. They are simple both in general design and operating details and yet meet all requirements in modern heavy duty lathes.

The headstock is of the all-geared type with four fundamental faceplate speeds by gearing, regardless of the type of drive. The headstock is of unusually heavy construction, and has very long bearings on the bed. It is enclosed and the cover forms a support for the driving pulley or motor. The faceplate spindle is of forged steel and is mounted in bronze ring-oiling bearings provided with large oil reservoirs. The thrust of the spindle is taken at the rear end by an adjustable self-oiling step bearing with anti-friction washers. The faceplate is keyed to the spindle and forced on under heavy pressure. It is also bolted to a heavy flange on the spindle. The speed change gears are located in the front part of the headstock convenient for the operator; this construction also has a mechanical advantage as the thrust is downward on the spindle. For the slower speeds a pinion engages an internal gear mounted on the faceplate, giving a smooth and powerful drive for heavy cutting. Ample lubricating facilities are provided for all moving parts. All driving gears are of steel.



Niles-Bement-Pond engine lathe finishing journals on crank shaft for marine engine

The tailstock spindle is of forged steel and is traversed by hand wheel. Graduated setover is provided for turning small tapers. The tailstock is clamped to the bed by four heavy bolts and straps. As a further precaution against slipping under heavy loads, the tailstock is equipped with a tailbrace which engages a cast rack in removable sections, located in the center of the bed. The tailstock is traversed along the bed by means of a crank wrench operating a pinion which meshes with the steel feed rack.

The carriage has bearings on both outside edges of the bed and is kept in alignment by means of taper gibs at the front. The carriage can be clamped to the bed when cross-feeding. The tool rest is compound and swivels on a graduated base. It is furnished with a four-bolt tool post. The apron is of ribbed box section and all shafts are supported at both ends. All feed gears are of steel.

The 60-inch lathe swings 61 inches over bed and 47 inches over carriage. The number of feeds by change gears are 14. The steady rest opens to 40 inches. The generous specifications of the Niles-Bement-Pond lathe make them very popular for handling the heaviest class of rough forgings with a high degree of accuracy and speedy production.

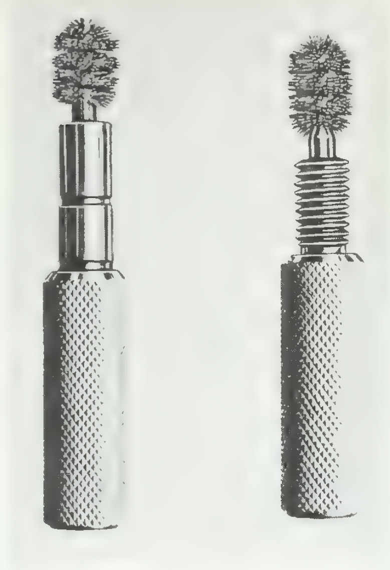
A New Gauge Kink

IN the days before the discovery of the power of steam had made possible the great factory, practically all commodities manufactured were the products of small workshops where some artisan had made the article from start to finish with his own hands, fitting each part carefully into its place.

When, later, the factory came to supersede the small workshop, the completed article was still manufactured under one roof, where part could be fitted to part and perfect accuracy secured.

At the present time, however, various parts of some machine—as, for example, the automobile, the sewing machine, the typewriter—are made in widely separated localities and unless these parts are manufactured so that they are interchangeable there is always trouble in assembling the finished unit. Not only is there trouble, but also an unnecessary amount of filing and fitting, which is very expensive. So manufacturers are realizing more and more the necessity to make parts interchangeable if it is proposed to manufacture in quantity and at a cost permitting competition.

If interchangeable parts are to be produced with absolute accuracy, it is necessary to check them with gauges. These gauges being precision instruments are expensive and require careful use, but it is very difficult to get the average workman to use them with the necessary degree of care. Particularly, it is practically impossible to insure that each article to be tested is carefully wiped free from foreign substances before the gauge is applied and as a result the foreign substances wear upon the surface of the gauge, at the same time interfering with absolute accuracy of measurement.



Pilot brush gauges

For these reasons many manufacturers are not yet using gauges, but still continue to file and fit parts.

In order to provide a wider field for gauges and to lessen the present great cost to manufacturers who are already using them in large quantities, a combi-veloped and patented by Mr. Herman L. Wittstein, works manager of the Chapman Valve Manufacturing Company of Indian Orchard, Massachusetts.

By the use of this combination of the brush with the gauge, more accurate results are obtained and the life of the gauge equipped with a brush is at least three nation of brush and gauge has been de-times that of the gauge without a brush, as has been definitely proved in actual tests. The brush on the gauge tends to act as a pilot, thereby eliminating almost entirely the wear occurring at the entrance end of the gauge.

It cleans the surface before the gauge enters, removes all foreign material, thus preventing abrasive action, and at the same time gives increased accuracy to measurement and increased speed in the inspection work.

The spiral brushes are so made as to leave the bristles at slightly varying lengths, so that when the brush is used in conjunction with a screw gauge, the bristles tend to thoroughly clean out the thread both at top and bottom.

There are at present a number of manufacturers who are using as many as 50,000 gauges a year. Assuming that only 20 per cent of these, or 10,000, are either plug or screw gauges, and using an average price of $5 each, the cost of these gauges would be $50,000. By the use of the brushes, which are very inexpensive, this amount can be cut to not more than $15,000 a year. It can readily be seen what a tremendous saving there will be in any manufacturing establishment where the gauges are equipped with the pilot brushes.

A company has been formed at Springfield, Massachusetts, under the name of the Brush Pilot Gauge Company, to manufacture and market Mr. Wittstein's device.

Pneumatic Tool Salvage

IN times preceding the European war, a few weeks' delay in the shipment of a pneumatic tool order caused the purchasing agent to foam at the mouth. Today the same individual calmly listens to the blunt statement that no delivery is possible in less than three or four months and makes the best of a condition neither to his liking nor of his making.

For times have changed.

With demand greater than ever in the history of industry and production, far behind in the gigantic task of rebuilding a war-wrecked world, former conditions have become so radically reversed that it is not uncommon to find the purchasing agent the new knight of the road.

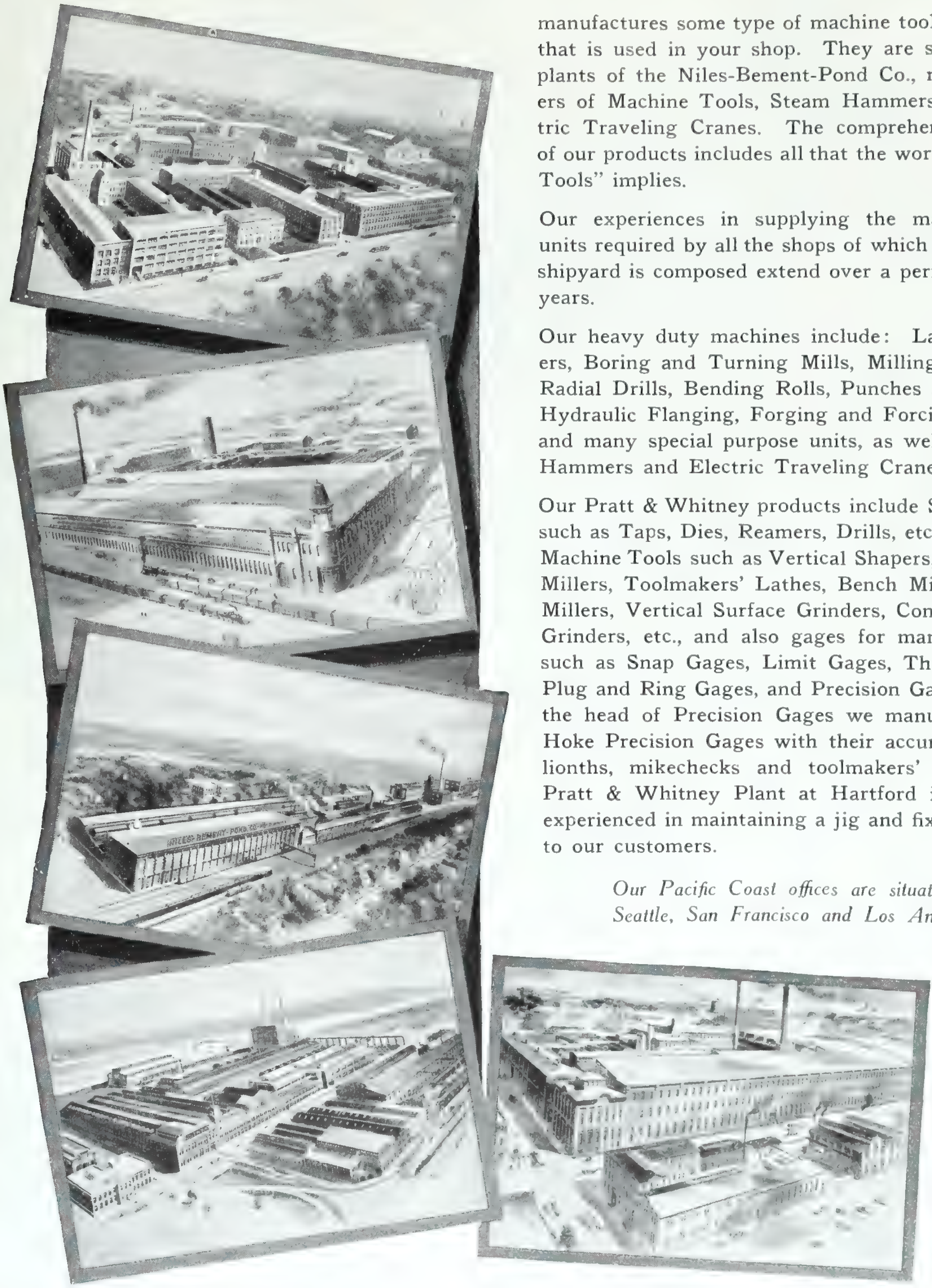
With such a reversal of conditions it became inevitable that manufacturers must pay greater attention to the repair of damaged tools and several firms have sprung up which make a business of making new tools out of old.

Many of these have performed operations on apparently worthless pneumatic chippers, riveters, sand rammers, etc., that would compare favorably with some of the wonderful surgical operations of the present war.

Our correspondents witnessed just such a scrap heap arriving at the Structural Tool Company of Cleveland, Ohio, and a few reclaimed tools ready for packing—the latter seemingly actually improved by adding the necessary new parts and improved features.

Here is one way to solve the problem of slow deliveries in new tools and we believe a very effective one.

Patterns made by Chinese students in an industrial school of the secondary grade. (See article on page 114b)



Each One of These Plants

manufactures some type of machine tool equipment that is used in your shop. They are some of the plants of the Niles-Bement-Pond Co., manufacturers of Machine Tools, Steam Hammers and Electric Traveling Cranes. The comprehensive scope of our products includes all that the word "Machine Tools" implies.

Our experiences in supplying the machine tool units required by all the shops of which the modern shipyard is composed extend over a period of forty years.

Our heavy duty machines include: Lathes, Planers, Boring and Turning Mills, Milling Machines, Radial Drills, Bending Rolls, Punches and Shears, Hydraulic Flanging, Forging and Forcing Presses, and many special purpose units, as well as Steam Hammers and Electric Traveling Cranes.

Our Pratt & Whitney products include Small Tools such as Taps, Dies, Reamers, Drills, etc.; Precision Machine Tools such as Vertical Shapers, Automatic Millers, Toolmakers' Lathes, Bench Millers, Hand Millers, Vertical Surface Grinders, Contour Cutter Grinders, etc., and also gages for many purposes such as Snap Gages, Limit Gages, Thread Gages, Plug and Ring Gages, and Precision Gages. Under the head of Precision Gages we manufacture the Hoke Precision Gages with their accuracy to millionths, mikechecks and toolmakers' flats. The Pratt & Whitney Plant at Hartford is also well experienced in maintaining a jig and fixture service to our customers.

Our Pacific Coast offices are situated in Seattle, San Francisco and Los Angeles.

NILES-BEMENT-POND CO.
GENERAL OFFICES: 111 BROADWAY, NEW YORK

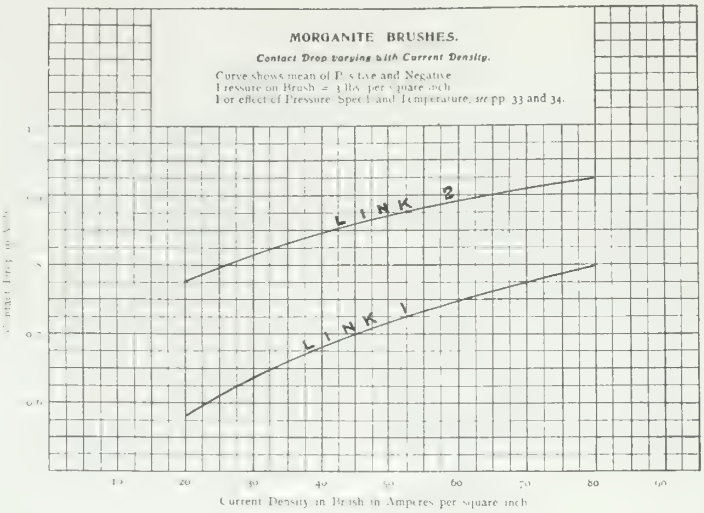
Efficient Collectors of Electrical Energy

ONE of the details of electrical machinery, which has always called for a considerable amount of attention from the designer, is the sliding contact by which electric energy is collected from or supplied to the commutator or slip ring of the generator or motor. In the very great majority of dynamo-electric machines, carbon has come to be recognized as the most suitable material for this detail and a large number of types and brands of carbon brushes have been manufactured and placed on the market.

A number of years ago the Morgan Crucible Company, Ltd., of London, England, began investigating the field of carbon brush manufacture as an outlet for part of the products of their plumbago mines. As a result of investigations and experiments carried on at that time they placed on the market a line of Morganite and Battersea carbon brushes which have some very unique and excellent features recommending them to the users of electrical machinery.

These brushes are constructed in layers in such a way that while the conductivity along the length of the brush is much higher than that of the ordinary carbon brush the resistance across the brush is increased to a very large degree. This quality of cross-resistance in brushes is very valuable, as it prevents to a maximum degree the short circuiting of coils in the armature. The Morganite brush thus formed is connected to its metal top by a patented process which makes such an intimate contact that the brush itself may be said to form an integral part of the metal top and the connection which joins it to the external circuit. The flexible copper cable is drawn through eyelets in the metal top and is then spread out into intimate contact with the top through the medium of a thin sheet of copper. The material of the brush is pressed into the metal top under great pressure, the top having a small brass strip known as the tie-bar which prevents its sides from springing outward even when the brush is overheated.

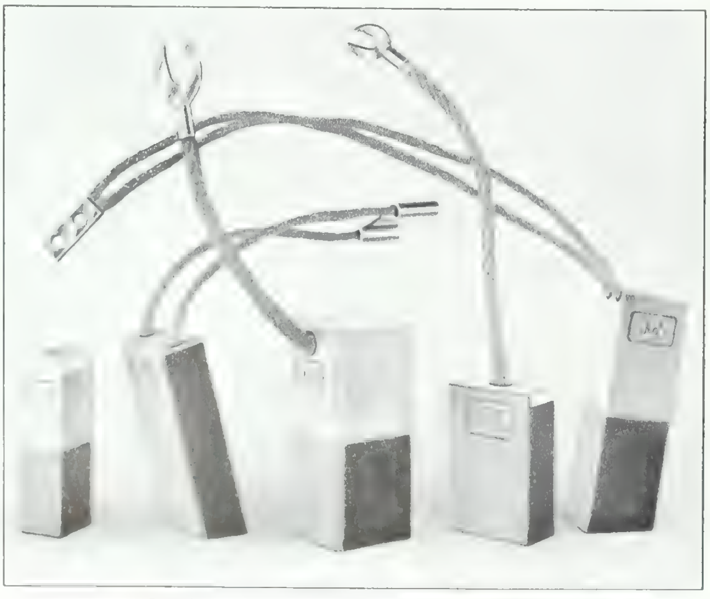
Careful tests have been made to ascertain the voltage drop at the junction of the brush with the metal top and of the metal top with the flexible cord and it has been shown by these tests that this method of connection is superior to any method which employs screws, nuts or solder. Vibration or heat tends to impair the efficiency of all other forms of connection, but this imbedded connection of the Morganite brush remains the same under all conditions of running.



Another point at which the Morganite brush has demonstrated its superiority is in the contact drop at the point of collecting the current from the commutator. At a pressure of three pounds a square inch of the brush on the commutator and at a current density of 65 amperes a square inch, the contact drop has been shown in numerous tests to be not greater than 0.9 volts. The specific resistance of grade "Link 1" Morganite is .00071 Ohms a cubic inch, the coefficient of friction is .15 and the normal current density as ordinarily used is 60 amperes a square inch.

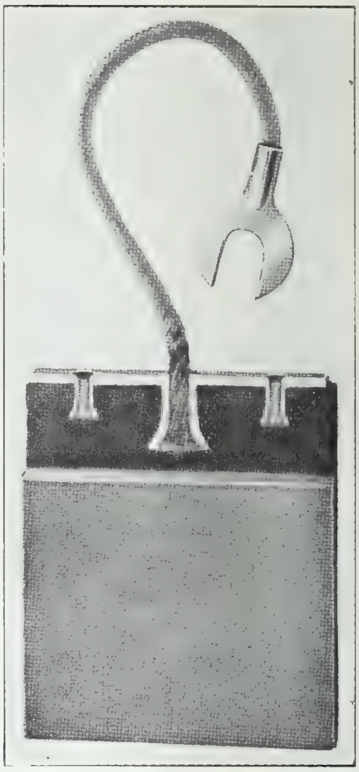
A third class is the Copper Morganite, which includes brushes made from a large variety of mixtures of specially selected graphite with copper and other metals. This class is largely used on low voltage direct current machines and the slip rings of alternators, rotary converters and induction motors—in short, in all brushes where a very low contact drop or a high current density in the brush is essential.

In this class of brushes the Morgan Crucible Company is prepared to carry out special investigations and advise customers as to the best composition of brush to use with any particular grade of slip ring or commutator bar.



Standard types of Battersea electro-graphitic brushes

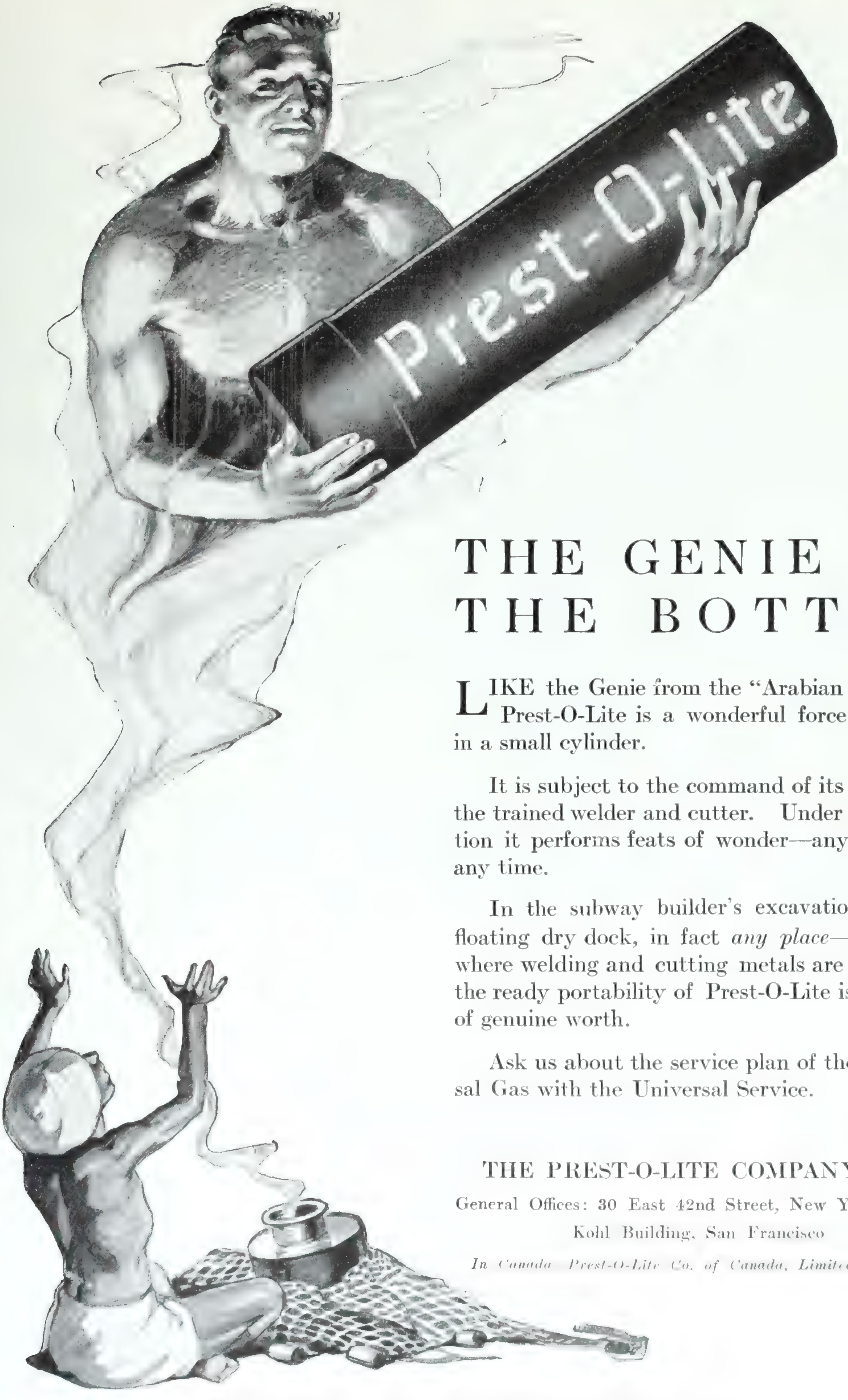
Copper Morganite alloys are also manufactured in grades peculiarly adaptable to controller use in the forming of specially shaped contacts. Under the general name of Battersea carbon brushes the Morgan Crucible Company manufactures a very large and constantly increasing line of carbon and electro-graphitic current collectors which covers practically every application of electric energy. This firm also makes a specialty of flexible leads for metal tops of brushes and for many forms of carbon powder resistances.



Brush showing metal top and flexible fixed by Battersea rivets

Their carbon alloy Morganite is also marketed by them in the form of gland rings for steam turbines and in self-lubricating bearings which have been found very useful in certain types of machinery where an oiled bearing would be objectionable. This material is also made up into dash pot plungers which have been widely used and found highly satisfactory in the mechanism of arc lamps, circuit breakers and other automatic machinery where it is highly desirable that the mechanism be independent of lubrication from outside sources.

The Herzog Electric & Engineering Company of San Francisco carry a complete stock of all classes of Morganite and Battersea carbon brushes.



THE GENIE OF THE BOTTLE

LIKE the Genie from the "Arabian Nights", Prest-O-Lite is a wonderful force confined in a small cylinder.

It is subject to the command of its master—the trained welder and cutter. Under his direction it performs feats of wonder—anywhere, at any time.

In the subway builder's excavation, in the floating dry dock, in fact *any place—any time* where welding and cutting metals are required, the ready portability of Prest-O-Lite is an asset of genuine worth.

Ask us about the service plan of the Universal Gas with the Universal Service.

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Trade Literature and Book Reviews

The Running and Maintenance of the Marine Diesel Engine. By John Lamb, Chief Engineer, British Mercantile Marine; 230 pages with numerous plates and illustrations; published by J. B. Lippincott & Company, Philadelphia, Pennsylvania; price $3 net.

This pocket size volume is a very practical work, written with the idea of presenting to sea-going engineers the various practical details of different those types, and how these defects that have been or are likely to be encountered in those types, and how these defects have been and can be overcome. It is admirably adapted for this purpose and if supplemented by more comprehensive volumes on the theory and design of internal combustion motors, it should serve a very useful purpose.

The whole field of internal combustion engineering is undergoing so many rapid changes that it will be very necessary for marine engineers to keep themselves abreast of progress by the use of such works as that of Mr. Lamb. The book is very well indexed and arranged in subject paragraphs, so that it is very convenient for study by those who have odd moments to put in on such work.

Shipbuilding Cyclopedia. A reference book on shipbuilding by F. B. Webster, Editor in Chief; J. L. Bates and S. M. Phillips, Associated Editors, and A. H. Haag, Consulting Editor. Size 8¼ by 11½ inches; pages 1160; insert folding plates 61; illustrations over 3000; published at New York in 1920 by the Simmons-Boardman Publishing Company. Price, cloth, $10; leather, $15.

The material for this cyclopedia is presented in six main groups, as stated in a review by Professor C. H. Peabody of the Massachusetts Institute of Technology. These groups cover first, Dictionary of Terms; second, Basic Design; third, Hull Specifications; fourth, Planning and Estimating; fifth, Ships Rigging and Cargo Handling Gear; sixth, Ships Plans.

The Dictionary of Terms in addition to definitions gives reference to pages in such a manner that it serves for an index to the volume.

The section on Basic Design edited by Mr. Bates adapts to merchant ships methods developed by Mr. Bates in the Bureau of Construction and repair of the United States Navy for the design of war ships.

The third division on Hull Specifications is edited by Mr. Webster and is divided into groups and indexed so that reference is facilitated to any and every item. This section will be found very valuable, especially as a basis for estimates of weights.

The section on Planning and Estimating is edited by Mr. Phillips and deals largely with the supervision of ship construction in the yard, ordering of material, planning and routing the work and estimating cost.

The fifth section on Ships Rigging and Cargo Handling Gear is edited by Mr. Haag and makes a very strong plea for standardization as leading to good practice and economy.

The sixth section on Ship Plans, edited by Mr. Webster, gives the equivalent of the information found in the vaults of many drawing offices. There are more than fifty folded plates and more than 300 pages of illustrations and tabulated information dealing with every type of merchant ship.

Sea Songs and Shanties. Collected by Captain W. B. Whall; 120 pages; 16 full page illustrations; published by James Brown & Son, 52 Darnley street, Glasgow; price 5 shillings net.

This is the fourth edition of a very popular book. The old romance of the sea as carried in the sea songs and shanties of the old sailing ship days is probably gone forever from the actual sea life of commerce but it seems to be still alive in the blood of all the seafaring peoples. The words and music in this collection are with a very few alterations those which were actually sung by seamen.

In his introduction to the first edition, Captain Whall, who was educated at Oxford and received a thorough training in music under Sir John Stainer, relates how in going to sea in 1861 in an old East Indiaman he was struck by the peculiar musical quality of the songs and shanties sung by the sailor men on that ship and how during his eleven years' experience on the ships of the East India Company he took down the words and music of these songs as they were actually sung by the sailors, many of these sailors having been old men of war's men who had seen service at sea in the time of Nelson and the great British admirals.

The Sign the World Knows. A very attractive 17-page booklet, setting forth the story of the world-wide service rendered by the Vacuum Oil Company of New York in the distribution of Gargoyle lubricating oils to practically every corner of the globe.

Vasco Vanadium Tool Steel. A pocket size booklet, published by the Vanadium Alloys Steel Company of Pittsburgh, Pennsylvania, and describing a new alloy steel which is claimed to be especially suitable for tools and all purposes where toughness and durability are the special requirements. Specifications are given for six different types of this new steel and lists of uses for which each of these tools is considered most suitable.

A very comprehensive description is given of the heat treatment used in toughening and finishing the product made from these various types of steel. There are added several useful tables for weights of steel shapes and decimal equivalents and standard thread sizes.

Catalogue of Columbian Rope & Twine. Published by the Columbian Rope Company, Auburn, New York. This catalogue is fully up to the high standard set for themselves by the Columbian Rope Company in all of their products. In presenting this catalogue they claim it to be better arranged and more convenient than any rope catalog hitherto published. All of the rope and twine products of the company are grouped according to a new plan. By this plan the catalogue is divided into six sections, each section is made as far as possible to include all the products of a certain type and on the title page of each section is a list of the items contained therein. Used in conjunction with the index on the back cover of the book this system of classification makes of the catalogue a very handy reference book for the users of rope and twine products. Nine pages at the beginning of the book are devoted to a very interesting story showing how good rope is made and carrying the reader through all of the various processes from the abaca trees on the Philippine plantations to the finished product on the reels in the company's shipping warehouses.

Bulletin No. 41—Coal and Ore Handling Machinery.

Bulletin No. 42 — Special Cranes.

Bulletin No. 43—Hydraulic.

Bulletin No. 44 — Hoisting and Mining Machinery.

Bulletin No. 45—Steel Works Equipment.

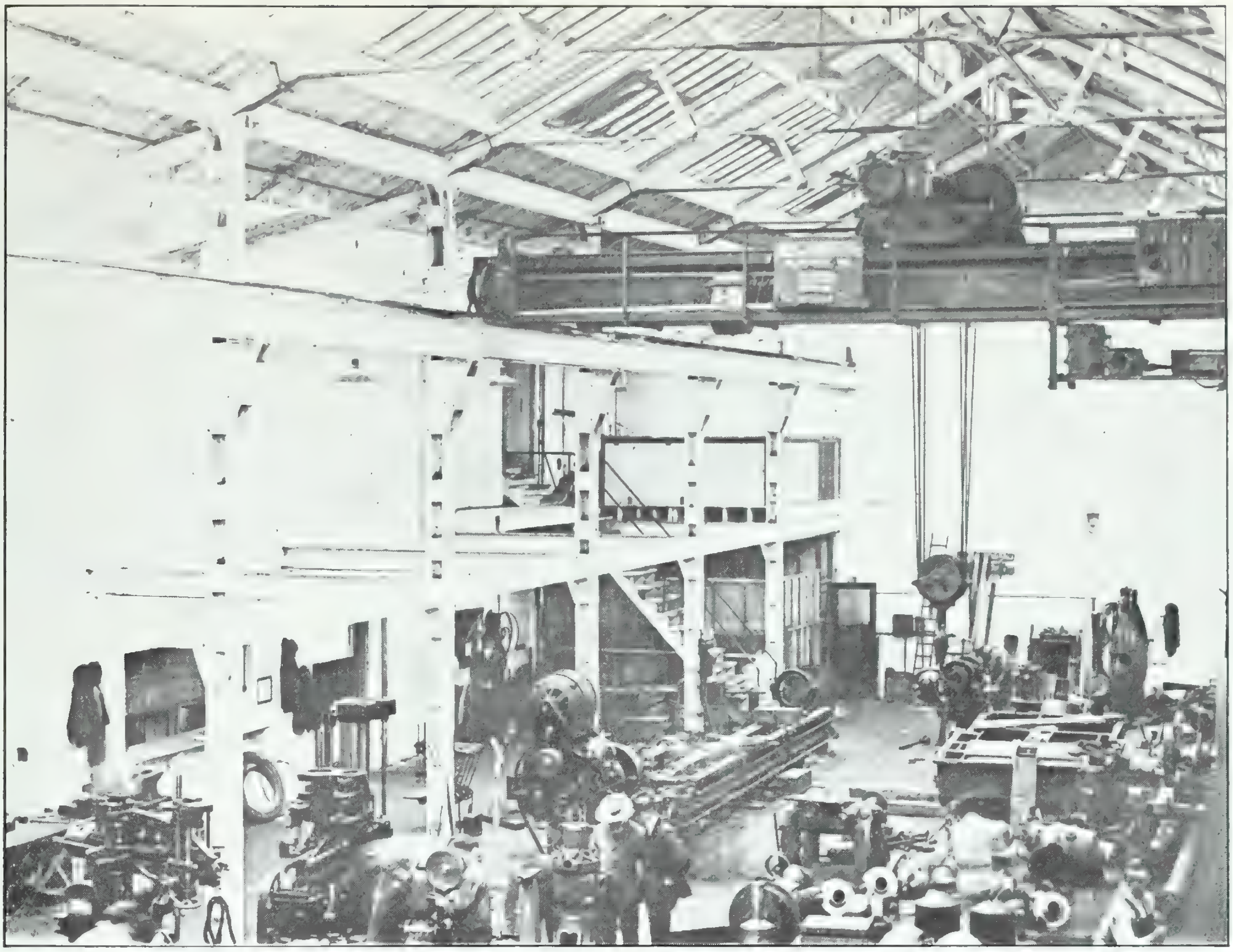
Bulletin No. 46—Coke Oven Machinery.

Bulletin No. 47—Port and Terminal Equipment.

Bulletin No. 48—Rubber Machinery.

These are part of a series of uniform booklets issued by the Wellman-Seaver-Morgan Company, of Cleveland, Ohio, the notable feature of which is the almost entire absence of text matter. Each machine or special installation is illustrated with a full page halftone engraving directly opposite to a full page line cut showing the general arrangement drawing in white lines on a blue ground and with overall dimensions plainly marked. This method of cataloging machinery certainly has a great many points which recommend it to the busy engineer and Wellman-Seaver-Morgan Company are to be congratulated on their adherence to it in so much of their publicity work.

Useful Facts About Oakum and Kindred Products. Published by the George Stratford Oakum Company, Jersey City, New Jersey. A handsomely illustrated book of 80 pages, describing the various oakum and kindred products manufactured by the Stratford Company and illustrating a large number of ships upon which these products have been used. The covers of the book are made from binders board manufactured by the Stratford Company.



15 Ton Type H E Floor Control P & H Crane—United Engineering Works, San Francisco, Cal.

Utilize Your Entire Shop Floor

Make every part accessible and derive full capacity from each tool. This can be accomplished by installing a P & H Electric Crane with either floor or cage control.

There is a Standard P & H Crane for your particular service.

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P&H cranes-hoists-monorail systems

Mono-Combustion Recorders

TECHNICAL publications have printed hundreds of articles on combustion in which it has been repeatedly stated that an analysis of CO2 alone is insufficient because the correct percentage of CO2 varies with the kind of fuel used, the method of firing, the method of admitting air, etc. Thus in one installation 13 per cent of CO2 is the maximum that should be allowed. In another installation 15 per cent might be the maximum. In another 8 per cent.

The best way to be **sure** about it is to simultaneously keep tab on CO. It is highly important that no CO be present.

The Mono Corporation of America, 48 Coal and Iron Exchange, Buffalo, New York, now announces a recorder that enables the fireman to constantly see that no CO is present and that CO2 is always maintained at a maximum.

Bonus systems that have been based upon percentages of CO2 have failed because the boiler room force soon learns how to so manipulate the dampers that a high CO2 reading is obtained. Yet combustion is incomplete and the object of the bonus system is defeated.

Now that both CO2 and CO can be recorded, the boiler room force finds it impossible to show an extremely high CO2 without showing some CO. The fuel must be so burned that the percentage of CO2 is as high as possible and at the same time there must be no CO. By so doing most economical combustion is effected.

The manufacturers of the Mono instrument have devised a premium system which they will be glad to explain to anyone interested. The system involves the use of a Mono rule which is laid over the chart. A record is kept on a sheet provided for the purpose and at the end of the month the figures are added, the average determined, and the bonus is paid.

Figure 1 shows the Mono Monoxide Recorder which will record both CO2 and CO on one chart. The device shown at the left is called the "Monoxide Auxiliary Type K," or it is called the "Monoxide Supplement." It is this supplement which, coupled with the standard Mono CO2 recorder, permits the recording of CO.

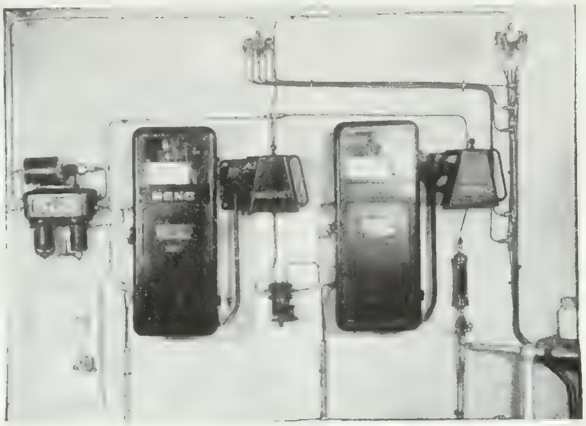

Figure 1.—The photo above shows an installation in a boiler room which makes absolutely complete furnace control possible. CO2 and (CO + CH4) are recorded simultaneously.

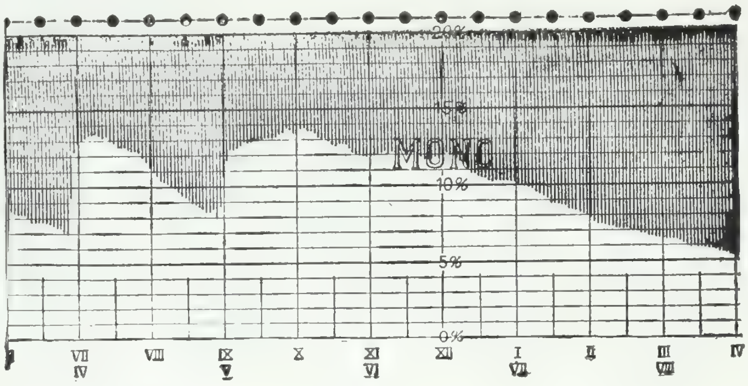

Figure 2.—This CO2 chart was taken simultaneously with the CO chart below

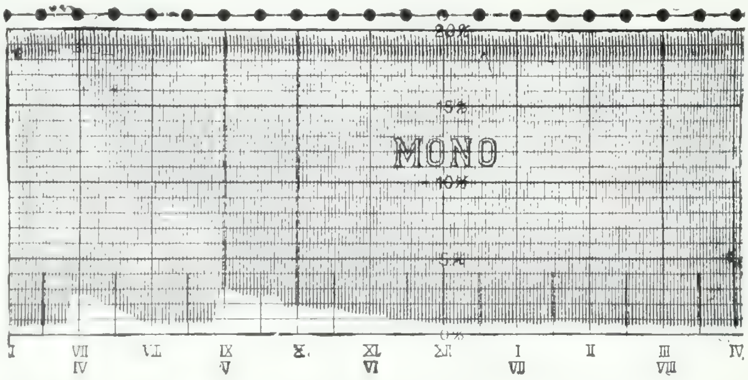

Figure 3.—This CO chart was taken simultaneously with the CO2 chart above

Figure 2 shows a Mono CO2 chart. Figure 3 shows a Mono CO chart. When taken simultaneously, these charts of course given an absolutely accurate account of furnace conditions.

More marvelous still, this same apparatus (without supplement) will record SO2 hence it is a valuable instrument for use in pulp and paper mills.

The chemical field finds the apparatus valuable for the automatic analysis of nearly all gases — CO2-CO-O2-H2-SO2-CH4-N2, etc.

The gas field finds the Mono instrument especially adapted to gas works for the determination of hydrogen, for carburetted water gas, and for carbon monoxide.

In fact, wherever gas is used to a great extent and where it is important that the gas be continuously, automatically and accurately analyzed, this instrument can be made to do the work.

FIGHTING FIRE WITH FIRE

THE literature of the pioneer days in the prairie states is replete with stories of emigrants who finding themselves in the path of a prairie fire, resorted to the expedient of lighting another fire which cleared a refuge for them before the oncoming rush of flames could harm them.

Modern fire fighters today combat flame with flame, but in another way. No up-to-date fire department is now without its oxy-acetylene apparatus for cutting away metal obstructions that may be interposed between the firemen and expeditious performance of their work. It may be a grating or an iron door that must be wrecked at a moment's notice to admit the passage of the hose and men, or to afford an entrance for rescuers. Sometimes it is the metal hull or hatch or a ship that must be penetrated in order to fight a fire in the hold. Whatever the obstacle it must be removed with the least possible delay.

Axe, crowbar and sledge are of little avail against steel and iron. Work that would require hours with these implements must be done in minutes. And it is done. The fire departments now use the oxy-acetylene torch, the only device that has been found adequate to the emergency. By use of the cutting blowpipe no metal barrier can stand long in the way of the modern fire fighter. His outfit is easily portable, so that he can work with it at the critical point the moment it is needed. There is no delay. It is already set up ready to use when it is brought to the work. Usually it consists of an Oxweld metal cutting blowpipe, a cylinder of Linde oxygen and a Prest-O-Lite tank of dissolved acetylene, as these are recognized equipment standards that have been found dependable.

It would be an endless undertaking to enumerate the instances in which this apparatus has aided in combating fire and in effecting the rescue of lives that must have been sacrificed without quick availability of the cutting torch. Such examples are so frequent that the day is not far distant when complete oxy-acetylene cutting equipment for fire departments will be required by law.

PARISH

Dependable

TACKLE BLOCKS

with test-determined Safe Working Loads

In the hurry and confusion of loading—with port delays and dockage fees—Parish Safe Load Cargo Hoisters give unfailing service and satisfaction because they are built to a test-determined standard. Careful analysis and experimentation have proved that it is possible to build tackle blocks to a definite, known standard of strength and endurance. The only blocks so built are Parish Blocks.

Do you know the strength of the blocks you furnish? Have your customers complained of worn bushings, bent center pins and warped shells? These break-downs are due to overloading and may be eliminated by using Parish Blocks.

Every block which leaves the Parish factory bears a name plate on which is stamped the safe working load. This is your guarantee of safety, service and satisfaction. Parish blocks have been designed and built to this standard, and each size and style has been given an ample margin of safety beyond the working load.

If you are interested in service, if you wish to avoid expensive replacements, unneccessary delay, and dissatisfied customers, ask for the complete Parish catalogue of Malleable Iron and Steel Shell Tackle Blocks. Ask for the Safe Load Charts and for the strength-determining formulae. They are evidence of Parish quality and will be sent to you upon request.

PARISH SUPPLY & MFG. CO.
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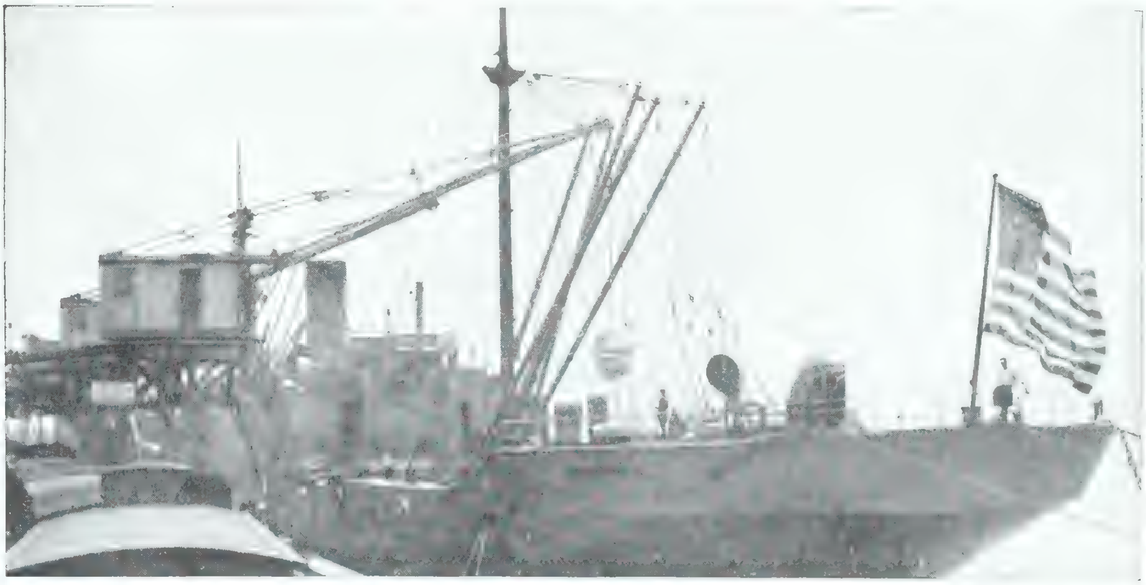
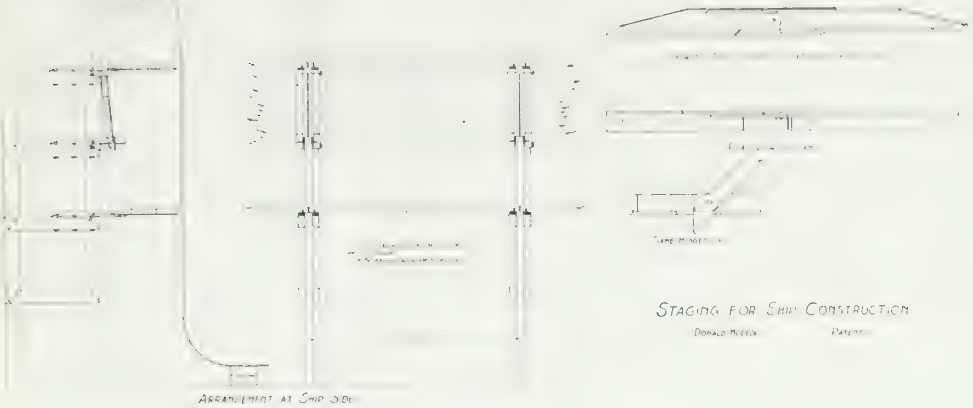
Equipped with Parish Malleable Iron Shell Cargo Hoisters



HOW THE OTHER FELLOW DOES IT



Permanent Staging

I AM submitting in the Kink contest a design for permanent shipbuilding staging which has for its object labor saving in the way of eliminating stage builders. As will be seen from the sketch herewith, this device consists of a hinged angle iron, one side of which is bolted to the permanent upright on the shipbuilding ways and the other side is used for supporting the plank staging. This latter side with the planks attached may be raised out of the way at the time of launching or at any time when convenience demands.

This type of staging will cost a little more to build than the present type, but once built it will pay for itself in a very short time. On account of the fact that with this type of staging it is not necessary to keep on hand any more stage builders than are necessary for the very simple maintenance of the ship ways.

This method is safer than the old method. There is no loose planking and no overlapping. When it is necessary to move the staging the bolt can be drawn from the hinge and the uprights and longitudinal staging moved separately and then fastened together again all in a much quicker and more economical manner than with the old type of staging.

D. McL., Tacoma.

COMBINATION OF REAMER AND COUNTERSINK

IN answer to Kinks, I wish to say that in my experience in reaming holes, especially on the main decks of hulls, I find a great deal of trouble and loss of time in changing from the reamer to the countersink. As you know, by the present method it is necessary to use either a cape chisel or a beveled drift and a hammer to drive the reamer out of the socket.

The unskilled labor employed in this work are constantly losing track of these tools and the idea has often occurred to me that it would pay well for the ship yard tool room to make up a number of combination reamers and countersinks on the same shank for use in work on the hull. I should like to have the opinion of expert tool makers on such a combination tool.

R. D., San Francisco.

BOLTER-UP EFFICIENCY

THE shipbuilding industry of the United States has now reached a point where it must compete with foreign yards for business and to do so more efficient methods must be introduced and the waste motion eliminated, as has been done in other industries in which America leads the world.

CONTEST

The kinks on this page are not exactly what we had hoped for in response to the announcement of the Kink Contest, but they are the best that have come in and we are awarding the announced prizes to these three as first, second and third in the order printed.

Remember that all sketches or drawings should be made on white paper with black ink, so that they may be reproduced as illustrations, and descriptive articles should preferably be less than two hundred words in length.

Nowhere is there more room for improvement than in bolting-up. What would be thought of a contractor putting up a frame building, whose carpenters had to climb down and go across the street every time that they wanted a fresh supply of nails, which they could only take a pocket full at a time, and whose tools were kept a block away, which distance they had to walk every time they needed a change of tools?

It is a cinch that a competitor who hoisted his nails a keg at a time and whose tool box was close at hand, would mighty soon put Mr. Mossback out of business.

Yet the first condition is exactly the present way in which bolting-up is done. Every time a bolter-up wants a fresh supply of bolts he must climb down off the staging, and perhaps go half way across the yard, and then bring back only as many as suits him.

In these days of electric cranes it is mighty poor business to hoist several tons of iron twenty or fifty feet by man power, a few pounds at a time.

The bolter-up who wants to loaf makes as many trips as possible, the one who wants to make a showing takes it out in cussing the company. Bolts and washers should be hoisted a crane load at a time to convenient places. All used bolts and washers should be sorted on the ship and only bolts and nuts needing machining sent off. What is the sense in paying one set of men to take bolts and washers away and another to bring them back?

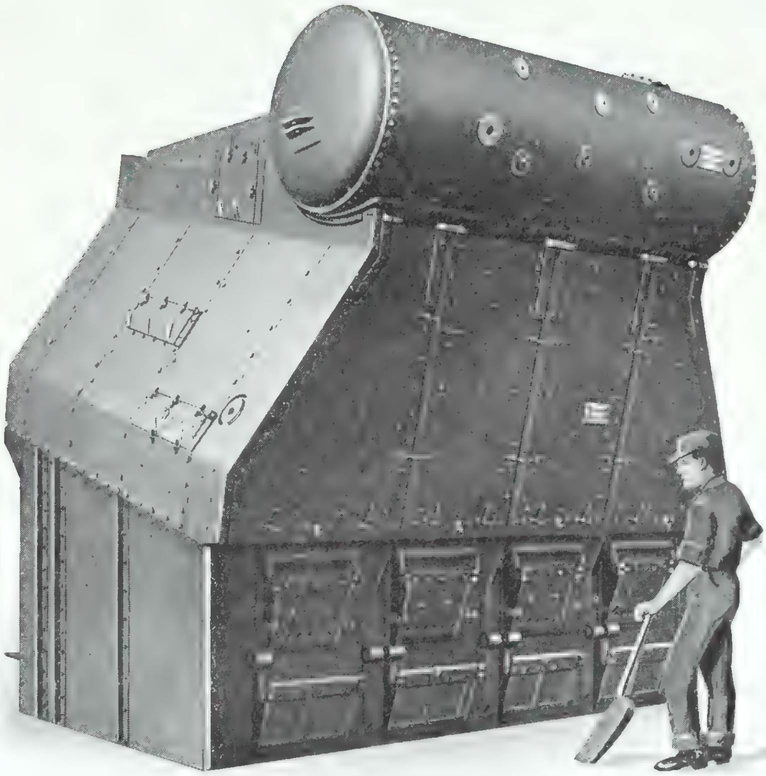
Under the present system the sweepers gather up all used bolts and washers and send them down to the scrap pile, there to be sorted and sent back to the ship, passing through several pairs of hands on the way, a clear waste of money.

It is safe to say that at least half an hour per day a man could be saved by adopting the plan outlined, and the bolter-up foreman would have a much better idea as to what his crew were doing at all times.

Chinese students pouring cast iron at one of China's industrial schools.
(See article on page 114b)

FOR SALE—Immediate Delivery

Heine Marine Type Water Tube Boilers



WORKING PRESSURES—200 lbs. per sq. inch, for marine purposes, having been built under the inspection of the United States Steam Boat Inspection Service, and of the American Bureau of Shipping.

HEATING SURFACE—Total heating surface 2518 sq. feet.

HORSE POWER—Based upon the A. S. M. E. Boiler Code this boiler will rate 251.8 horse power. In the Shipping Board's test sheet of a test made of this type of boiler, June 17th, 1919, they rate this boiler at 434 horse power, and burning coal, under forced draft have developed 700 horse power. A copy of this test sheet will be sent upon application.

UPKEEP COST—The cost of keeping this type of boiler in first class condition is at a minimum, as each tube is accessible from its own handhole plate, and as there are not special or off size tubes in this boiler, they are always obtainable from any hardware dealer.

SHIPPING WEIGHT—The total weight of the boiler, casing, and fire tile complete is about 60,000 pounds.

Shipping weights and cubic measurements for export will be furnished upon application.

OCEAN SHORE IRON WORKS

550-558 Eighth Street **SAN FRANCISCO**

Anticipating Governor for Marine Engine

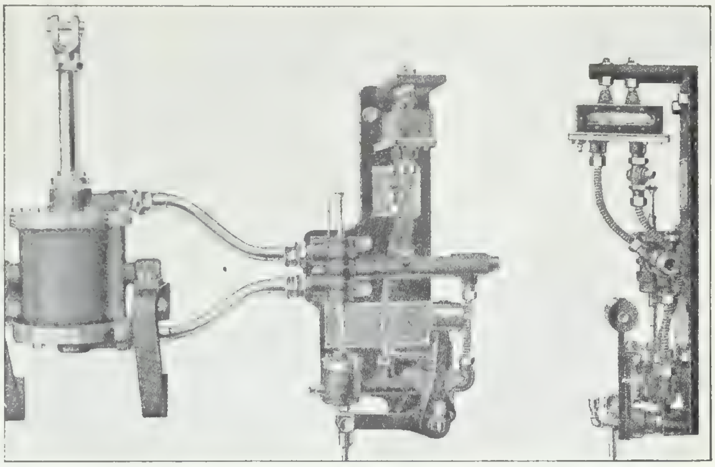
THE British Marine Engineering Company, Ltd., of London, for a number of years have been perfecting the Ramsay patent marine governor and they now announce that they have a positive system of controlling marine engines under all conditions, which system functions both in an emergency and in the anticipation of ordinary racing through heavy seas. The great difficulty with marine engine governing by the ordinary methods is that racing must be started before the governor begins to function.

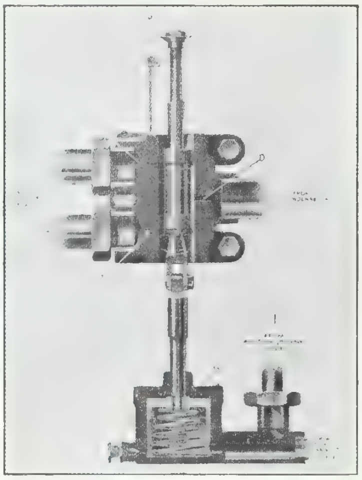
In studying this problem the manufacturers of the Ramsay governor have developed an anticipating valve which automatically comes into action when the lift of the ship's stern brings the propeller dangerously near the surface and which begins to close the throttle valve at the moment that the propeller begins to come out of the water. This so-called anticipating valve, as shown in our illustration, is composed of a closed box which is suspended on adjusting bolts with its long side parellel with the ship's keel. In this box is a rocking valve controlled by a rolling ball. This valve operates between the condenser and a relay cylinder, opening and closing as the motion of the vessel causes the ball to roll forward or aft.

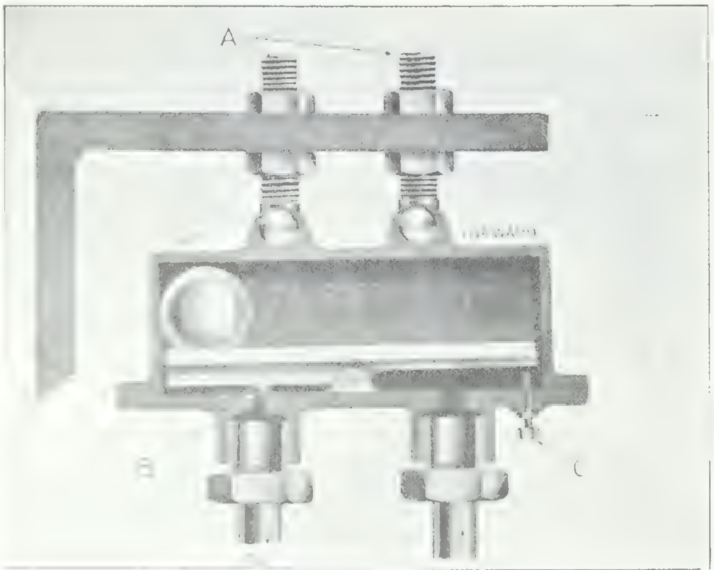
When the valve is open the influence of the vacuum is applied through valve B to the underside of the piston in the relay chamber, thereby drawing down the three-way valve which controls the operating cylinder. The atmospheric pressure pushing this relay cylinder down drawns down with it the three-way piston valve above, thereby closing the port E to the condenser vacuum and opening port E to the atmospheric pressure and opening the port F to the condenser vacuum and closing the port F to atmospheric pressure, thus reversing the conditions in the operating cylinder and drawing its piston downward, thereby closing the throttle. The spring catch I and the beveled locknut and washer J provide an emergency control. If an engineer on watch should be obliged to leave his post while the engine is running he should screw the washer J down close to I so that if any accident should happen to the propeller or shaft in his absence I will engage J and the throttle remain closed until J is released by the engineer.

The adjustment screws on the anticipating valve provide a means for resetting this very sensitive feature of the governor to suit the trim and the predetermined speed at the outset of each voyage. With the exception of this slight adjustment the Ramsay governor needs no attention through years of service.

There is provided with all Ramsay governors an emergency attachment which provides against racing due to accidents and to short following seas which might possibly expose the propeller without pitching the vessel. This consists of a cock in the line from the condenser to the relay cylinder which as described above controls the three-way valve of the governor. This emergency attachment valve is operated by two pins suitably spaced on a triangular lever. Between these pins there swings a weighted arm which is oscillated through an adjustable spring connection by a bell lever connected to the crosshead in such a way as to give a four-inch stroke. At the predetermined speed this weighted arm swings between the pins with ample clearance but on an increase of the speed by one per cent or more the added momentum given to the weighted lever will cause it to strike one of the pins thereby opening the cock in the condenser line and operating the relay cylinder in the same way as by the opening of the anticipating valve.


Front view of complete Ramsay governor


The relay cylinder and three-way piston valve on the Ramsay governor



Anticipating valve on the Ramsay governor

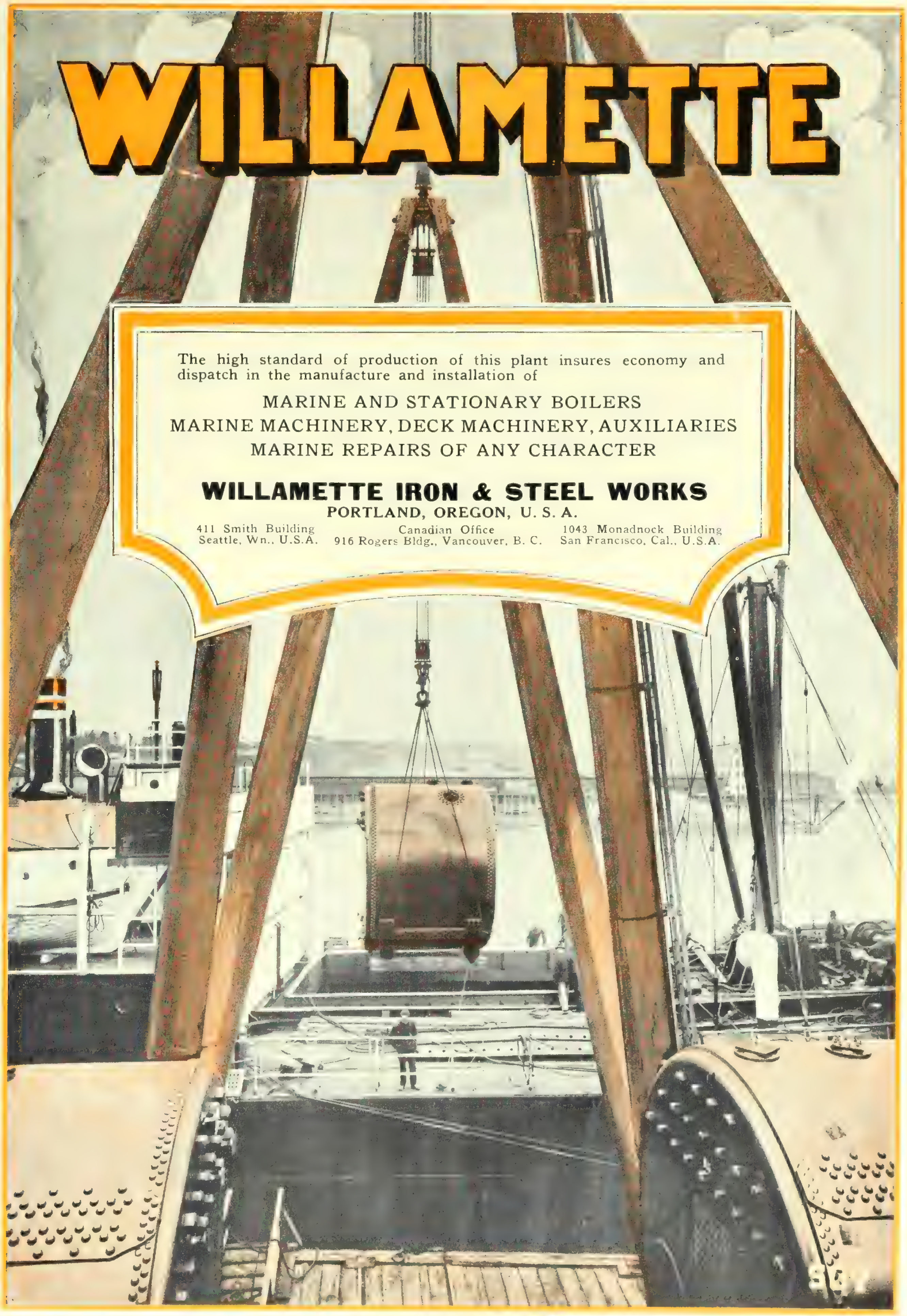
Many of the largest steamship companies in the world are using the Ramsay governor and it has proven its reliability under the most trying conditions in the hardest kind of service.

Charles W. Cory & Sons, Inc., 290 Hudson street, New York City, are distributing the Ramsay governors in the United States.

COAL CONSERVATION FILM AVAILABLE FOR EXHIBITION

ENGINEERING clubs and societies, manufacturers' associations, commercial organizations, technical schools, and the educational departments of large corporations will be interested in the announcement that the Diamond Power Specialty Company, Detroit, Michigan, now has available for free distribution three copies of its motion picture, "Coal Is King." This picture was prepared from a scenario by Robert June, and the pictures were taken under his direction by the Ford Motor Company.

The film was originally prepared as part of the coal conservation campaign used during the war, but has just been completely revised and brought up to date, all war material being eliminated and much new material added. The film deals with good and bad methods of coal mining and transportation, good and bad methods of firing, combustion losses and their minimization, power plant instruments such as draft gauges, CO_2 recorders and their uses, losses caused by leaky boiler settings, good and bad management of the boiler room, and the necessity for keeping the boiler surfaces clean is properly brought out. Pictures of scale and soot removal, losses caused by firing the boiler too high or too low above or below rating, losses caused by cutting in stand-by boilers too early or too late, losses caused by uncovered steam pipes, leaky pipes, steam traps, etc., are shown.



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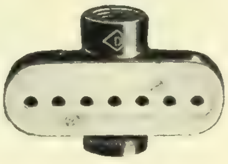
CONDULETS



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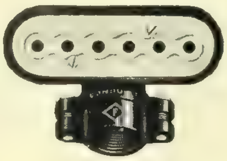

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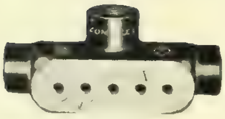

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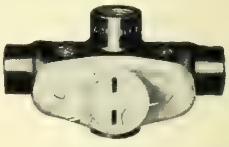

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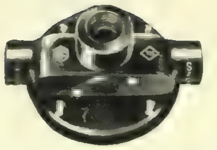

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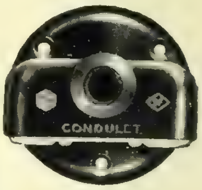

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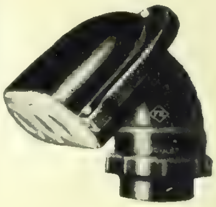

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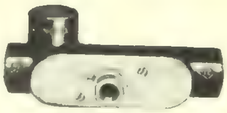

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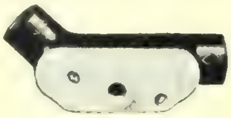

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3rd "	5.00
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and four awards of yearly subscriptions.

THROUGHOUT the war emergency shipbuilding program, which is now about at its close, the shipbuilders of the Pacific Coast and the machinists in the shops working on marine machinery have made a very wonderful record in production. A great deal of credit for this record is undoubtedly due to ingenuity of men and foremen in the yards and shops. While this work was going on at top speed, no one connected with it had time or opportunity to properly analyze and describe the methods used and so spread the good knowledge around for the mutual benefit of all the other fellows in a similar line of work.

It has occurred to the Pacific Marine Review that many of the originators of schemes in ships and yard practice might like an opportunity to put their ideas into print, and we are, therefore, setting aside two or three pages each month under the above heading.

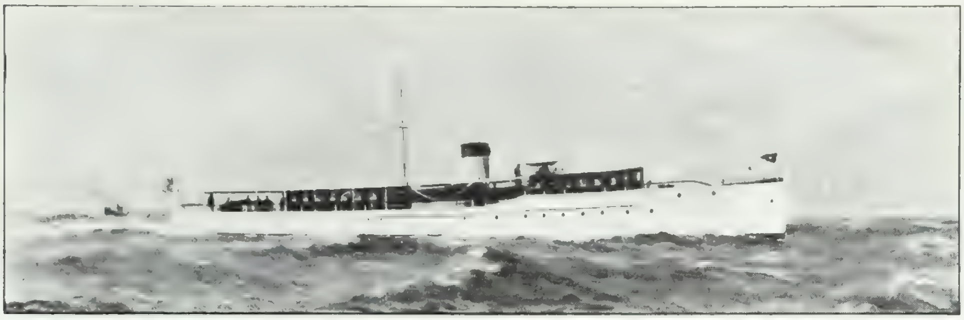
In order to make it worth while, we are offering a $10.00 prize each month for the best shop or yard "kink" sent in during that month, and a $5.00 prize each month for each of the four next best "kinks." We are also offering five yearly subscriptions to Pacific Marine Review each month for those "kinks" which may be sent in but which, not being published in full, shall receive honorable mention.

By the word "kink" we mean some unusual or new method of obtaining better production on machine tools, or of speeding up work in bolting up, or in the use of pneumatic tools in the yard, or some scheme for a better system in the forwarding of work to the ship, or any new idea that would tend to efficiency in machine work. This need not necessarily be confined to shop or yard practice. Repairs at sea or emergency shop work on board ship would be just as eligible for the prize as the other.

Where necessary to make the "kink" clear, sketch or sketches should accompany each article. Articles should not be longer than four hundred words and preferably should be confined to two hundred and fifty words. Remember that "brevity is the soul of wit" and many words make much confusion. All sketches should be made on white paper or tracing cloth with black ink.

PACIFIC MARINE REVIEW
576 Sacramento Street
San Francisco

The Motor Yacht Modesty



THE largest transom stern motor yacht to take the water this year is the Modesty, 125 feet in length with a beam of 16 feet 6 inches. This yacht was designed by the Consolidated Shipbuilding Corporation, formerly the Gas Engine & Power Company, and Charles L. Seabury & Company, Consolidated, and is being built and equipped by them at their works, Morris Heights, New York City. The owner of this new cruiser is a New York Yacht Club man, and is the son of a late yachtsman well known in yachting circles, and who was known as the most prominent of his time.

Modesty, the name given this new cruiser, could not have been more appropriately selected. Her general characteristics while aristocratic in design are unassuming, yet full of gracefulness and charm. Behind all this lies a rugged construction, a workmanship of skill and precision, a heritage of her builders from the old school of experience. For over thirty-five years they have built and powered the most prominent pleasure craft in America.

The owner's quarters are aft, and consist of two double staterooms, three single staterooms, three bathrooms, smoking room with passageway amidships. A winding stairway forward on the port side leads up to social hall on deck, fitted with player piano, built-in seats, desk and book cases.

The engine room is arranged forward of the owner's quarters. Here two six-cylinder 11-inch bore by 12-inch stroke Speedway gasoline engines are installed. The exhausts of these motors are led up through the stack. The auxiliary machinery and fuel tanks are also located in this compartment.

The galley is arranged next forward fitted with ice machines, refrigerator, a five-hole shipmate's range, together with all other appurtenances that go to make up a complete cuisine. A dumb waiter shaft leads up to butler's pantry at after end of dining saloon on deck, which comprises the forward deckhouse. The dining saloon is a spacious one, with hangings and furnishings exquisitely designed.

A door forward from galley leads to officer's quarters consisting of three staterooms and mess room. Forward of this, the crew's quarters, crew's toilet and chain locker are located.

A 20-foot power tender of carvel construction is carried on port side of main deck; on the starboard side, a 16-foot power tender of similar construction. A 12-foot rowing dingey is carried on top of the after deckhouse.

The bridge is located aft the forward deckhouse approached by steps upon the starboard side. Here the steering wheel and engine room telegraphs are located. An upholstered seat is arranged at after end.

The interior decorations of this handsome craft are being designed and supplied by a prominent decorator of New York City. We have every reason to believe that the artistry of the builders, coupled with delightful refinements of the decorators, will make Modesty the finest motor yacht to be delivered this season.

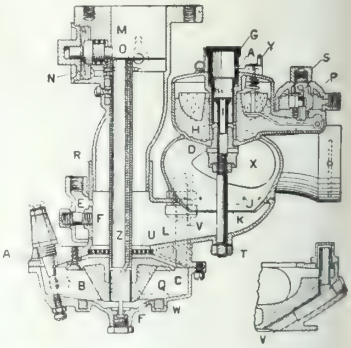
MOTOR-BOAT FIRE HAZARD

A MOTOR-BOAT with gasoline soaked bilges is a potential volcano. A backfire through the carburetor of such a boat may start a conflagration which will envelop the engine room immediately and in a short time the boat is burned to the water line. The prevention of fire on boats where gasoline or distillate is used as a fuel lies very much in the hands of the engineer in charge. He can not prevent an occasional backfire but with care he can keep gasoline or distillate from spilling into the bilges.

With the increasing scarcity of the lighter fuels kerosene burning equipment has been installed on many motor-boats which are now in every-day use. High temperatures are required in order to vaporize the kerosene and two methods have been used to obtain the required temperature. One is the utilization of exhaust heat and the other method develops the necessary heat by burning the heavy parts of the kerosene in a fire-bowl built into the carburetor. A jump spark is necessary to keep the flame burning in the fire-bowl. At first thought it might seem dangerous to have a high tension ignition system feeding sparks into a carburetor on a motor-boat, but such is not the case. The Ensign Fuel Converter is designed especially for this purpose and the fire in the fire-bowl of the converter is as safe as the fire in each of the engine cylinders.

Should the high tension wire become disconnected and the spark jump to the nearest ground, there would be the equivalent of a small open flame, minute, however, in comparison with the flame of a backfire through a distillate carburetor. Furthermore, when we consider that the fuel being used is kerosene instead of gasoline or distillate, it is apparent that the fire hazard is greatly diminished by use of the fuel converter, it being remembered that a small stream of kerosene allowed to fall upon a burning match will immediately extinguish the flame. A magneto spark will not light cold kerosene.

From the above it is plain that when an Ensign Fuel Converter is installed on a marine engine the fire hazard is reduced to a minimum. For this reason and because of lower fuel consumption and a much cheaper and more plentiful fuel, many motor-boat owners are now equipping their boats with these converters.



Sectional elevation of Type N Ensign fuel converter

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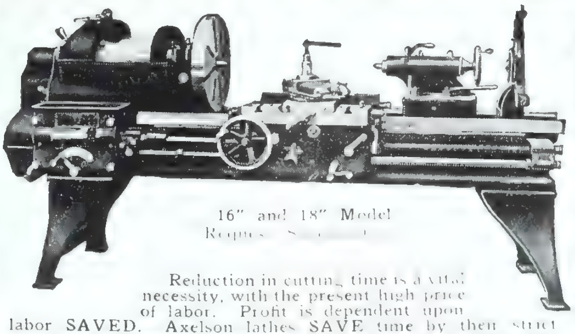

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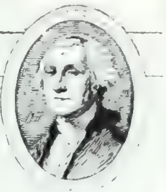

Washington, Feb. 13, (Special) Homer L. Ferguson, president of the Newport News Shipbuilding and Dry Dock Company, told the Senate Committee on Commerce this afternoon that unless some form of preferential were given the American merchant marine, the time was not far distant when most of the American ships would drift into foreign hands.

Mr. Ferguson pleaded for the upbuilding of American Insurance which he said was at the heart of the matter.

New York Commercial, Feb. 14, 1920.

The Basis of Our Shipping Prosperity

Marine Insurance controls the destiny of ships and cargos.

If America's foreign trade is to thrive we must develop a powerful Merchant Marine. But if American ships must depend on foreign marine insurance, both ship and cargos will be foreign controlled.

American shipping would be handicapped, perhaps even driven off the seas by foreign marine insurance as it was in the '70s.

American shipping must be protected by American Marine Insurance. The two must develop together or fail together.

Have you read the booklet "The Basis of Our Shipping Prosperity?" It states facts of interest to American business men. Write for it.

The Washington Marine Insurance Co., of New York

MARINE AND AUTOMOBILE INSURANCE

HOME OFFICE: 51 BEAVER STREET, NEW YORK

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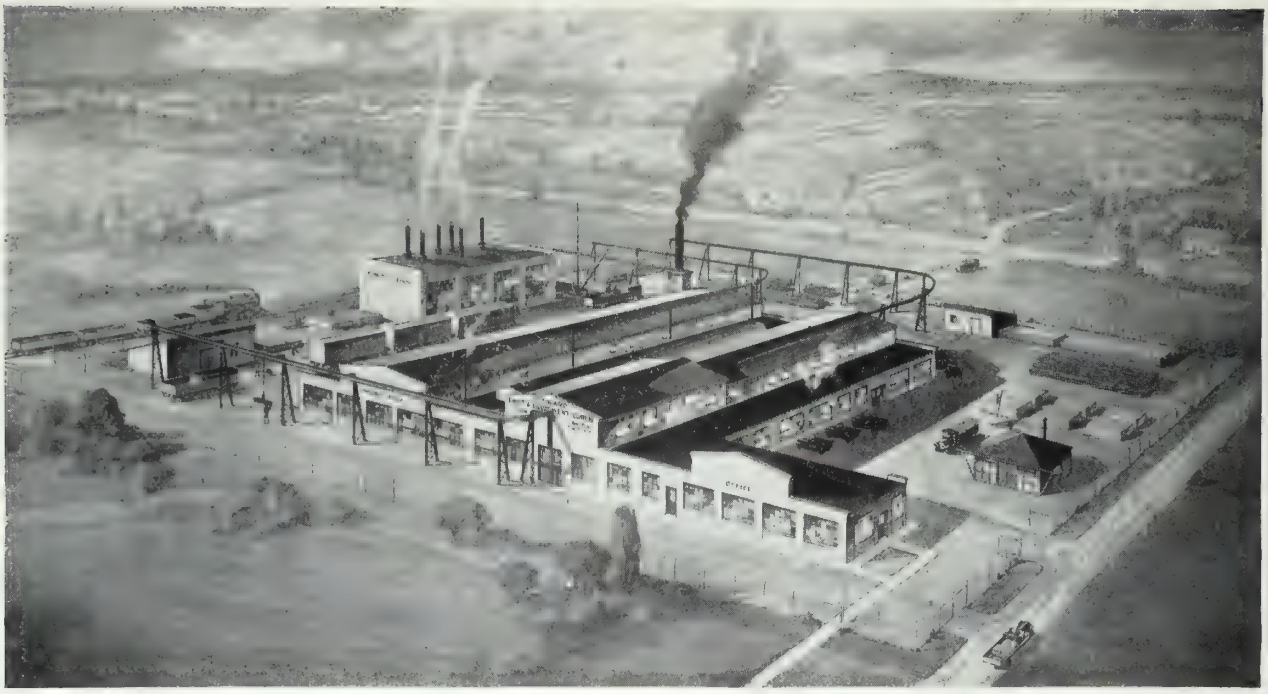
Steward Lifeboat Falls Controller



The plant of the Steward Davit & Equipment Corporation

To save the cost of Manila boat falls, and at the same time provide superior life-saving equipment, is the main reason for the invention of the Steward Lifeboat Falls Controller.

The Steward Company have brought out mechanical davits, boat chocks and release gear which are very well known and the use of which insures the quick turning out of boats and a safe and positive release, but the greatest difficulty in launching boats, namely, to lower safely to the water, presented a problem they have only recently succeeded in solving by the perfection of the Steward lifeboat falls controller.

With this device, the lowering of a lifeboat is under the absolute control of one man and lowering other than on an even keel is utterly impossible. It also eliminates the great delay caused by the lower blocks toppling and the falls twisting as in practically all cases where the empty falls have to be recovered to swing out a second boat. In short, it substitutes for the incalculable human element—a mechanical device under the absolute control of one man.

Its construction and operation is simple and fool-proof. The drum is divided into two parts, from each side of which the falls lead through the fairleaders, firmly fastened to the deck, through the upper falls blocks on the davit head. The simplicity of the device in general prevents any possibility of fouling.

The lowering is controlled by a special patented multiple wrapped Raybestos brake band running over a brass faced drum, the lowering operation being performed by the simple act of lifting a lever. Should this lever be released, the lowering stops. Inasmuch as both leads pay off the same drum, the boat can be lowered only on an even keel.

If it is desired to raise the boat by means of a steam winch instead of hand power, a special provision is added to the falls controller whereby a one-half inch wire rope can be lead through the controller to the winch for raising the boat.

This device enables the use of wire falls, which do away with the constant expensive replacements of Manila falls.

In addition to all the above it has value as a labor saving device. Less than one-third the number of men, used on an ordinary hand falls, are necessary to recover the boat, and one man has absolute control of lowering the lifeboat, whereas with hand falls three to four men are necessary.

The Steward lifeboat falls controller requires no extra deck space.

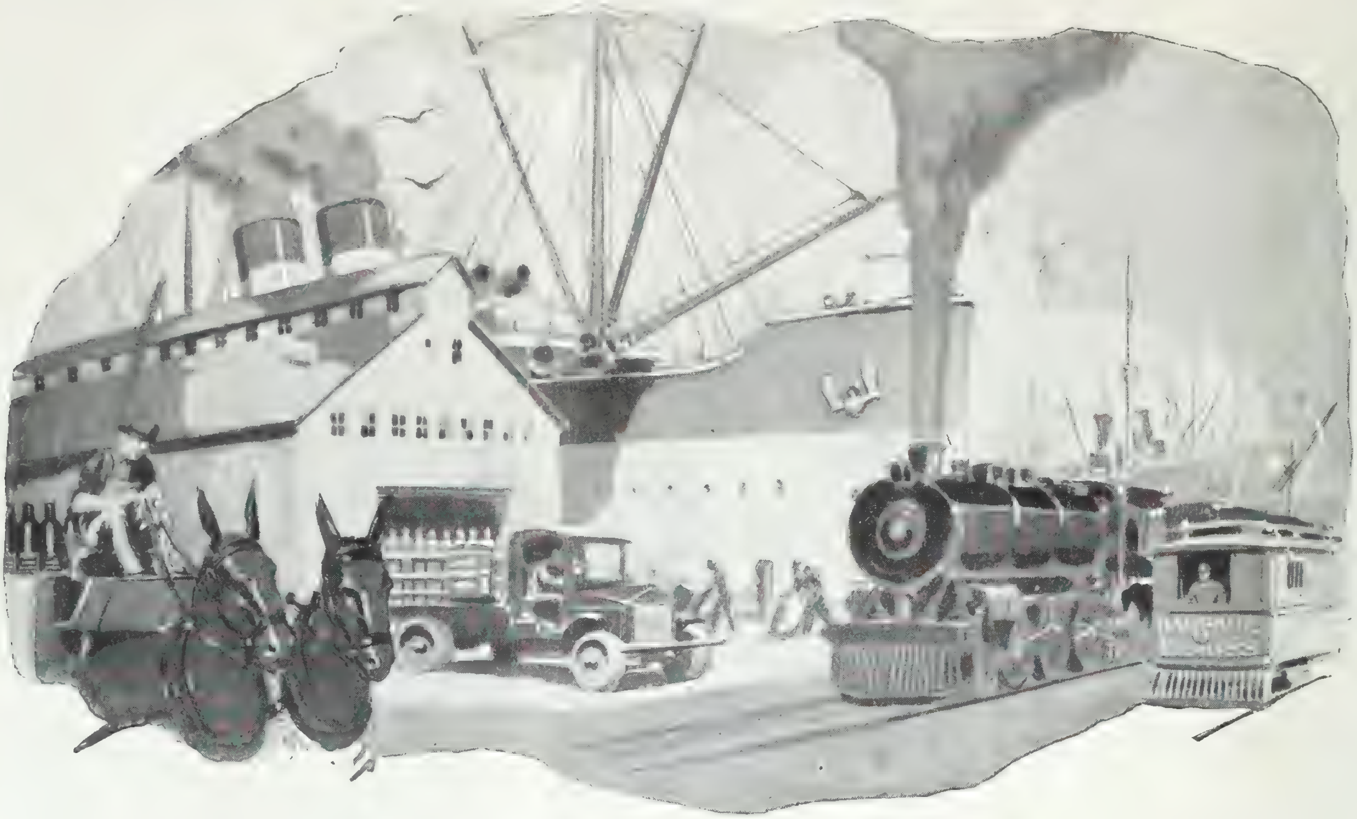
The steel steamer Lake Grandy. First steamer loaded out of Chicago, Illinois, for ocean trade

Pacific Marine Review

Seal Rocks
San Francisco

August
1920

Pacific Marine Review, Vol. 17, No. 8. Published monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.



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Because of this super-service, oxygen users throughout America depend upon Linde delivery with as much confidence as they depend upon the uniform purity of Linde Oxygen.

That is why Linde must produce more oxygen than any other maker in the world.

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THE LARGEST PRODUCERS OF OXYGEN IN THE WORLD

Pacific Marine Review

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Pacific Marine Review

The National Magazine of Shipping

August, 1920

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AN ANALYSIS AND DIGEST OF THE MERCHANT MARINE ACT OF JUNE, 1920

By J. C. ROLFS

WE are very glad to be able to give to our readers this masterly summary of the Merchant Marine Act, prepared at our request by J. C. Rohlfs. Busy executives will find here the whole bill in a "nutshell," stripped of legal verbiage and illuminated by brief comment. Especial attention is directed to Section 2, under which, the legislation referred to in the bill only by date of passage, has been all summarized for the convenience of our readers.—Editor's Note.

SEC. 1. Announces that it is necessary for national defense and growth of foreign and domestic commerce that the United States shall have a proper merchant marine, ultimately to be owned and operated privately by citizens of the United States. Congress is to do whatever may be necessary to develop and encourage the maintenance of a merchant marine; and the Shipping Board, in the disposition of vessels and shipping property, in the making of rules and regulations, and in the administration of shipping laws, is to keep always this purpose and object in view.

SEC. 2. Certain emergency legislation, which granted the President exceptional war powers, has been repealed as follows:

(A) To place an order with any person for such ships or material as the necessities of the government, to be determined by the President, may require during the period of the war and which are of the nature, kind and quantity usually produced or capable of being produced by such person.

(B) To modify, suspend, cancel, or requisition any existing or future contract for the building, production, or purchase of ships or material; or take possession, lease or assume control of, any street railroad, interurban railroad, or part thereof, cars and other equipment necessary to operation.

(C) To require the owner or occupier of any plant in which ships or materials are built or produced to place at the disposal of the United States the whole or any part of the output of such plant, to deliver such output or part thereof in such quantities and at such times as may be specified in the order.

WAR POWERS REPEALED

Under Section II on this page the writer has summarized the various pieces of former legislation by which the President was given arbitrary power affecting mercantile marine affairs. These powers have all been abrogated by the passage of the Merchant Marine Act of June, 1920, and it is well for all shipowners and shippers to study carefully this section so that they may know to whom they should attach responsibility.

(D) To acquire, contract, establish, or extend any plant, and in pursuance thereof, to purchase, requisition, or otherwise acquire title to or use of land improved or unimproved or interest therein; and to requisition and take over for use or operation by the United States any plant, or any part thereof without taking possession of the entire plant, whether the United States has or has not any contract or agreement with the owner or occupier of such plant.

(E) To purchase, requisition, or take over the title to, or the possession of, for use or operation by the United States any ship now constructed or in the process of construction or hereafter constructed or any part thereof, or charter such ship.

(F) To take possession of, lease or assume control of, or to extend, improve, or increase, or cause to be extended, improved or increased, any street railroad, interurban railroad, or part thereof wherever operated, and all cars, appurtenances and franchises or parts thereof commonly used in connection with the operation thereof necessary for the transfer and transportation of employes of shipyards or plants engaged or that may hereafter be engaged in the construction of ships or equipment therefor for the United States.

(G) In pursuance of the foregoing powers, or any of them, to make advance payments or loans of such amounts and upon such terms as the President may deem necessary and proper.

(H) That upon taking possession of property, or leasing or assuming control thereof, just compensation shall be made therefor, to be determined by the President, and if the amount thereof so determined by the President is unsatisfactory to the person entitled to receive the same, such person shall be paid seventy-five per centum of the amount so determined by the President and shall be entitled to sue the United States of America to recover such further sums as added to seventy-five per centum will make up such amount as will be just compensation therefor, in the manner provided for by section twenty-four, paragraph twenty, and section one hundred and forty-five of the Judicial Code.

The President may exercise the power and authority hereby vested in him through the several departments of the government, and through such agency or agencies as he shall determine from time to time.

(I) For the acquisition or establishment of plants suitable for shipbuilding or ship maintenance or repair, or of materials essential thereto, and for the enlargement or extension of such plants as are now or may be hereafter acquired or established, authority is granted to enter into contracts or otherwise to incur obligations for not to exceed $34,662,500 in addition to the amounts heretofore appropriated: Provided, That obligations incurred hereunder may be met from appropriations made or to be made for the construction of ships.

(J) The United States Shipping Board shall not require payment from the War Department for the charter hire of vessels furnished or to be furnished from July 1, 1918, to June 30, 1919, inclusive, for the use of that department when such vessels are owned by the United States government.

(K) The act entitled "An Act to confer on the President power to prescribe charter rates and freight rates and to requisition vessels, and for other purposes," approved July 18, 1918.

(L) That the board, with the approval of the President, is authorized to have constructed and equipped in American shipyards and navy yards or elsewhere, giving preference, other things being equal, to domestic yards, or to purchase, lease, or charter, vessels suitable, as far as the commercial requirements of the marine trade of the United States may permit, for use as naval auxiliaries or army transports or for other naval or military purposes, and to make necessary repairs on and alterations of such vessels.

(M) That the board, upon terms and conditions prescribed by it and approved by the President, may charter, lease, or sell to any person, a citizen of the United States, any vessel so purchased, constructed, or transferred.

(N) That when any vessel purchased or constructed by or transferred to the board as herein provided, and owned by the United States, becomes, in the opinion of the board, unfit for the purposes of this act (the Shipping Act, 1916), it shall be appraised and sold at public or private competitive sale after due advertisement free from the conditions and restrictions of this act.

The above repeals are, however, subject to certain limitations and do not affect any contracts or agreements lawfully entered into while said war acts were in force. The Shipping Board now has the President's power to adjust, settle and liquidate all matters arising out of the exercise by the President of any of the war powers granted him.

SEC. 3. Creates an enlarged board to be composed of seven members, appointed by the President and confirmed by the Senate. Salaries, $12,000 per year. Commissioners shall be appointed with due regard to their fitness; two from the Pacific, two from the Atlantic, one each from Gulf, Lakes and the interior. Not more than four from same political party.

SEC. 4. Transfers title to all vessels, including ex-enemy vessels, and other property acquired by the government during war to the Shipping Board, except such vessels or property which in the opinion of the President are required by the army or navy for military uses.

SEC. 5. Sales section. Board **authorized and directed** to sell **all** vessels as soon as practicable, consistent with good business methods, at **public or private competitive sale,** after appraisement and due advertisement. Initial payment or rate of interest not specified, balance payable in fifteen years. Prices to be governed by domestic and foreign markets, supply and demand, existing and future freights, and cost of constructing similar tonnage. The words "at public or private competitive sale, after appraisement and advertisement" were added to this section at the last moment, making the purchase of a vessel rather cumbersome and wrapping it with red tape.

BOARD MUST SELL

SECTIONS III to VII create an enlarged Shipping Board, transfer to that board title to all vessels, except those used by the Army and Navy, acquired by the Federal government during the war, and authorize and direct the Shipping Board to sell all vessels as soon as practicable. One of the chief functions of the new Shipping Board will be to establish and keep well oiled the machinery for such sales.

SEC. 6. Board may sell to **aliens** such vessels not necessary to our merchant marine. Terms, ten years, 5½ per cent. Requires, however, affirmative vote of five members and complete record of reasons for such sale. s

SEC. 7. Board instructed to determine what steamship lines should be established to foreign ports to promote, develop, expand and maintain foreign trade, and an adequate postal service, and to sell or charter to American citizens who agree to establish and maintain such lines. If purchaser or charterer cannot be secured, the board shall operate new routes until developed. (NOTE: There would probably be less loss to nation if board placed new routes under private operation at government expense with proper audit.) United States mail to be carried on such lines at price agreed on between Postmaster-General and the Shipping Board. Where government lines parallel private lines, the rates and charges for government service shall not be less than the cost thereof, including a proper interest and depreciation charge. (NOTE: This protects the private operator against unfair competition.)

SEC. 8. Board and Secretary of War to investigate ports, terminals, railroads, highways and any other matters that may tend to promote and encourage the use by vessels of ports adequate to care for the freight which would naturally pass through such ports. (NOTE: This will certainly eliminate much of the congestion at present overburdened ports.)

SEC. 9. Insurance clause. Purchaser of government vessel shall keep same insured with such insurance companies, associations, or underwriters, and under such forms of policies and to such an amount as the board may prescribe or approve. Insurance payable to the board and/or to parties as interest may appear.

SEC. 10. Government insurance. Board may create, maintain and administer a separate insurance fund which it **may** use to insure, in whole or in part, any interest of the United States in any vessel or plant under its ownership.

SEC. 11. Board **may**, for a period of five years, set aside annually $25,000,000 to be known as its construction and loan fund, but prohibits board from contracting for any new vessels. New additions to our merchant marine are therefore left to private enterprise. Citizens can borrow two-thirds of cost of new vessel if built in **private shipyards in the United States,** though rate of interest is not specified.

FUND FOR SHIPBUILDERS

SHIPBUILDERS are particularly interested in Section XI, which provides for an annual fund of $25,000,000 to be used for loans to citizens for the construction of new ships, and provision is made that up to two-thirds of the cost of a new vessel may be loaned if the vessel is built in private shipyards in the United States.

Section XII authorizes the board to keep in repair and to recondition all vessels in its possession.

Section XXIII also provides a fund for shipbuilding purposes by exempting from excess profit taxes proceeds of ship sales and profits derived from vessels operating in foreign trade. The amount of these taxes must, in order to obtain this exemption, be invested in new tonnage built in American yards.

SEC. 12. Permits board to re-condition and keep in repair all vessels in its possession, regardless of prior ownership or flag.

SEC. 13. Board may now, without outside interference, sell all property, other than vessels, to which it has title.

SEC. 14. Provides for the transfer of excess revenues of the board to the treasury. After July 1, 1921, board will be dependent upon Congress for the amount of its operating capital. (NOTE: This may prove rather burdensome to the Shipping Board.)

SEC. 15. War Department not required to pay charter hire of vessels furnished by the board from July 1, 1918, to June 30, 1919.

SEC. 16. Terminates board's authority to purchase, build, requisition, lease, exchange, or otherwise acquire houses, buildings, or land, other than acquired up to the signing of this bill.

SEC. 17. Shipping Board is authorized and directed to take over on January 1, 1921, all docks, piers, warehouses, wharves, terminal equipment, etc., acquired by the War or Navy Department and not in the opinion of the President necessary for their uses.

SEC. 18. Amends Sec. 9 of the Shipping Act of 1916, and any vessel purchased, chartered or leased by an American citizen from the Board is entitled to register as an American vessel, and foreign vessels so admitted may engage in the coastwise trade.

Prevents sale or charter of any American-owned vessel to aliens except with the consent of the Shipping Board and specifies penalty in violation of said law.

SEC. 19. No rules pertaining to foreign American shipping may be made by any government agencies except by the public health service, consular service, and the steamboat inspection service, without first obtaining the consent of the Shipping

AID TO AMERICAN SHIPPING

THE Merchant Marine Act was framed with the idea in view of enabling American merchant vessels to compete with those of any other nationality. In pursuance of this policy it has in Section XXI extended the coastwise laws to all American territories, including Alaska, Hawaii, and the Philippines; has directed the President of the United States to give notice of the repeal of treaties which have prevented discriminatory tariffs as covered in Section XXXIV, and in Section XXVIII has limited discriminatory inland rail rates to goods imported or exported in American ships. Some of these provisions have aroused great criticism and opposition, particularly from British and Japanese sources.

Board, and the final decision in any dispute is left to the President of the United States.

Also authorizes Shipping Board to issue "orders in council" to protect American vessels against unreasonable foreign competition, giving such orders the effect of law.

SEC. 20. Prevents **any** common carrier by any combination, agreement or understanding from paying or allowing a deferred rebate, or to use fighting ships, or to retaliate against **any** shipper by refusing space accommodation when available, or to make any discriminatory contract on the volume of freight offered. Penalty for breach may be fine of not more than $25,000, and thereafter denial of entry to guilty vessel to American ports until such violations have ceased.

SEC. 21. Extends coastwise laws to Islands and foreign possessions or territories on and after February 21, 1922, provided adequate American tonnage available at that time.

SEC. 22. Cancels Shipping Board authority to suspend coastwise laws. Foreign vessels admitted under the American registry act of August 18, 1914, were permitted to operate coastwise. To retain such right, American ownership must be proved as of February 1, 1920.

SEC. 23. American shipowners exempted from the excess profits tax, on vessels operated in the foreign trade, for ten years from the signing of this act, provided such funds are reinvested in new American tonnage built in American yards to plans approved by the Shipping Board. To take advantage of this exemption, it would appear that vessels must be operated exclusively in the foreign trade. Further, any vessel documented or built prior to January 1, 1914, may be sold, and the profits exempted from income taxes, provided the entire proceeds are reinvested in the building of new tonnage in American yards, and of a type approved by the board.

SEC. 24. All mails of the United States when practicable must be carried in American vessels. Rate for same is to be a reasonable and just one.

SEC. 25. The American Bureau of Shipping is made the official classification society for United States vessels. This is as it should be. As a maritime nation we should be able to build, classify and repair vessels in accordance with the judgment of our own experts.

SEC. 26. American cargo vessels are now permitted to carry not to exceed sixteen passengers coastwise or foreign. This privilege is extended to vessels of any flag in the foreign trade, which allow the like privilege to cargo vessels of the United States. This section, however, does not encroach upon the coastwise laws of any foreign nation.

SEC. 27. Restricts the shipment of merchandise between points in the United States, including districts, territories, and possessions, to American vessels, but excepts merchandise transported between points within the continental United States (excluding Alaska), over through routes heretofore recognized by the Interstate Commerce Commission. Also excepts Yukon River, Alaska, until the Alaska Railroad is completed.

SEC. 28. Allows discriminatory inland rail rates on goods imported or exported in American ships. Great protest has been raised on this section by foreign interests. So far as Pacific shipping is concerned, it gives too great an advantage to the American ship, owing to the present great rail differential, and appears somewhat drastic. Heretofore the American shipowner has only asked to be placed on an equal footing with his foreign competitor.

SEC. 29. Framed to create and encourage American marine insurance companies, and provides for the exemption of associations from penalties of the antitrust laws, and for the removal of restrictive legislation. Opposition and reported retaliation on the part of British insurance companies. The real cause of the decision of British insurance companies to accept American marine risks at their home offices seems to be the New York State law imposing certain taxes and requiring increased reserves in this country.

SEC. 30. Known as Ship Mortgage Act of 1920. Designed to create a financial interest on the part of the people in ships and shipping securities. Ship mortgages are now made secure against all subsequent claims, except a few of special character.

SEC. 31. Deals with the payment of seamen's wages. A seaman can no longer request pay every five days in a foreign port, as permitted in the old law. The Shipping Board's interpretation and instructions to masters of Shipping Board vessels read as follows: "Under the new Merchant Marine Act a seaman may demand one-half the balance of wages earned and unpaid. If he has earned two months' wages on July 1, he may demand one month's wages. If on August 1 he makes a second demand, he is entitled to another month's wages, because that is one-half of the balance earned and remaining unpaid. Under the old law he could demand one month's wages from July 1, but only one-half month's wages on August 1, because the total demand could never exceed one-half of the amount earned. Only one demand may be made in the same harbor on the same entry."

Foreign seamen on foreign vessels are granted the same privilege in the ports of the United States.

SEC. 32. Payments of wages not earned, that is, payments in advance, are void wherever they may be made. Heretofore, such payments made in a foreign country were good in the United States if valid by the law of the country where made.

SEC. 33. Personal injury clause. Permits the recovery of damages by seamen for personal injuries and grants right of trial by jury.

SEC. 34. President authorized and directed within ninety days from June 5, 1920, to give notice to other nations of the repeal of treaties or conventions which prevent the imposition of discriminatory customs duties on imports entering the United States in foreign and American vessels, and which also restrict the right of the United States to impose discriminatory tonnage dues.

SEC. 35. Power and authority in Shipping Board may also be exercised by it through the Emergency Fleet Corporation.

SEC. 36. If any provision of Merchant Marine Act declared unconstitutional, the remainder of Act shall be valid.

SEC. 37. Definition of certain terms used in framing the law.

SEC. 38. American corporations operating vessels in the foreign trade must have a majority stock ownership in American citizens. Coastwise shipping corporations must be 75 per cent American owned.

SEC. 39. That this Act may be cited as the Merchant Marine Act, 1920.

CONCLUSIONS

THE Merchant Marine Act, or Jones Bill as it is popularly known, while not by any means perfect or permanent, is acknowledged by the great majority of shipbuilders and shipowners to be a great step in the right direction. It is certainly a very great advance over anything attempted by Congress in the last hundred years in the way of formulating a marine policy. If the Shipping Board can secure a widespread distribution among American citizens of ownership in the great war emergency fleet which it is trying to sell, there will be no doubt that the American voter will take care of his merchant marine property so as to make it a commercially paying proposition.

HANLON DRYDOCK & SHIPBUILDING COMPANY

EXTENSIVE enlargements and improvements of drydocking and repair equipment are being undertaken by the Hanlon Dry Dock & Shipbuilding Company, of Oakland, with a view to preparing the yard for work of the most diverse nature. New marine railway, floating drydock, graving dock, floating repair shop, salvage steamer at the Oakland plant and machine shop in San Francisco, are some of the more important additions already under way or projected for the immediate future. When all have been completed, the Hanlon yard will be in a position of unusual strength and able to offer any service that might be required by shipowners.

An interview with D. J. Hanlon, president and owner of the Hanlon Shipbuilding & Dry Dock Company, developed the following facts:

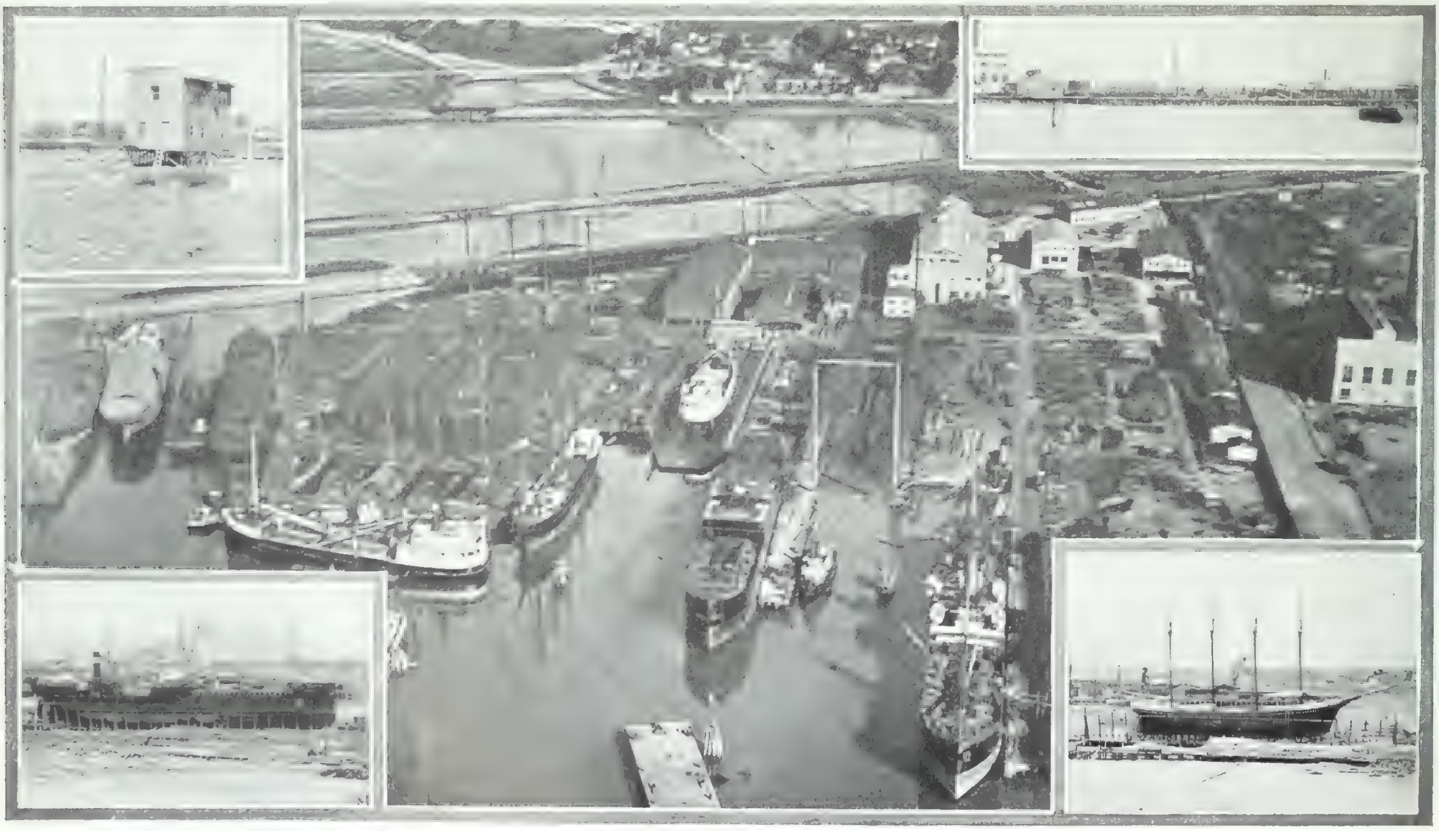
Prior to 1912 he had been foreman for J. W. Dickie, and had built the Key Route ferry boats and a number of other vessels. In the early part of 1912, he decided that he would go into business for himself, contracting on ship repair work. Almost immediately he was met by a strong opposition from the drydock owners, who, with the exception of one shipbuilding company, refused the use of their drydocks to Hanlon contracts. So he leased a piece of property from the city of Oakland, mud flats covered by the tide twice every twenty-four hours, but located admirably for shipbuilding and ship repair work because the ebb tide flow from Lake Merritt scours the silt away from its frontage.

Immediately after obtaining the lease, he ordered the first piling to be towed over to start operations, but found that the land which had been leased to him was occupied by another company as a warehouse for storing piles. The occupants had a well-trained Portuguese sheriff who did nothing but exhibit his badge every time he saw Hanlon coming, and he was not allowed even on the raft until the early part of 1915, but the rent was there on the first of each month for the Oakland officials, as he was taking no chances of being evicted. There were about twenty acres of the choicest mud, of which there are still some samples around the plant or in the immediate vicinity, and it necessitated thirteen calendar months to move it out with a dredger working three shifts before construction work could be started. In September, 1915, work was begun on a marine railway capable of taking out a vessel of 4000 tons deadweight, and the first ship was hauled out on April 26, 1916. In trying to get a design for this marine railway, he met with discouragement in all directions, and the marine railway, gears, etc., were his own design.

In the meantime he took a contract to build the schooner Flagstaff, which was then the largest wooden vessel ever built on the Pacific Coast. He did not have enough ground on which to build her, so he instructed his superintendent to build the vessel on the property adjoining the one he had leased from the city of Oakland. Later, finding that this land belonged to the city also, he secured on it a lease running concurrently with the one already granted him.

In the latter part of 1916, he secured in competitive bidding the first contract that the United States Shipping Board let. This was for rebuilding the steamer Iris at a cost of about $300,000, and when the bids were opened Hanlon was almost $100,000 lower than his nearest competitor. At the time he took this contract he did not own a riveting hammer or any tools whatever that could be used for steel shipbuilding. Nevertheless, the man with the will to do things is greater than any tool, and the class of work which was done on the Iris is on record in the United States Shipping Board's files and will stand any kind of investigation. An interesting feature of this contract was the building of the boilers in the boiler room of the vessel which was made necessary because Hanlon had no gear with which to handle a complete boiler.

Later on he obtained two contracts from R. Lawrence Smith, of New York. These vessels, known as the Governor John Lind and the Major Wheeler, were afterwards requisitioned by the United States Shipping Board Emergency Fleet Corporation. Their history is well known to the shipping people of the Pacific Coast, and their



Aeroplane view of the Hanlon Dry Dock & Shipbuilding Company plant, Oakland, California. Insert upper left shows original office taken in summer of 1915. Insert upper right, construction in progress. Two lower inserts illustrate the marine railway in use

Photo by Bushnell

D. J. HANLON

A Pacific Coast Shipbuilder Who Practically Single-handed and Laboring Under Many Difficulties has in Four Years Transformed a Mud Flat Into a Splendidly Equipped and Well Organized Modern Steel Shipbuilding Plant.

United States Shipping Board steel freighter Dellwood, built by the Hanlon Dry Dock & Shipbuilding Company

records can also be found in the Shipping Board's files.

In 1917 he took a contract to build six boats about the same type, but fifteen feet longer, for the United States Shipping Board, but was handicapped from the beginning on account of not receiving the material, which was re-allocated to the Japanese shipbuilders. After waiting for a period of three or four months, virtually doing nothing, he was compensated by getting a contract for six more ships, but was once more up against the same proposition of no material deliveries. Had it not been for the delay in getting the material, there would have been no doubt in the world that this yard would have given as good account of itself as any other yard on the Pacific Coast.

D. C. Young, former superintendent of the Hanlon Dry Dock & Shipbuilding Company

The yard at the present time is considered as one of the best to be found anywhere; laid out in such a manner as to facilitate repairs of any kind, with every convenience and contrivance known, such as the cranes, electric lights, water, air winches for moving vessels; in fact, every known device to expedite work and reduce costs.

At the present time Hanlon has five building slips and is in a position to build any size of any type vessel afloat. He has about the largest individually owned machine shop west of the Rocky Mountains, equipped with all new tools, with capacity for building large marine engines, and is operating a marine railway capable of hauling out a vessel of 400 tons. He has the machinery now in the course of construction for another marine railway having ample depth and sufficient power for hauling out an 8800-ton vessel, and which will be installed when Hull No. 86 is completed. He has also taken soundings for putting in a graving dock which will be able to accommodate any size ship that enters the port of San Francisco.

Lumber has been ordered for a floating drydock of the pontoon type, 540 feet in length, with a lifting capacity of 12,000 tons.

The Hanlon Company also owns and operates the salvage steamer Homer, which is conceded to be one of the best equipped salvage steamers in the world, and this wrecking outfit is under the supervision of Captain L. Curtis, who is well known as an expert salvor, and Captain R. Seike, navigator.

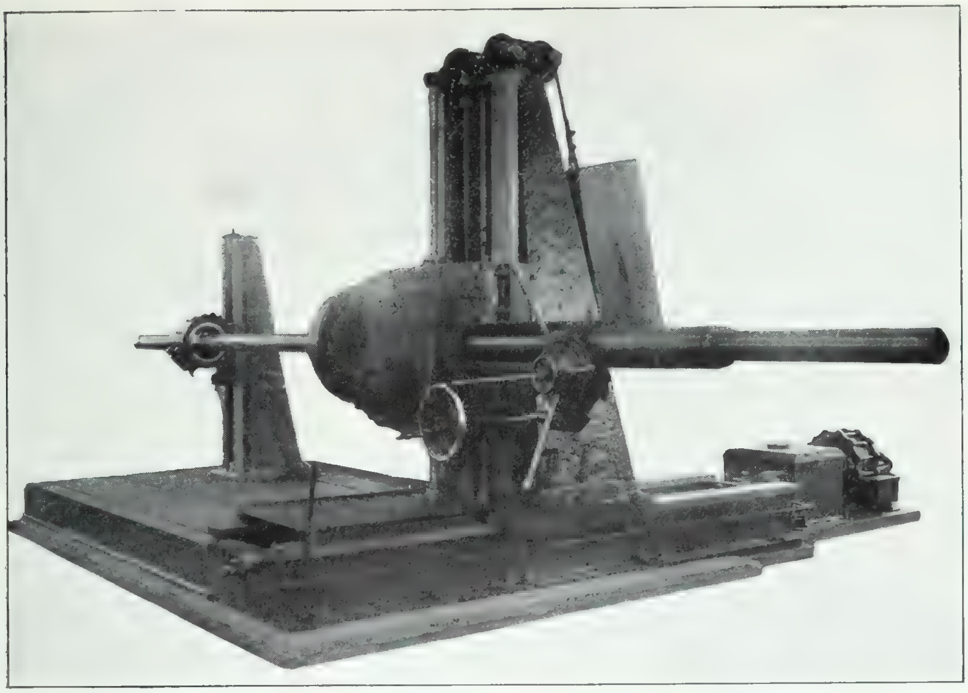
The Hanlon yard was the first shipyard on the coast to use gas for rivet heating, furnace heating, bending frames, etc., and it has been conceded that an enormous saving has been effected in putting gas to these uses. This company also operates a fire boat, and this is the only shipyard we know of that takes this precaution. There are several small launches kept by the company in order to facilitate work done in the immediate vicinity.

About two months ago, Hanlon bought what was known as the Denman Building on Spear street, San Francisco; a reinforced concrete building, Class A type, 97½ by 137½, two stories and basement, but so constructed as to carry seven more stories whenever it may be deemed necessary to put them on. This he intends to fully equip as a machine shop, with tools of every type, capable of doing any repair work that is to be done on the San Francisco waterfront.

He is also fitting out a floating repair shop which will be equipped with all tools for doing any repair work around the bay or up the river, or wherever the occasion may arise.

Some time ago, when the Skinner & Eddy Corporation was about to close, Mr. Hanlon got in touch with the chiefs of the different departments to see what arrangements he could make towards taking them over when they completed their work with that corporation. He was successful in getting Mr. J. F. Mooney, superintendent of the yard at all times during the great construction program and the real man behind the gun at the Skinner & Eddy

Hull No. 78, ready for launching May 18, 1918



Large horizontal boring mill in the machine shop, Hanlon Dry Dock & Shipbuilding Company

yard. Mr. Mooney brought with him Mr. James Young, his former assistant at Skinner & Eddy; Mr. F. C. Henn, chief engineer in charge of the installation of marine engines; Mr. E. R. Rich, hull superintendent, and Mr. Fogart, in the machine shop, and Mr. Curtis, the estimator. Mr. Hanlon also secured the services of Mr. Carmichael, who is foreman pipefitter, and who was formerly with the Northwestern Steel Company of Portland. Needless to say, all of these men brought with them their choicest workmen and only the very best results can be anticipated with an organization of this type.

Thus in the space of five years, in the face of tremendous obstacles and starting with very little working capital, has one man, by dogged perseverance and untiring energy, mixed with shrewd common-sense, converted twenty-five acres of tidal mud flats into a modern shipyard equipped and ready to undertake any shipbuilding or ship repair work.

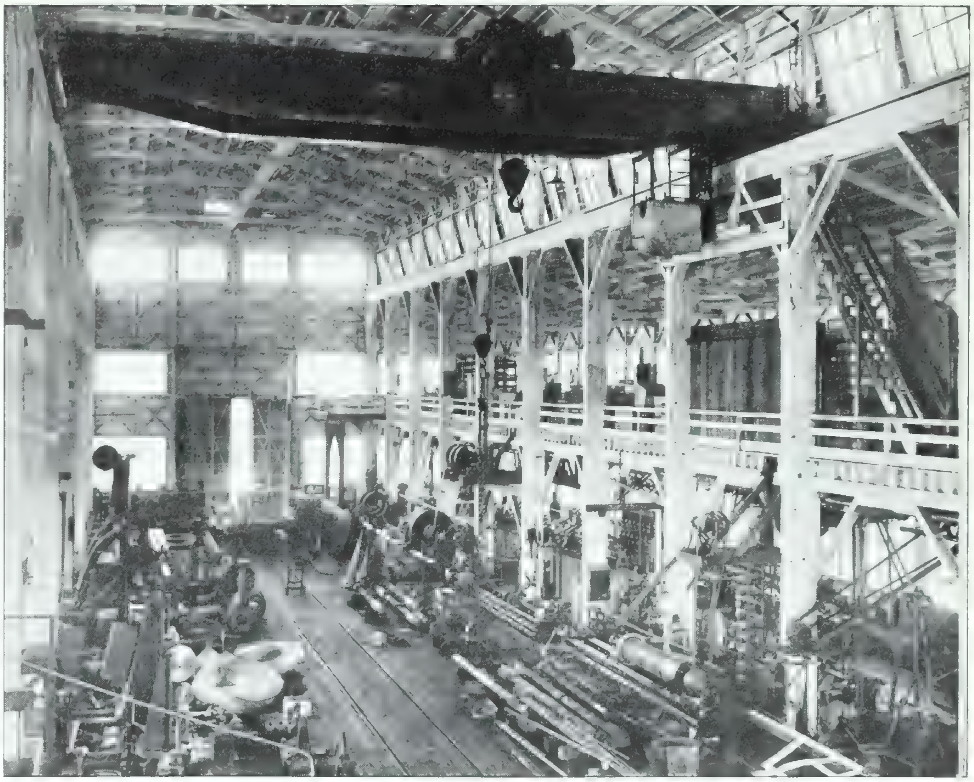
He himself credits much of the success of this work to his method of choosing a good man and turning him loose on the job. Not slow to blame where he thinks blame is deserved, he is quick to appreciate good work and unstinted in his praise thereof.

So in all this interview, Mr. Hanlon attributed most of the success of the plant to his efficient superintendent, Mr. D. C. Young, who was constantly on the job at the yard while he (Hanlon) was traveling all over the country digging up machinery, contracts and finances. Other notable assistants to whose names he constantly alluded were Mr. L. Wilhelmson, chief engineer, who designed many of the special tools built at the plant; Mr. Carl Foard, purchasing agent, whose ability to squeeze one dollar into two was of great assistance in the initial stages of the enterprise; Mr. A. A. Eichler, chief draftsman, who knew how to figure according to cash available; and Mr. Ralph Barker, who kept the accounts in order.

The Hanlon Shipbuilding & Dry Dock Company is unique in that its owner, president, manager, board of directors, etc., are all fused in one person, and that person an energetic, practical shipbuilder in the prime of life and possessed of a great ambition to make his plant the best, as it is today the largest, individually-owned shipbuilding establishment in the United States.

AMERICAN SHIPPING

American seagoing ships of 1000 gross tons or over registered for foreign trade or enrolled for the coasting trade, according to the returns of the bureau of navigation, Department of Commerce, on June 1, 1920, numbered 2801 of 10,681,025 gross tons, of which 1610 of 6,801,536 tons are owned by the government of the United States, represented by the United States Shipping Board.



Central bay of the machine and erecting shop, Hanlon Dry Dock & Shipbuilding Company

LINER DE KALB SOLD

EFFORTS of the Oceanic Steamship Company to get the de Kalb, formerly the German liner Prince Eitel Friedrich, have failed, as the vessel has been sold to the American Ship & Commerce Corporation for $800,000. The Oceanic line desired the vessel allocated by the Shipping Board to replace the steamship Sierra, which was sold, leaving only two liners, the Ventura and Sonoma, on the Australian run, but hope of having the allocation made waned when the de Kalb was advertised for sale by the Shipping Board. At the present time, the Oceanic has no plans for acquiring another vessel or for building.

During the early months of the war the de Kalb was famous (or infamous) as a commerce raider. Her gross tonnage is 8737; and, prior to her conversion into a transport, she had cabin accommodations for 250. Her speed is fifteen knots.

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J. S. HINES . . . . Publisher
B. N. DEROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . Associate Editor
J. G. BRAY . . . . . Pacific Coast Adv. Mgr.

NEW YORK OFFICE
[illegible] Church Street
M. B. STEWART, Manager

SEATTLE OFFICE
560-561 Empire Building
J. A. KENNEDY, Manager

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SHIPBUILDING ON PACIFIC COAST

DURING the six months just past much pessimism has been expressed over the future of the shipbuilding industry on the Pacific Coast. The friends of that industry have seen many shipyards dismantled and abandoned. The Shipping Board can let no more contracts for new construction. Competition is keen. Money is tight. Labor is greedy, and so on ad infinitum the gloomy arguments present themselves.

Pacific Marine Review from the very beginning of the war emergency period in shipbuilding has consistently warned its readers to expect the present condition, but now instead of complacently folding our hands and saying "I told you so," we would like to call their attention to a few facts which indicate to us that this present phase of Pacific Coast shipbuilding activity is merely incidental to the return of normal health.

In order that we may have a better perspective through which to view the present condition, it might be well to review a little shipbuilding history. If we go back to the year 1900, we find that on all the Pacific Coast of North America there was only one shipbuilding plant with an organization and equipment suitable for the building and outfitting of any class of wood or steel vessel. This plant was the old Union Iron Works at San Francisco. This plant had proved at that time that it was well able to compete with Atlantic Coast shipyards in the construction of merchant and naval ships and in the building of marine and stationary steam engines.

During the years from 1900 to 1915 several smaller plants, such as Craig's at Long Beach, Moran's at Seattle, were organized at various points on the coast. When the opening of the great war closed the shipyards of the United Kingdom to all but naval work and the shipping companies of Great Britain and other European nations began to look around for shipbuilding ways on which to build cargo vessels, there immediately came a great impetus to the building of shipyards on the Pacific Coast and when, two years later, the United States entered into the great war and there came the combined call of patriotism and profit which the shipbuilding industry, as nursed by the Emergency Fleet Corporation, presented to every man who had had the least experience in any kind of steel construction, then this industry entered into what might be called the critical stage of a high fever.

At the beginning of 1915 there were in the United States engaged in shipbuilding labor some thirty-five thousand citizens. By the end of 1917 the number of employes in the industry had reached almost half a million. Old shipbuilders looked on with a kind of horror at the spectacle of cowboys, barbers, shyster lawyers, and what not becoming ship carpenters or ship fitters almost over night. To the old-fashioned masters of the art of shipbuilding such a policy seemed almost sacrilegious, and yet in a few months they began to see fairly seaworthy ships coming out of this chaotic, feverish condition of the industry with a rapidity and a volume unprecedented in any of its former history.

It seems to us that this period of the shipbuilding industry and not the present slump was the dangerous one, for the great majority of the new yards and new organizations which rushed into the building of ships during the war were not actuated in any way by an ambition to become real shipbuilders or by the call of the sea, nor were they capable of feeling that marine consciousness which is necessary in any real shipbuilding or marine engineering work.

The nation needed ships and needed them quickly and the American business man responded nobly to that call. Now the need of the country for ships having come back to normal, and practically all of the newcomers in the industry who have attempted normal shipbuilding under competitive conditions having found themselves unable to meet those conditions, they have recognized their own limitations, and have naturally gone back into the business for which they were originally trained. This is not only true of the executives and managers in many of the emergency program shipyards, but it is true to a very large extent of the labor personnel right down the line, so that the present movement in shipbuilding is practically a return to normal conditions.

The Pacific Coast may well congratulate itself that out of this feverish condition she has emerged with an aggregate of permanent shipbuilding plants which puts her in a position to successfully compete in all bidding for contracts on merchant shipbuilding for American or foreign ship owners. In 1900 we had one real shipbuilding plant. In 1920 we have on the Pacific Coast of the United States at least ten, and perhaps twelve, permanent shipbuilding establishments prepared to build steel vessels of any type, and with these shipbuilding plants we have a vastly increased manufacturing plant for ship's engines, ship's boilers, and marine auxiliary machinery of all kinds, so that, taking the extension of shipbuilding industry over a period of twenty years, we may safely assert that we have had during that time an increase in permanent shipbuilding capacity of over one thousand per cent.

Looking at the proposition from another angle, our pessimistic friends will say to us, "Very true, you have the shipbuilding plant but what is going to keep that shipbuilding plant busy, and particularly, what is going to keep that manufacturing plant busy which is peculiarly equipped for the building of boilers, engines and auxiliary machinery?" To this query we can only reply that our hope in this respect is fixed upon expansion of Pacific Ocean trade.

The shipbuilding plant will be undoubtedly kept busy in the repair, reconditioning, and alteration of our present merchant marine fleet and in the building of special types for special trades and of new vessels to supply the normal annual increase and to take the place of the normal annual wastage of that fleet. This will also to a considerable extent keep busy the auxiliary manufacturing plants. Another feature which will be of very great help in this respect is the action of the United States government in so largely augmenting its permanent naval fleet on the Pacific. It will be up to these manufacturing establishments to acquaint themselves with the requirements of naval vessels and to manufacture navy standard fittings of all sorts for the requirements of this fleet.

On the Pacific Coast we have been, until recent times, very largely dependent upon foreign bottoms, either British or Jananese, Danish or Norwegian, to carry our export and import freight. The working out of the present Merchant Marine Act will gradually change over this condition into one where the majority of all Pacific Coast imports and exports will be carried in American bottoms. As Senator Wesley L. Jones very truly points out in his statement to the citizens of Seattle on the Merchant Marine Act, one American ship is worth more to the business of an American port than ten Japanese or British ships. While this is more true in general business than it is in the shipbuilding industry, still it is very true that an American ship will favor for her regular drydocking and reconditioning expenses the establishments of her home port.

Admiral Benson, chairman of the United States Shipping Board, in a statement made very recently in New York, outlined the policy of the United States Shipping Board with regard to the sale of their immense fleet of steamers and its effect on the shipbuilding industry. He maintained that the Shipping Board should holds its price up for the ships and that its only inducements offered to prospective customers should be those of immediate delivery and easy terms. He declared also that the Board stood ready to loan money on very easy terms to all shipping companies who desired to build motorships or special types of cargo steamers. While this declaration is not to be considered as final, it may be taken as outlining the principles which will direct the Board when a final decision is reached.

Undoubtedly the present lack of interest in new contracts for ship construction is due to the uncertainty in the minds of shipping men as to the future action of the Shipping Board. The Board itself is very much embarrassed by the fact that there is no possibility of a quorum as there are only two members still acting and they do not know whether under the new Merchant Marine Act they will be reappointed or dropped, but it may be taken for granted, no matter what the personnel of the Board, that under the Merchant Marine Act it will consistently follow a policy of encouragement to shipbuilders and it will be constantly having work for shipbuilding plants in the repair of its huge fleet until that fleet be disposed of to private interests.

It is very interesting in this regard to notice the tremendous growth of Pacific Ocean shipping during the same twenty years in which we have outlined progress of shipbuilding plant. It is only fifty-three years since the first commercial steamship crossed the Pacific Ocean. Twenty-six years ago there were carried in and out of San Francisco during the year 40,000 tons of freight and in and out of Puget Sound 36,000 tons of freight. Of that tonnage only 7500 tons, or a respectable load for one ordinary steamer, were carried from this country to the Far East, so that we may say that in 1900 the Pacific Ocean commerce had really only gotten away to a fair start. At that time there were some 237,000 tons of shipping engaged on the Pacific Coast in all of the routes running in and out of Pacific Coast harbors, and the clearances and entrances at our Pacific Coast ports during that year would amount to in the neighborhood of 6,000,000 tons. Last year, in spite of the fact that the great majority of Pacific Coast shippers complained of a scarcity of tonnage, this aggregate of entrances and clearances had grown to, in round numbers, 93,000,000 tons. If we compare this growth of shipping with the growth in shipbuilding plant as given above, we find that wehere, roughly, shipbuilding plant has increased one thousand per cent shipping has increased fifteen hundred per cent, and Pacific Coast trade with the Orient is just in its infancy.

There is every reason to believe that the increase in this trade during the next twenty years will be far more rapid than it has been during the last twenty. The remarkable advance of the Japanese Empire with its seventy millions of people is to be more than duplicated by the modern movement in the ancient Kingdom of China with its four hundred and fifty millions and its vastly greater natural resources and stability of character.

That the old conservative shipping houses of San Francisco are confident of great expansion in the near future is shown by the great outlay of money in the construction and the permanent character of the improvements which are going up or projected along California street, so we would say to our shipbuilding friends that a little patience and courage will tide them over the present difficult period and they will soon again be on a normal basis and all have ample opportunity to build real ships wherewith to carry American goods and American citizens over the trade lanes of the seven seas.

NATIONAL MARINE EXPOSITIONS

THE exposition held by the National Marine League at the Grand Central Palace in New York City was said to be by practically everyone who attended an unqualified success.

One primary object of this exposition and others that are to be held under the same auspices is the awakening of the minds of the American people to a greater sense of the value to them of a national mercantile marine, and undoubtedly the New York exposition had a great deal of that effect upon the minds of the crowds who, every afternoon and evening, wandered through the exhibits and had explained to them the mysteries of marine engineering and the romance of marine commerce.

It is not, however, at New York and at the other great seaports that this educative feature of these expositions is most needed, and we are glad, therefore, to learn that splendid progress is being made by the General Expositions Company and the National Marine League in connection with the marine exposition which is to be held this fall in Chicago. The metropolis of the Great Lakes section is the financial and largely the distributing center of a tremendous industrial and manufacturing area, the people of which have not until very recent years been brought into intimate contact with marine matters, and it is hoped that this marine exposition will stimulate and crystallize the sentiment for a deep waterway from Chicago to the sea, which has been growing so powerfully during the period of the war.

Further expositions should be held in the larger Middle West cities even where these cities have no direct connection with water navigation. It is necessary, if America is to maintain any large mercantile marine fleet, that the majority of the voters in all sections of the country should be vitally interested in maritime matters, and there is no better way to interest the mind than by the appeal to the eye through such expositions. This appeal should be of great service to the United States Shipping Board in disposing of its fleet of steamers, because it is only as a very great number of the people become investors in ship securities that it will be possible to have any large sale of these ships.

OPERATION COSTS

SOME idea of the stupendous rise in the cost of general steamship operation on the Pacific in the past couple of years may be gleaned from the recently issued statements of the coastwise steamship companies covering the year 1919. Tremendous increases appear in practically every item of operation and in some instances are greater by 80 per cent as compared with similar items in 1917.

The statistics show that labor benefited liberally during 1919, ships' crews, longshoremen and other shore forces securing wage increases ranging from 20 to 30 per cent, which to the Admiral Line alone represented an increase of $1,000,000 in round figures. Marine insurance shows a steady climb since 1917 and overhead charges substantially a 20 per cent increase.

Fuel oil which was bought by the operators on contract in 1917 at 89 cents per barrel, shows an increase to $1.60 per barrel in 1919, or almost 80 per cent. What this means in dollars and cents may be better realized when it is considered that the coastwise fleet of the Pacific Steamship Company consumes a million and a quarter barrels of oil per annum.

These figures are representative of the increases which appear in every item of operation during 1919 and which meant an outlay by the operators of several millions of dollars more than in previous years. And 1920 promises further increases rather than relief, as the four-month period of this year from January to April already shows an aggregate increase of 15 per cent over corresponding period in 1919.

These increased costs can be paid from but one source, the ships' earnings, and as freight and passenger fares do not keep abreast of the increases in operating costs the operators are constantly confronted with the problem of meeting them from these limited and restricted sources.

SHIP MORTGAGE RESOLUTION

A RECENT resolution of the Shipping Board clears up one point raised regarding the interpretation of the Ship Mortgage Act. The board holds that the section of the act prohibiting surrender of the documents of a vessel applies only to transfer of title and not to renewing of license on changes from one route to another. The board's resolution follows:

WHEREAS, Subsection O (a) of the Ship Mortgage Act, 1920, provides as follows:

"Subsection O (a), The documents of a vessel of the United States covered by a preferred mortgage may not be surrendered (except in the case of the forfeiture of the vessel or its sale by the order of any court of the United States or any foreign country) without the approval of the board. The board shall refuse such approval unless the mortgagee consents to such surrender."

and

WHEREAS, In the opinion of the board, such act does not cover cases in which vessel owners merely renew licenses or change documents incident to change of trades where the ownership remains the same; and

WHEREAS, In the interest of shipping it is highly important that this matter be decided without delay;

BE IT RESOLVED, That the Shipping Board construes subsection O (a) of the Ship Mortgage Act, 1920, which is contained in Section 30 of the Merchant Marine Act, 1920, as applying only to cases where documents of a vessel covered by a preferred mortgage are surrendered for the purpose of transferring title to said vessel or assigning said mortgage.

THE P. & O. REBATE SYSTEM

COPIES of a Peninsular & Oriental circular relating to rebates, signed by Lord Inchcape for the directors and dated April 1, have been received in the United States. The circular throws an interesting light upon the British rebate system:

"To those exporters from Japan (including Formosa), China (including Manchuria and Hongkong) to Europe or to ports via Europe who, from the first of May to 31st of October next may have found it to their interest to confine their support and shipments during that period to the Peninsular & Oriental Line, we shall be happy to allow a rebate of 7½ per cent on the freights contributed.

"To those who, on the 30th April, 1921, may have found it to their interest to confine their support and shipments during the preceding six months to the said line, we will allow a rebate of 7½ per cent on the freight contributed.

"To those who, on the 31st October, 1921, may have found it to their interest to so confine their support and shipments during the previous twelve months to the said line we will allow an additional 2½ per cent on freights contributed during the six months ending 30th April, 1921.

"Until further notice shipments made by the Oss, MM, East Asiatic Company, of Copenhagen (including steamers of the Norwegian, Africa and Australia line, to Scandinavian ports only), Russian East Asiatic Steamship Company of Petrograd, Swedish East Asiatic Company of Gothenberg, Nippon Yusen Kaisha, and Glen, Shire, Ben, Mutual, Ellerman, Osaka Shosen Kaisha, and Lloyd Trestino Line, shipments by direct steamers to Black Sea ports, and full cargoes of lumber from Japan, will not invalidate claims for the above.

"No returns will be payable on freight contributed by cereals and oils from Manchuria, rice, silk and treasure, the produce on the Eastern Archipelago transshipped at Hongkong, nor any cargo the freight upon which may be arranged a 'net' rate.

"Exporters applying for the returns, which will be payable in London on and after the 1st of January, 1921, 1st of July, 1921, and 1st of January, 1922, respectively, must fill and sign forms which can be obtained from the agents.

"Exporters failing to apply for returns within three months after the conclusion of each rebate period forfeit their claims thereto."

DEFENDER AND CHALLENGER

As we go to press the race is being run which will decide the fate of the American Cup. Shamrock IV has won twice, Resolute has won twice. Apparently the odds in sailing qualities of the yachts and in seamanship of the commanders are entirely in favor of Resolute. We here show the two yachts as hauled out on the great dry dock of the Morse Dry Dock & Repair Company. Resolute on the left, Shamrock on the right.

AMERICAN BOYS FOR AMERICAN SHIPS

Design of a Single-Screw Steel Cargo-Passenger Motorship Proposed for Philippine-China Coast Trade

By RUFINO MARTINEZ

This article describes the design of a motorship for a particular route and service following the outline of the advanced course in marine engineering-naval architecture as given in the college of mechanics, University of California, 1919-1920, intended for post-graduate students who expect to take up ship design work. The object of such a course is to familiarize the students with the methods in common use in the designing department of a shipyard.

Mr. Martinez was a scholarship student, taking the course and performed all the work involved in the preparation of this design and the figuring of the data, receiving only such guidance as he would get in any commercial shipyard drafting room.

The article is presented under the caption, "American Boys for American Ships" because it shows what can be accomplished by a young American under difficult circumstances.

IN the process of designing a ship's form, the first problem that confronts the naval architect is the question of size, type, speed and the power required to drive the vessel at the desired speed. Before any calculations can be made, however, certain factors must be considered. The designer must, first of all, ascertain the particulars of the service to which the vessel will be put. Experience has shown that the nature of the service which the ship will be called upon to perform, the kind of fuel available, the length of voyage, and local conditions, determine the most economical design.

Shipowners of today are no longer in the habit of buying old, discarded vessels as was the case during the war. They demand ships that are scientifically designed; ships of the proper size, type, and speed; in short, they demand ships that will pay dividends when put into service. It follows that before any work can be done on the design of such vessels, the designer must, beforehand, know or have fixed in mind, the principal particulars of the vessel under consideration. They are: (1) length; (2) breadth, (3) depth, (4) draft, (5) displacement, (6) longitudinal center of buoyancy, (7) sheer heights, (8) outline or form of stern. These particulars are more or less guided by the works or experience of other designers, i. e., by comparing results and using the various co-efficients which have been accurately determined from successful existing ships similar in type and design; by consulting the Tables of Ship Sales and Trial Trips, and other important shipbuilding data which can usually be found in such standard publications as the Shipbuilding and Shipping Record of London, the Pacific Marine Review of San Francisco, the International Marine Engineering of New York, etc.

The amount and kind of traffic which the proposed vessel will have to carry, and the berthing facilities along the proposed route, must also be investigated. The former generally determines the type, and the latter the draft of the vessel. The length of voyage and the kind of fuel available will determine the form, most economical speed, as well as the type of the propelling machinery to be installed.

For purposes of design let the following be the requirements of the owner:

Length between perpendiculars, 220 feet.

Draft, loaded, 16 feet.

Depth, molded, 15 feet 9 inches to main deck; 23 feet 6 inches to awning deck.

Deadweight (approximately), 1200 to 1260 tons.

Cargo, homogeneous, 960 to 1000 tons.

Cabin passengers, first class, 56.

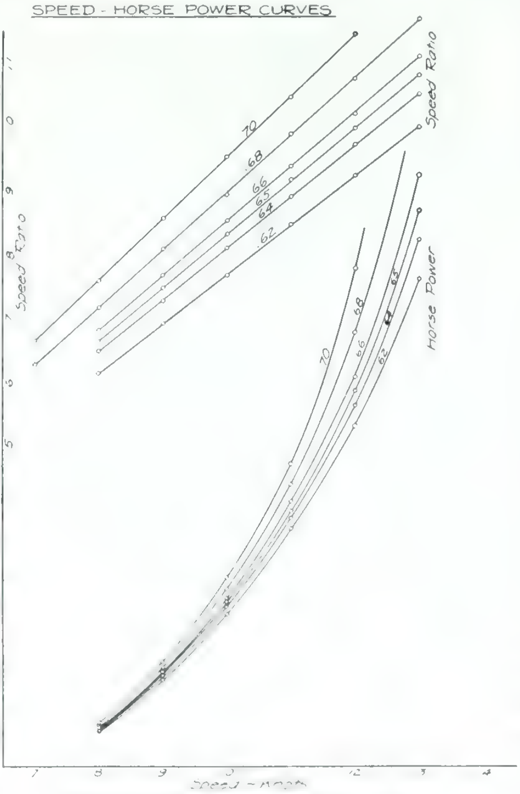
Cabin passengers, second class, 24.

Speed at sea, 10 knots.

Engines of Diesel type.

Length of voyage, 30 days.

As this is to be a passenger-cargo steamer, an awning-deck type will be found to be the most suitable. From the data already at hand, as mentioned in a preceding paragraph, for a vessel of the required length and draft, a beam of 35 feet is desirable for reasons governing stability. The speed and power curves in the figure show that a block coefficient of from .62 to .70 may be used. Selecting a block coefficient Cb = .65, from the formula



Speed ratio and speed horsepower curves

$$Cb = \frac{\text{molded displacement,}}{\frac{(L)\ (B)\ (d)}{35}}$$

where L = length bet. perpend.
B = beam molded,
d = draft at designed load,

the displacement is determined. In this particular case the displacement is

$$\frac{(220 \times 35) \times 16 \times (0.65)}{35} \text{ or } 2288 \text{ tons}$$

The mid-area coefficient may either be assumed, or taken from Hogg's Tables, and is about 0.918 for a vessel having a block coefficient of fineness of 0.65. The cylindrical or prismatic coefficient, by definition, is the ratio between the block coefficient and mid-area coefficient. This ratio is

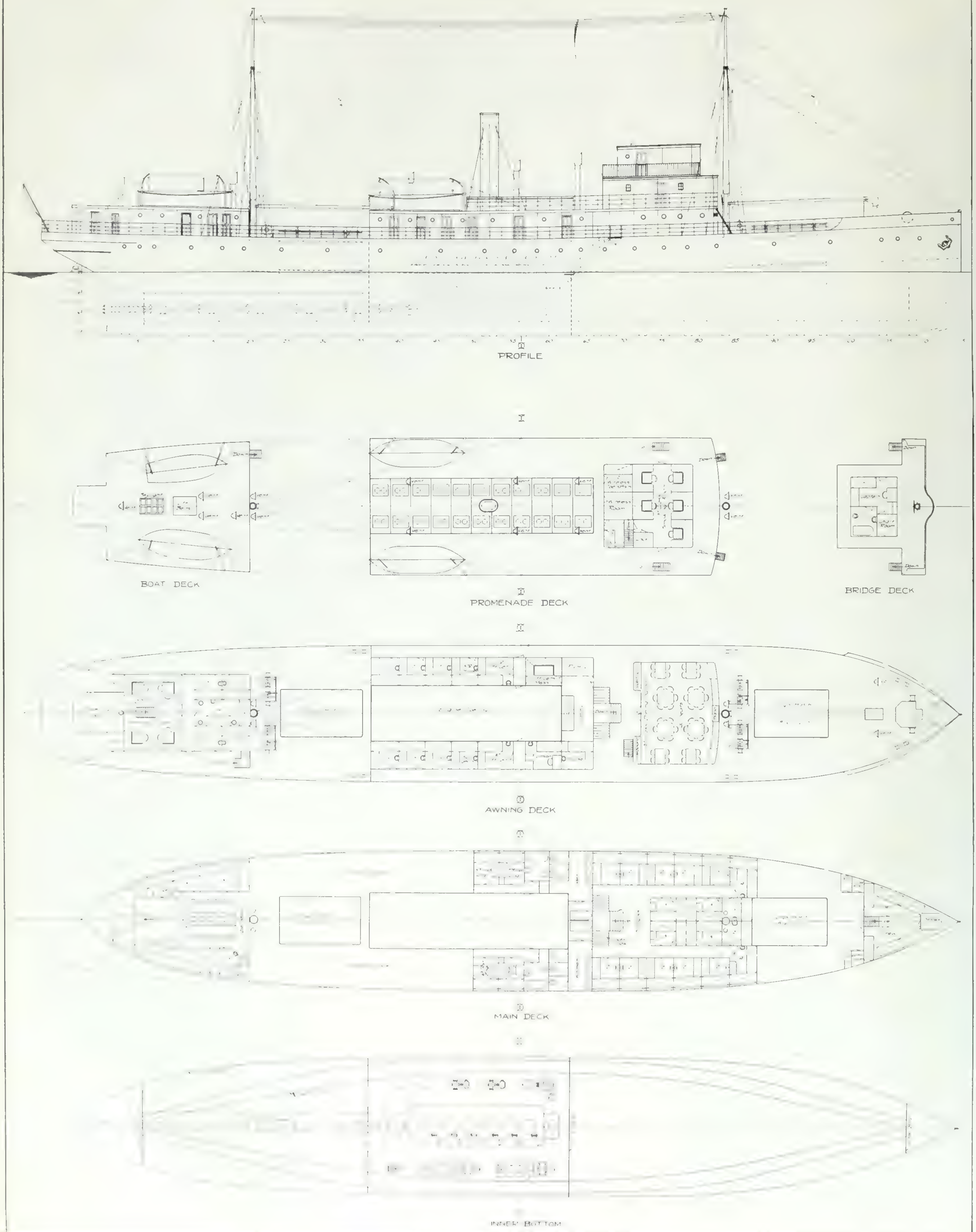
$$\frac{0.65}{0.918} \text{ or } 0.708$$

To determine the block coefficient which will give the best results as regards economy in the propulsion of the proposed vessel, six block-coefficient values are here assumed and the following results plotted:

Since the vessel is required to have a speed of 10 knots at sea, an equivalent speed of 11 knots in smooth water will be required. By the use of Morton & Goodie's Speed-Power Computer, the power required to propel the ship at various speeds was computed, and the results used in plotting the speed-horse power curves; also the speed-ratio curves; from which the most economical power is selected. From the results obtained in these calculations, the curves illustrated herewith were plotted.

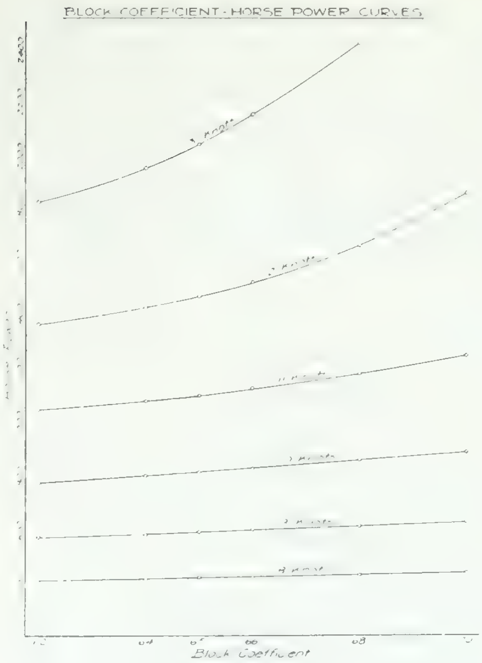
From the cross curves, i. e., block coefficient-horsepower curves, it is seen that

Block coefficient	.62	.64	.65	.66	.68	.70
Mid-area coefficient	.895	.910	.918	.925	.940	.955
Prismatic coefficient	.693	.703	.708	.713	.723	.733
Displacement, tons	2184	2253	2288	2323	2394	2464



Outboard profile and deck plans of single screw steel motorship design for the Philippine Island-China Coast freight and passenger service for a speed of 11 knots in smooth water, which is equivalent to 10 knots at sea (the required speed), from 1050 to 1100 indicated horsepower will be required to drive a vessel 220 feet long, 35 feet beam, with a draft of 16 feet. It is further observed that a block coefficient of .64 to .66 may be used mith economy. For the vessel under consideration, a block coefficient of .65 will be selected, and a 1200-brake horsepower Diesel engine will be installed, practical experience having shown that the losses due to variations of angular velocity of the propeller in the Diesel engine are thereby compensated.

At this stage of the work the designer turns to data or plans at hand, of ships similar in type and design already built and which have proved satisfactory. These data are useful not only in the determination of dimensions, but also in preparing the preliminary plans, with the necessary modifications to fit the particular vessel that is being designed. Having already determined the mid-area, prismatic, block-coefficients, and the power necessary, the next operation is the drawing of the preliminary body plan, and the calculation of all the weights that make up the ship.

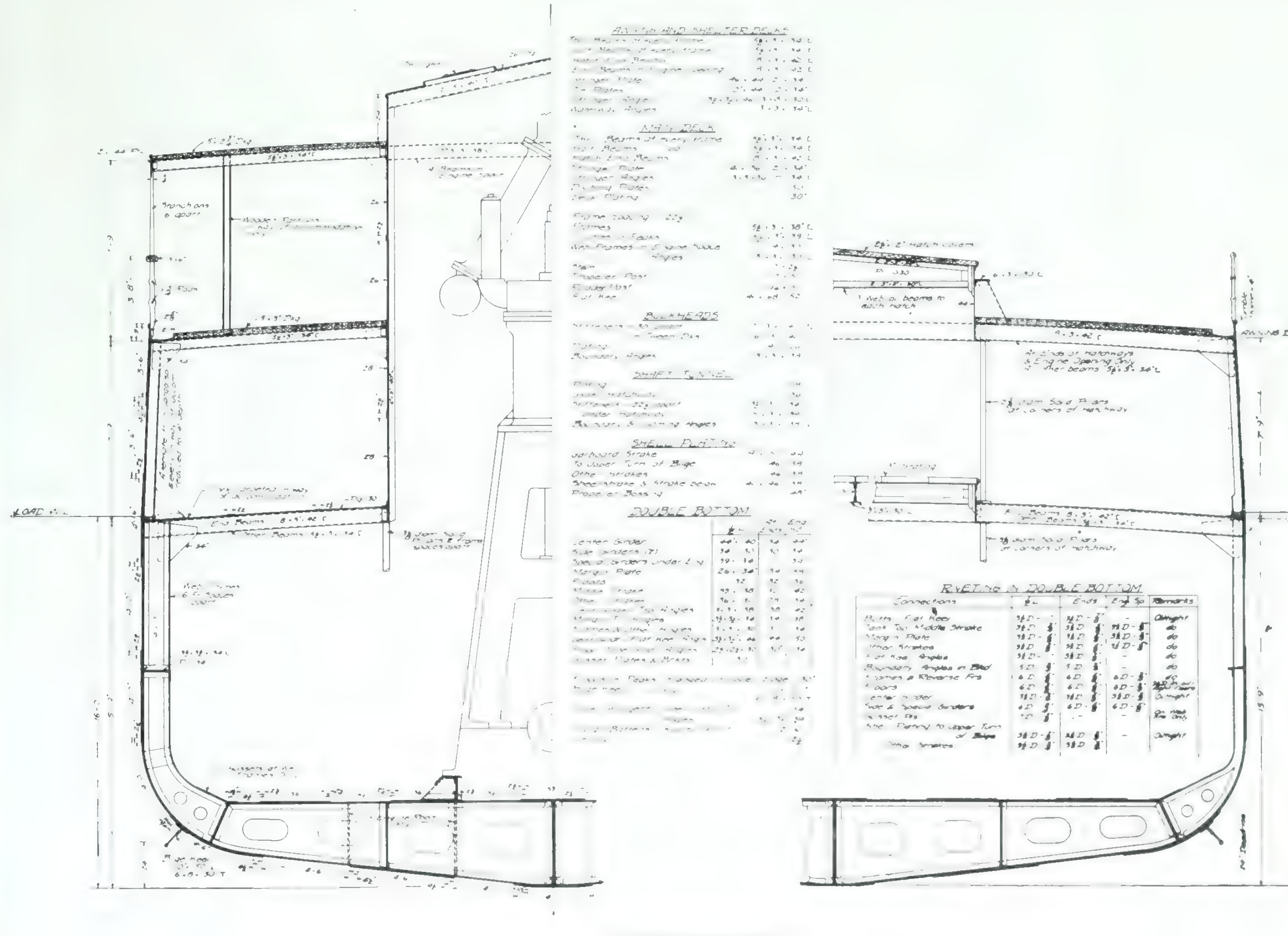


Block coefficient and horsepower curves

The preparation of the body plan is accomplished by the aid of Hogg's Tables of End Coefficients, assuming the center of buoyancy as being located on the midstation. For the mid-area coefficient of 0.918, and prismatic coefficient of 0.708, the corresponding end station coefficients are found and used in drawing the body plan. The sketching of the body plan is usually done on vellum paper and preferably in soft pencil to obviate the difficulty of erasing. Two other plans, the elevation or sheer plan, and the plan of the preliminary lines, are prepared in conjunction with the drawing of the outlines of the body plan. It is necessary that these lines are "fair," and the corresponding points at the different water lines check each other in the three plans, namely, the body plan, sheer plan, and lines.

Having "faired" the preliminary lines, the midship section, which shows a cross-section of the vessel amidships, is next drawn. This gives all the principal dimensions and particulars of the various members that make up the structural hull, and is used for the calculation of the weight of the vessel.

The calculation of the weights of all the structural parts entering into the construction of the ship is a long and laborious process and takes even the most experienced designers several weeks, depending on the size of the vessel. In order to save time, an approximate method is more often used, and that is, by comparison with the accurately calculated weights of existing vessels similar in design and construction. If, however, such data are not



MIDSHIP SECTION

Midship section design for single screw steel motorship available, then the first method is the only recourse left to the designer.

For purposes of design, the weights that go to make up the total displacement of a vessel are usually divided into several groups, as follows:

(1) Weight of hull and outfit which includes all the steel-work, wood-work, outfit, and other miscellaneous parts such as cement, cargo battens, etc.

(2) Weight of machinery, main engines and auxiliaries.

(3) Weight of fuel.

(4) Weight of stores, passengers, crew, baggage.

(5) Weight of cargo.

The sum of these five items makes the total displacement of the vessel.

The first thing to be done is to tabulate all those weights that can be found, but as they are dependent upon the size of the vessel desired, it is necessary to express items (1), (2) and (3) in terms of the dimensions L, B, D and d, which represent the length, beam, depth, and draft.

(1) WEIGHT OF HULL AND OUTFIT

The weight of hull and outfit may be subdivided into (a) steel-work, (b) wood-work, (c) outfit, and (d) miscellaneous. It is assumed that this weight varies as the product of the dimensions L, B, D. Let Wh represent the weight of item (1). Then Wh = (L) (B) (D) (Ch), where CH is called the hull coefficient, and varies from .003 to .0065. Sometimes Ch is given as 0.3 to 0.65. In this case

$$\text{Wh} = \frac{(\text{L})\ (\text{B})\ (\text{D})}{100} \times \text{Ch}.$$

In this particular case Wh was found to be 839 tons. Therefore

$$\text{Ch} = \frac{839}{(220)\ (35)\ (23.5)} = 0.00463 \text{ or } 0.463$$

If the weights of items (a), (b), (c), (d), are taken separately,

$$\text{Cha} = \frac{555}{(220)\ (35)\ (23.5)} = 0.00306 \text{ or } 0.306$$

$$\text{Chb} = \frac{111}{(220)\ (35)\ (23.5)} = 0.00061 \text{ or } 0.061$$

$$\text{Chc} = \frac{106}{(220)\ (35)\ (23.5)} = 0.00059 \text{ or } 0.059$$

$$\text{Chd} = \frac{67}{(220)\ (35)\ (23.5)} = 0.00037 \text{ or } 0.037$$

(2) WEIGHT OF MACHINERY

The weight of machinery is dependent upon the indicated or brake horsepower (in Diesel engines) of the vessel, which in turn is dependent upon the vessel's speed. Thus

$$\text{IHP or BHP} = \frac{(\text{Displacement})^{2/3} \times \text{V}^3}{\text{Ac}}$$

where Ac is the admiralty coefficient. As the horsepower, displacement and speed are already known, Ac may readily be found.

$$\text{Ac} = \frac{(2288)^{2/3} \times (11)^3}{1200} = 193$$

The weight of machinery is

$$\text{M} = \text{BHP} \times \text{Cm}$$

where Cm is the machinery coefficient and varies from .25 to .09. Also,

$$\text{M} = \text{Cm} \times \frac{(\text{Displacement})^{2/3} \times (\text{V})^3}{\text{Ac}}$$

The weight of the machinery was found in this case to be 192 tons. Therefore,

$$\text{Cm} = \frac{37{,}100}{231{,}500} = 0.16$$

(3) WEIGHT OF FUEL

Since a Diesel installation is contemplated, oil fuel must be used and will be carried in the double bottoms. The weight of fuel depends on the length of voyage, horsepower, and fuel consumption.

Let T = length of voyage in knots = 30 × 24 × 11 = 6720 (the total run being assumed as 30 days).

$$\text{Then } \frac{\text{T}}{\text{V}} = \text{number of hours of steaming} = \frac{6720}{11} = 610.$$

Let Oc = the oil in pounds consumed per horsepower per hour. Assuming 1 gallon = 16 BHP per hour, Oc = 0.51 pounds.

The total fuel consumed by the engine per hour is BHP × Oc = 1200 × 0.51 = 612 pounds.

Therefore the total fuel consumed by the engine during the voyage = 610 × 1200 × 0.51 = 375,000 pounds.

From 15 to 20 per cent is usually added to this figure.

(4) WEIGHT OF STORES, CREW, PASSENGERS, BAGGAGE

This item is given by the owners and is represented by Wp in the calculations. In this particular vessel Wp is 65 tons.

(5) WEIGHT OF CARGO

Like item (4), this weight is also furnished by the owners and in this case is 989 tons.

$$\text{C.G. loaded} = \frac{35{,}170}{2{,}288} = 15.37 \text{ ft. above base}$$

$$= \frac{258{,}000}{2{,}288} = 112.8 \text{ ft. from stem or } 2.8 \text{ ft. aft of the midstation.}$$

C. G. light condition = 14.46 above base = 8.2 aft the midstation.

(Continued on Page 114b)

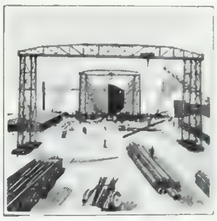
SUMMARY OF RESULTS

TABLE OF WEIGHTS

Item	Weight Lbs.	Moments Base as Axis Ft.-Lbs.	Moments Stem as Axis Ft.-Lbs.
Hull—(a) Steel work	1,243,860	15,660,934	142,142,496
(b) Wood work	249,385	7,095,400	29,957,500
(c) Outfit	236,565	4,909,100	23,918,000
(d) Misc., cem., battens, etc.	149,500	308,000	16,600,000
Machinery	431,060	5,424,800	60,044,000
Fuel oil	455,000	13,920,000	52,400,000
Stores, passengers, crew, baggage	146,300	2,870,000	18,300,000
Cargo	2,213,330	28,550,000	234,000,000
Totals	5,125,000	78,738,234	577,361,996

Item	Weight Tons	Moments Base as Axis Ft.-Tons	Moments Stem as Axis Ft.-Tons
Hull—(a) Steel work	555	6,995	63,500
(b) Wood work	111	3,170	13,360
(c) Outfit	106	2,195	10,680
(d) Misc., cem., battens, etc.	67	138	7,410
Machinery	192	2,422	26,850
Fuel oil	203	6,217	23,420
Stores, passengers, crew, baggage	65	1,283	8,185
Cargo	989	12,750	104,600
Totals	2,288	35,170	258,000

Material Handling



THE PORT OF LIVERPOOL

By CAPTAIN F. T. CHAMBERS, U. S. N.

NEAR the close of the twelfth century Strongbow Earl Pembroke, under Henry II, partially conquered Ireland and thereby incidentally laid up for his descendants and his government a peck of trouble which is still in evidence. In maintaining this conquest and the garrisons of the conquered towns on the neighboring island, two ports on the west coast of England were used, one at Chester on the River Dee and one at Bristol.

It was very soon found that the silting up of the river Dee rendered Chester unsuitable and the royal engineers were ordered to search out a new port. They recommended a site on the bank of the Mersey River where a small stream formed at its junction with the river a large pool, one side of which was bordered by a promontory of red sandstone. Here in 1207 King John built a castle and a number of houses and formed a royal borough to which by charter he gave the name of Liverpul. This name, now spelled Liverpool, is taken from the Cyrmic word Llyvrpwl, which being translated is either "the expanse of the pool" or "the pool at the confluence."

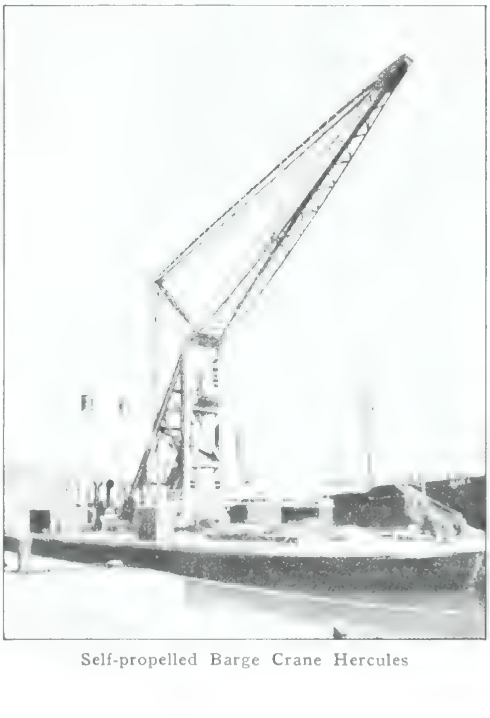
After the end of the first Irish wars the town had a very precarious existence, as is shown by the fact that in 1700, five hundred years after its establishment, the population only amounted to 5000. Very early in the eighteenth century, however, its merchants opened up profitable overseas trade, particularly in sugar, slave-trading and privateering.

It is notable that in 1709 there was constructed at the port of Liverpool the first wet-dock, and as will be seen in the body of the article by Captain Chambers this form of dock was essential to the success of any large maritime operations in Liverpool on account of the large rise and fall in the tides. This dock was designed and constructed by an engineer named Thomas Steers, and was simply a basin dug in the bank of the river with an entrance which could be closed at high tide by a wooden gate with suitable mechanism, so that the vessel could float at the side of the dock independently of the condition of the tide in the river.

Stalbridge Dock, Garston Estate, Liverpool. Water area of dock fourteen and one-half acres

By the year 1800 the population of Liverpool had grown to 77,000, and early in the nineteenth century the city took first place among all British ports in the volume and value of its exports.

While the early history of Liverpool is somewhat in doubt, it may be said to date as a port from 1720, when the first dock was placed in commission. It will therefore readily be understood that eleven feet over the bar at low water of spring tides was quite sufficient for ocean commerce then and for centuries thereafter. Liverpool was a very small town, located at the mouth of the river Mersey, just off the Irish Sea, and its location gave it importance, especially in the Irish trade. Those were the days of small wooden sailing ships and as Liverpool grew more and more in the shipping business it built according to its needs, with never a surmise of the days of steam and steel. The tide has a range between high and low at springs of thirty-three feet and a consequent current velocity of as much as seven knots per hour. Such conditions necessitate a dock system different from ours. It is quite out of the question to handle cargo from piers thrust into the stream. Enclosed basins were required and these the Liverpool shipping interests proceeded to construct. Small basins, or docks, as they are called, were all that the small ships required and these were built as needed, with lock gates to hold the high tide level at all times.



Self-propelled Barge Crane Hercules

The business of the port grew apace, and Liverpool grew accordingly. It now has a population of three-quarters of a million people. It is second to London in overseas shipping, but far excels it in exports. But its early prosperity has militated againts its present economy, and like the port of New York, though for a much better reason, its docks are city bound. But whereas New York continues to build narrow piers of no or next to no co-ordination with the railways, shipping interests in Liverpool will tell you with frank regret how the city has grown so close to the dock system as to shut out the railways entirely in some instances, and to make rail connection difficult always. Ships have grown so large that the original eleven feet over the bar has been increased to thirty-two feet at low water. Old docks have been torn out and replaced by larger and deeper basins, but it has been impossible in most cases to provide sufficient railway conections. The abutting property is too valuable for purchase or condemnation for dock purposes. Thus, as at New York, uneconomical teaming too frequently takes the place of direct railway transfer.

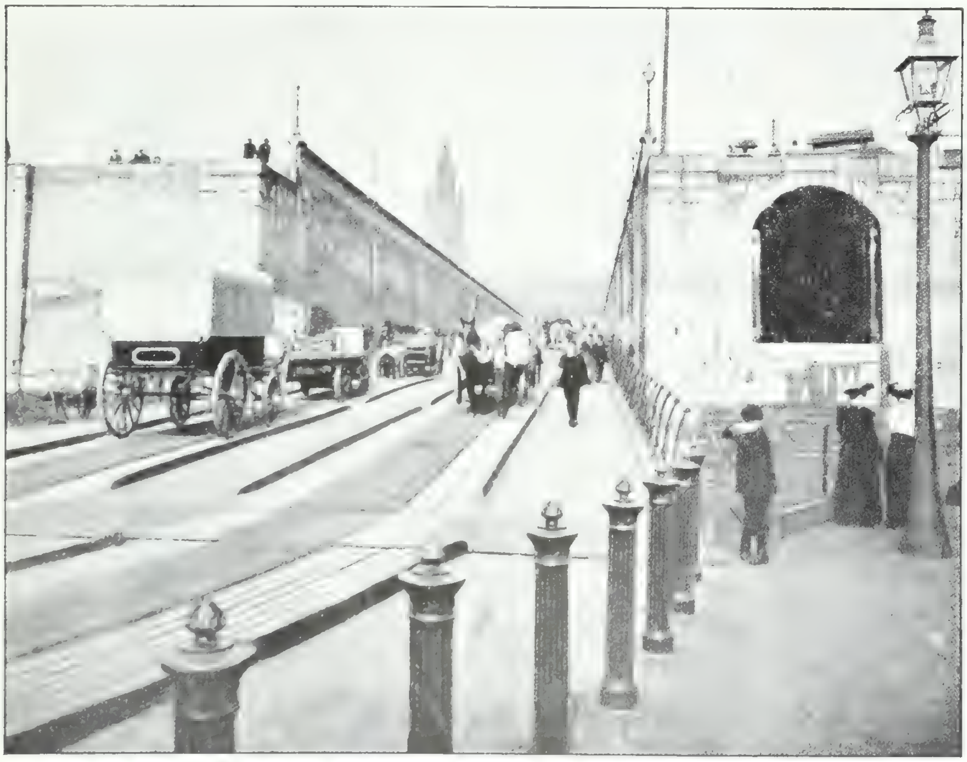
So the port, as it now exists, is based upon an old port. The original docks were in what is now the center of the dock system, and the extensions have been made both north and south from this center. The principal extensions have been to the north. It has not been considered possible to get, as in London, away from the congested areas (see plate). Speaking generally, railway communications come in from the east while the dock system runs north and south. There is no through railway communication across the Mersey, which lies west of the dock system. The growing town has formed a bottle neck through which the trade of the port has to pass. The imports into Liverpool are distributed over a much wider area than those into London. Besides food imports, Liverpool deals with practically the whole of the cotton imports required in the Lancashire district. The export trade from Liverpool is a very large one, and the exported goods are collected over a wide area. Efforts have been made to increase the amount of traffic transferred direct between the quays and the railway trucks, but the difficulty of finding an adequate space for railroad sidings is a serious one.

The Birkenhead Docks across the Mersey are worked as a part o the Port of Liverpool. These are well placed in regard to the railways for export traffic, and are used largely for this purpose by the ocean going vessels trading to the Far East. Birkenhead is not favored for import traffic. Liverpool has laid itself out especially to provide for vessels of the larger size and has incurred very considerable expense in deepening the bar, providing graving dock accommodations, deep water docks, etc. It has the bulk of the American trade. The dock system faces along the river for a distance of seven and one-half miles; the main basins running along the river foreshore. In addition there is the considerable dock system of Birkenhead, which, as before stated, is operated in connection with the Liverpool docks and is all under the Mersey Docks and Harbor Board. Also about four miles south of the Liverpool Docks, on the same side of the river, lie the Garston Docks and Estate, owned and operated by the London & Northwestern Railway Company. Garston being in close proximity to the manufacturing districts of Lancashire, Yorkshire, and the Midlands, is important as a general and coal shipping center. It is within an exceptionally short haul from the South Lancashire and North Staffordshire coal fields.

The history of the port of Liverpool is of particular interest, both as to the growth of the dock system, and the development of the port management.

General conditions are best shown by the excellent map hereto attached, from which it is readily seen that the more southerly of the dock systems are now used for smaller vessels, while the northerly docks have been improved from the early conditions, with a view to the accommodation of the largest ships. The Gladstone Docks, now in the course of construction, will be the largest of all. Even so, it will be observed from the map that the area for development along the waterfront is much restricted, and as heretofore remarked, it is so hemmed in by the town as to prevent broad treatment.

The port of Liverpool, like that of London, is under the control of a so-called trust, the Mersey Dock and Harbor Board, which represents the port interests. This board was established in 1858 by Act of Parliament and has twenty-eight members, twenty-four of whom are elected by the dock rate payers, i. e., persons paying rates and dues on ships and goods only, and the remaining four are appointed by the Mersey Conservancy Commission, who consist of the First Lord of the Admiralty, the Chancellor of the Duchy of Lancaster, and the president of the Board of Trade.


One of the Swinging Bridges to the Floating Landing Stage at Liverpool. This Floating Stage is nearly 2500 feet long and about 100 feet wide and is a remarkable piece of terminal engineering

The city of Liverpool has no direct jurisdiction. The effort is made, in making appointments to the board, to give the various trading interests in the local shipping community a proportionate representation. Up to eight years ago there was considerable friction among the various factions, due to the efforts of each to obtain a maximum number of positions on the board. Since then, by mutual understanding, a proper proportion has been reached and maintained without friction. Only in case of dissatisfaction at a decision of the local board is appeal ever made to the Board of Trade, which is an executive department of the Imperial Government and corresponds in part to our Department of Commerce.

The port of Liverpool has twenty-one graving docks, 350 feet or more in length, of which four have middle gates enabling them to be used for two ships each at separate dockings. In addition there is a graving dock 283 feet 9 inches long.

The Gladstone graving dock, in the new Gladstone section now under construction, has been built to care for the largest liners. It is 1050 feet long and 120 feet wide. It has been so arranged as to be used either as a dry or wet dock. When inspected, it was serving as a wet dock for the Cunard liner Aquitania. The pumping plant for this dry dock is of particular interest and is a very handsome installation. It is equipped with five 54-inch pumps, operated by four-cylinder, two-cycle Diesel engines, each with its own direct connected air compressor. These engines are vertical and have a rating of one thousand brake horsepower each. The combined pumping capacity of the five pumps is thirteen tons of water per minute. The entire installation has been placed at a low level in the pump-well house, two of the pumps being four feet lower than the other three in order to take the last drainage of the dry dock. Within the pump house there is a water level stage indicator, operated by means of a float inside a large pipe. This enables the engineer in charge to visualize the height of water in the dry dock while pumping. Other than four cargo cranes, hereinafter described, there was no mechanical equipment for this dry dock. The gates of this dry dock are of the sliding caisson type, electrically operated.

With one or two exceptions, all dry

docks are owned and operated by the Mersey Board, the repair jobs to ships using the dock being let out by private contract. Liverpool possesses extensive repair facilities, there being six large concerns, and as many small ones. During the war these were controlled by the British Admiralty. The repair shops are, in general, at some distance from the dry docks.

The Cunarder Mauretania in the Entrance to Sandon Docks, Liverpool

The approved method of bunkering is from barges alongside, while taking cargo. This is done by two means, namely: By separate coal barge using single whips attached to short outriggers from the ship itself, the motor power being furnished from small separate barges containing a winch operated by a donkey engine. To the single whip a basket is attached, this basket being filled by men with shovels. A notable case of this was the coaling of the Aquitania, which was spurred off from the quay and had two barges on each side. Four baskets were being used to each barge. The Aquitania was taking on 6000 tons of coal, which it was said would require four days' time. The second method of bunkering is by a mechanical elevator. There seemed to be considerably more mechanical coaling in this port than at London. Three self-contained barges and elevators were noted, the barges holding about 1000 tons of coal each, and being equipped with a chain belt elevator, running the entire length of the barge under the contained hopper. This belt discharged into an elevator hopper, which, in turn, discharged through a chute into a funnel rigged on the ship's side. A third method of coaling is in limited use at two points. First, at the Bramley Moore Dock, where the railway runs along one side and one end of the slip. At the side of the dock, a traveling crane lifts individual coal cars containing ten tons each, and discharges them into a chute, which, in turn, discharges into barges or small ships. At the end of the dock is a low level chute, supplied with coal from a tipple which inclines an individual car endwise to discharge it. The cars are shifted from the main line by turntable.

There are also cars which contain four separate boxes. These boxes are picked up one at a time and discharged. At the Canada Dock there are two types of shore loading. The first consists of a traveling revolving jib crane of 30 tons lifting capacity, which traverses the quay on a 25-foot gauge track. Single cars are pulled onto a platform by means of a capstan, lifted by the crane and tipped into the vessel alongside. The second type consists of an elevator tower. Individual cars are shifted from the main track by turntable, rolled upon the elevator platform, raised and tipped into a chute discharging directly into the vessel alongside. Each of these two devices has a loading capacity of 350 tons per hour. The bulk of the coal for this port comes in by rail. The floating equipment for coaling is privately owned. It will readily be understood that the elevator and crane methods above described are only applicable to the small British cars.

Coaling companies charge the same price for coaling by hand as by machine. One coal merchant, in particular, showed an aversion to the use of machines, stating that men wear out and other men replace them, whereas, machines are a constant source of overhead expense.

There is apparently no oil bunkering at the port of Liverpool. While there are some few oil tanks, notably along the west float at Birkenhead, these are used for the storage of oil received for internal distribution.

Warehouses, or transit sheds, parallel practically all quays, as will be seen from the map. Most of them are two stories high, the second story having hinged landing platforms that the hydraulic jib cranes running on the roofs of the buildings, or the ship's gear, may land their loads just outside the second story wall, or, with the platforms hinged down, make the landing on the lower or ground floors. These buildings vary in width from 80 to 120 feet, and are, in the main, constructed of brick and reinforced concrete with the steel columns fireproofed.

Mechanical handling equipment consists usually of traveling, hydraulic jib cranes, running on tracks on the warehouse roofs, and having a capacity in general of thirty hundred weight. Many of the warehouses have no such handlers. As compared, however, with the provision of such devices in American ports, the number of cranes is large, as shown by the tables herewith.

At the new Gladstone Dock four electric, traveling, gantry jib cranes, the forward leg running on a track near the face of the quay wall, the back leg running on a track on the eaves of the warehouses, were observed. These cranes are of considerable height, and the jibs have a length of about 60 feet beyond the edge of the quay. Practically none of the one-story warehouses was equipped inside with handling devices, although there were numerous locomotive jib cranes mounted on ordinary flat tread wheels, capable of running inside and outside the sheds.

At Langton Dock there is a 100-ton revolving hydraulic crane for extra heavy work. This is fixed at the edge of the quay, and ships have to be brought under it. One floating suction grain elevator, built since the war began, was observed.

At the Brocklebank Dock, so-called jiggers were observed in operation. These were lowering sugar bags and consisted of a single pulley with braking device. One end of the single rope was attached to a bag, which was lowered until it almost reached the truck below, where it was stopped by the brake. The other end of the rope was then attached to another bag, when the brake was released, the weight of the first bag jerking the second bag to a vertical position relieved its weight upon the upper platform, so that it was only necessary to push it off. The bag then descended until it almost reached the truck, where it was stopped, from which point the operation was repeated as before. It was observed that a considerable portion of the unloaded cargo was landed on the second floor of the transit shed, whence it was trucked across to the opposite side and lowered by jiggers into trucks. Some of the trucks draw trailers after them. These trucks were in most instances operated by steam, and several were observed weighing seven or eight tons, carrying a combined load on the truck and trailer of twelve and one-half tons.

At the King's Dock a small electric jib crane for use inside the transit shed was observed. It is mounted on flat tread

DOCK WAREHOUSES.

WAREHOUSE	No of BLOCKS	FOR STORAGE OF
Albert	5	General Produce.
Wapping	1	
Birkenhead	3	
Wool (Great Howard St.)	1	Wool.
†Stanley	2	Tobacco.
Waterloo	3	Grain and Bread Stuffs.
Birkenhead Grain	4	
Composite (N'th Side E. Float)	2	
*Wallasey	4	
*Morpeth	1	
Stanley Dock Tobacco Warehouse	1	
TOTAL	27	

† The Vaults at these Warehouses are used for the Storage of General Produce

* The Whole of the Morpeth Warehouses and the Eastern Block of Warehouses (B) on the North Side, together with the Eastern Block (C) on the South side of the Wallasey Dock now form part of the Mersey Cattle Wharf. These Warehouses are not therefore available for General Trade purposes.

SHEDS ON DOCK QUAYS.

		FLOOR AREA	TOTAL FLOOR AREA
LIVERPOOL.	Acres.	Acres	Acres.
Enclosed Sheds, D'ble and Treble Storey	82½		
,, ,, Single Storey	134½		
		217	
Open Sheds		4½	221½
BIRKENHEAD			
Enclosed Sheds		32	
Open ,,		1¾	33¾
TOTAL			255¼

DOCK RAILWAY.

	Miles.	Yards.
LIVERPOOL (including High Level Coal Railway)	45	1619
BIRKENHEAD (including Sidings on Cavendish Wharf)	47	225
TOTAL	93	84

LAIRAGES.

BIRKENHEAD.	CAPACITY	
	Oxen.	Sheep.
Mersey Cattle Wharf	6613	22000

The Morpeth Warehouses, and the Wallasey Dock Warehouses, Blocks B and C, and Sheds, Nos. 1, 2, 3, 4 and 5, now form part of the Wharf.

At that part of the Wharf known as Woodside Lairage two sets of Chill Rooms are provided with space altogether for 2085 carcases. At that part of the Wharf known as Wallasey Lairage, there are also Chill Rooms having space for 1300 carcases. All these Chill Rooms have Refrigerating Machinery capable of maintaining the rooms and their contents at the desired low temperature of 33° Fahr.

CRANES.
AVAILABLE FOR GENERAL USE.

DOCK.	HYDRAULIC		STEAM, Etc		HAND.	
	No	Power	No.	Power	No.	Power
LIVERPOOL.		Tons.		Tons.		Tons
Gladstone Dock	—	—	*4	1½(E)	—	—
	—	—	1	5	—	—
Hornby Dock	*5	1½	—	—	—	—
Langton Dock	*4	1½	—	—	—	—
Do. Branch Dock	1	100	—	—	—	—
Do. Graving Docks	1	30	—	—	2	2
	mo	vable	—	—	1	5
Carriers' Dock	—	—	—	—	1	10
	—	—	—	—	1	5
Brocklebank Dock	—	—	1	7	—	—
Brocklebank Branch	—	—	*4	1½(E)	—	—
Brocklebank Graving Dock	—	—	—	—	1	5
Canada Graving Dock	1	40	—	—	—	—
	1	1½	—	—	—	—
	mo	vable				
Do. Branch Dock, No. 1	*1	½	—	—	—	—
	9	1½	—	—	—	—
	8	1	—	—	—	—
Do. Do. No. 3	1	30	—	—	—	—
Huskisson Dock	*11	1½	†1	15	—	—
	10	1	—	—	—	—
,, ,, Branch, No. 3	*18	1½	—	—	—	—
,, ,, Branch, No. 1	*23	1½	—	—	—	—
Sandon Dock	*17	1½	—	—	—	—
	2	1	—	—	—	—
Wellington Dock	—	—	1	9	—	—
High-level Coal Railway	2	10½	—	—	—	—
	2	23	—	—	—	—
	4	24	—	—	—	—
	1	30	—	—	—	—
Salisbury Dock	—	—	—	—	1	7
Clarence Half-tide Dock	—	—	—	—	1	25
Victoria Dock	—	—	—	—	1	1½
Prince's Half-tide Dock	—	—	—	—	1	15
	—	—	—	—	1	5
Prince's Jetty	1	1½	—	—	—	—
	1	5	—	—	—	—
Prince's Graving Dock	—	—	—	—	2	2
Chester Basin	—	—	—	—	1	1½
	—	—	—	—	1	1
Canning Half-tide Dock	—	—	—	—	1	5
Do. Dock	—	—	1	8	1	9
Do. Pierhead	—	—	—	—	1	5
Albert Dock Warehouses	1	1½	—	—	—	—
Wapping Dock	3	2				
	5	1½				
	8	1	Jiggers.			
Duke's Dock	—	—	—	—	1	10
King's Dock, No. 2	—	—	*6	1½(E)	—	—
Do. No. 1	—	—	*6	1½(E)	—	—
	—	—	1	1 (E)	—	—
Queen's Branch Dock, No. 1	*12	1½	—	—	—	—
	10	1	—	—	—	—
Do. No. 2	*13	1½	—	—	—	—
Coburg Dock	—	—	—	—	1	7
Toxteth Dock	*9	1½	6	1 (E)	—	—
	4	1	—	—	—	—
Harrington Dock	*8	1½	—	—	—	—
Herculaneum Dock	1	30	—	—	1	7
	1	25	—	—	1	16
	mo	vable				
Herculaneum Graving Dock, No. 3	1	1½	—	—	—	—
TOTALS	200	—	32	—	22	—

† Steam and Hand.
* Roof Cranes.
(E) Electric.

Tables showing the Warehouses, Sheds and Cranes available for general use at the Port of Liverpool

wheels, and has a lifting capacity of 600 pounds. At another dock there is a portable belt conveyor, electrically operated, and having a high central gallows frame enabling the belt to be lifted to any angle. This machine was purchased for stacking to high elevations, but was being used for loading drays, for which it seemed well adapted.

In the Victoria section of the Birkenhead Docks, there is an electric traveling crane, the trolley of which carries a jib. The crane has three movements, the traverse, the trolley, and the hoisting operation of the jib attached to the trolley. This trolley can be run outside the wall of the transit shed in order to pick up loads from the ships. Another crane observed at Birkenhead is similar except that it has but two movements, the traverse of the trolley jib, and the operation of the hoist on the jib. This hoist is arranged to lift to a height of thirty-eight feet above the dock floor. It was observed in the process of unloading cargo. At another point electric jib cranes are attached to the wall of a transit shed on the truck delivery side. The cargo doors for the upper and lower decks of the sheds are staggered so that the jib cranes can be used to handle material to or from either without interference with the other. These jib cranes have a lifting capacity of one ton.

With the exception of two tugs, the property of the Mersey Board, and kept for fire and emergency use, all tugs and barges are privately owned. In contradistinction to the London practice, privately owned tugs enter the basins here for the purpose of shifting vessels.

Labor is paid both by the day and by the piece. In bunkering ships the labor is paid by the day where mechanical devices are used, and by the basket where baskets and single whips are used.

The average turnaround for ships is said to be fourteen days. The greatest problem is labor. In ordinary times the great problem is congestion of goods in the transit sheds. It is stated that ships come in so rapidly, and are unloaded so quickly, that the sheds become blocked with miscellaneous and unclassified goods, making it difficult to find sufficient space for loading drays. Consignees are allowed seventy-two hours to remove their goods, after which penalties accrue.

An account of the port of Liverpool would not be complete without mention of the landing stage. It has already been explained that the tide has a range between high and low of thirty-three feet. Under such circumstances it is necessary for ships to await slack high water before approaching the docks, and but for the landing stage or some similar device, passengers would have to wait at times several hours aboard ship. The stage is a floating structure carried on iron pontoons about 200 in number, the normal dimensions of each being about 80 feet long, 10 feet wide, and 6 feet deep. The stage parallels the river quay, and is held in position by a number of bridges connected with the shore and the stage by swivel joints and by mooring chains, the shore ends of which are in the river walls. The level of the deck of the stage is about six to eight feet above the water. For the ordinary river ferry, gangways are arranged in fixed positions, but for the trans-Atlantic and other ocean-going vessels, movable gangways and high level bridges, adapted to the towering decks of ocean steamers, have been provided. The total length of the floating structure is 2478 feet, so that several large ships can be accommodated at one time.

Liverpool is well equipped with warehouses for various classes of traffic. The tobacco warehouse at Stanley Dock is 125 feet high, and has a total floor area of 36 acres, or a working capacity of 70,000 hogsheads. There are many other warehouses for special purposes, such as grain, wool, etc.

It is very evident after a visit to the port of Liverpool, and a talk with its managing directors, that the community is very much alive to both future possibilities and present conditions. It recognizes its weakness as well as its strength, and is free to express its regret that the growth of the city itself has so restricted the space for docks, and for co-ordination of these docks with the railways. It is safe to say that had it the available space it would use it for the construction of the most modern terminal system.

SHIP SUBSIDY IN JAPAN

In marked distinction to the United States, Japan has consistently encouraged shipbuilding and shipping since the ports of the empire were opened to the world seventy years ago by Commodore Perry. Until the necessities of war created an American merchant marine the extent of that governmental assistance was not of great concern to the general public of the United States; there was a vague knowledge that subsidies were given by the empire; otherwise, little attention was paid to the effect of such subsidies on Pacific shipping. Now, however, with the recent awakening of a merchant marine sentiment and the passage of the Jones act, Japanese subsidies have assumed a greater importance.

The first Japanese navigation subsidy, as opposed to a shipbuilding subsidy, was embodied in a law of 1896, which remained in effect until 1910, when another act was passed. Under this later law millions of dollars have been paid each year, the budget for the year, April, 1919, to March, 1920, having contained the following maximum amounts: Nippon Yusen Kaisha, European line, yen 1,569,672; North American services of the Nippon Yusen Kaisha, Osaka Shosen Kaisha and Toyo Kisen Kaisha, yen 2,509,187; South American line, Toyo Kisen Kaisha, yen 269,350; Australian line, Nippon Yusen Kaisha, yen 188,497; Java line, Nanyo Kisen Kaisha, 220,000. There is every indication that the fixed policy of the Japanese government will be to continue granting subsidies, both to existing lines and to others that may be established. In view of this and of the place these subsidies have assumed in international economic relations, a translation of the act of 1910 will be of interest, especially since few translations into English have been made. The law, without various regulations that have been issued by the Department of Communications, follows:

Article 1. The competent minister may grant a navigation subsidy in accordance with the stipulations of this law to a commercial company, the partners or shareholders of which are solely Japanese subjects during a period not exceeding five years, so that it may engage in navigation on some of the following lines. Provided, the amount of the subsidy to be given and its duration to be referred for the approval of the Diet.

European Line. North American Line. South American Line. Australian Line. The "subsidized navigation" mentioned in this law refers to the foregoing regular lines.

NOT OLDER THAN FIFTEEN YEARS

Article 2. Ships to be employed in the subsidized navigation shall be steel vessels not older than fifteen years, 3000 tons or more of total tonnage, with a speed of twelve miles or more an hour, qualified within the shipbuilding regulations framed by the competent minister and registered as Japanese ships. The speed of ships shall be calculated by a method to be determinedmined by the competent minister.

Article 3. A ship built in a foreign country cannot be employed in the subsidized navigation. Provided, in case a foreign-built ship was less than five years of age when she was registered as a Japanese ship, and special permission of the competent minister has been obtained reregarding her use on a subsidized line owing to unavoidable circumstances, the above stipulation shall not apply.

FIFTY SEN A GROSS TON

Article 4. The amount of subsidy to be given to vessels having a speed of twelve nautical miles an hour shall be at the rate of not exceeding 50 sen a ton gross of the vessel used, for every 1000 nautical miles, with an extra subsidy not exceeding 10 per cent of the above sum for the additional speed of one nautical mile an hour; the amount to be fixed according to the conditions of the line. The subsidy is reduced in respect of vessels whose age exceeds five years on a graduating scale of 5 per cent each year. As regards foreign-built vessels, one-half the amount of subsidy to be granted in accordance with the foregoing stipulations shall be given. As regards the vessels built according to special plans approved by the competent minister or those vessels put on a regular line which has not yet reached the fifth year since its opening, an extra subsidy may be given at a rate not exceeding 25 per cent of the amount to be granted according to the stipulations of the two foregoing clauses. The calculation of subsidy shall be made out according to the shortest route between each port and a fraction of a ton or mile shall be left out of account.

SANCTION REQUIRED FOR RATES

Article 5. Passage and freight rates on the subsidized lines shall be fixed with the sanction of the competent minister. When the competent minister thinks it necessary, classes of goods to be carried may be specified and the reduction of passage and freight rates may be ordered.

Article 6. Ships to be used on the subsidized lines shall be subject to the selection of the competent minister; mails and postal supplies carried free of charge; equipment be made for wireless communication, and officials dispatched by the competent minister on communication business and the inspection of the routes of navigation shall be carried free of charge.

Article 7. Those who engage in the subsidized navigation shall carry out arrangements which are necessary for the maintenance of the regular lines in compliance with the requirements of the competent minister.

MUST KEEP CADETS

Article 8. Those who engage in the subsidized navigation shall keep cadets on board the regular liners at their own expense at the following rate: four cadets on a ship between 3000 tons and 5000 tons; five cadets on a ship between 5000 and 8000 tons; six cadets on a ship over 8000 tons.

Article 9. Those who engage in the subsidized navigation shall not be allowed to employ foreigners at their head or branch offices or on board their ships unless the permission of the competent minister is obtained. In case vacancies have been caused among the men employed on a ship while she is in foreign waters owing to death or other circumstances, these vacancies may be filled irrespective of the foregoing stipulation. In this case the fact shall be reported to the competent minister by those who are engaged in the subsidized navigation or the captain and the necessary permission obtained.

UNDER GOVERNMENT SUPERVISION

Article 10. Those who engage in the subsidized navigation shall, in accordance with an order of the competent minister, produce an account of receipts and expenditure relating to the subsidized navigation and a report of the business condition. When the competent minister deems it necessary, officials may be dispatched to the head or branch office or agency or on board the ship employed by those who engage in the subsidized navigation and cause an inspection of the account of receipts and expenditure or business condition. In case of the inspection as mentioned in the foregoing clause, those who engage in the subsidized navigation shall report all matters relating to business as required by the inspecting officials and produce all the books and papers for their inspection.

Article 11. The competent minister may requisition or employ for public purposes ships employed on the subsidized lines at proper compensation. The foregoing stipulation shall be applicable in respect of ships employed on the subsidized lines during the three years after they have finished the last voyages on the lines. Those who are not satisfied with the amount of compensation may institute legal proceedings in an ordinary court of law within three months after the receipt of notice regarding the requisition or employment of their ships. The institution of legal proceedings mentioned in the foregoing clause, however, shall not suspend the requisition or employment of the ships.

SALE TO FOREIGNERS FORBIDDEN

Article 12. Any ship employed in the subsidized navigation shall not be sold, chartered or mortgaged to a foreigner during the period she is in receipt of the subsidy or within three years after the conclusion of the last voyage. Provided, this provision shall not apply when the subsidy granted on the ship has been refunded, when she has become unseaworthy on account of natural disaster or other uncontrollable agency, or when the permission of the competent minister has been obtained.

Article 13. The following matters shall be determined by the competent minister: The starting point, terminus and ports of call of a subsidized line. The number of ships to be employed on the line, gross tonnage, speed, age of ships, and matters regarding to substitute ships. The number of voyages, days to be spent in a voyage, and matters regarding dates of arrivals and departures. The method by which the subsidy is to be paid. The reduction, suspension, cancellation, refunding of the subsidy owing to the non-fulfillment of a contract and matters relating to the settlement of a dispute.

Article 14. The competent minister may give an order to the agent or captain regarding the carrying out of a contract by those who engage in the subsidized navigation.

FINES FOR REQUISITION REFUSAL

Article 15. Those who have refused the requisition or employment of ships as stipulated for in Article 11 or those who have infringed the stipulations of Article 12 shall be liable to a fine of over yen 200 and not exceeding yen 1000, and required to refund the amount of money corresponding to the subsidy granted on the ship. The refundment referred to in the preceding article shall be collected in the same way as the payment of national taxes left in arrears. The government shall have the right of priority in respect of such refundment next to national taxes.

Article 16. The provisions of law No. 52 issued in 1900 shall apply correspondingly in regard to offenses stipulated in this law and other orders issued in relation with this law.

Supplementary Rules: This law shall come into force on and after January 1, 1910. The Navigation Encouragement Law is abolished. Provided, in case of ships in course of building with the object of receiving the bounty at the time when this law is promulgated, the bounty as stipulated in the law shall be paid in respect of such ships until September 30, 1914. No subsidy stipulated for in this law shall be given in respect to the ships which received the bounty as mentioned in the preceding clause. The stipulation of Clause 2 of Article 4 of this law shall not apply as regards foreign-built ships which had been registered as Japanese ships prior to September, 1899.

View of the Waterfront of the Kawasaki Dockyard Company at Kobe

KAWASAKI OF KOBE

Of all the Oriental yards building vessels for the United States Shipping Board on its present program, the Kawasaki Dockyard Company, of Kobe, was given the largest contract, both in number of vessels and aggregate tonnage. The Kawasaki contract was for five vessels of 9000 deadweight tons each Eastern Moon, Eastern Ocean, Eastern Planet, Eastern Dawn and Eastern Cloud), an aggregate of 45,000 tons, or more; as compared with the Osaka Iron Works' contract for four vessels of 10,500 tons each and the Kiangnan program at Shanghai of four of 10,000 tons each, which were its closest rivals.

A GREAT SHIPBUILDING YARD

By right of size and importance, the Kawasaki yard was entitled to this leadership. It vies with the great Mitsubishi plant at Nagasaki for the title of premier yard of Japan. Long established, builder of merchant ships, of battle-cruisers and superdreadnoughts for the Japanese navy and of locomotives and cars for the Imperial railways, owner of four plants and of a large shipping company, the Kawasaki group has a peculiarly strong position in commercial Japan. Any corporation that in normal times employs 18,500 men, not to mention crews of steamships, commands prestige. Besides the main shipyard at Kobe, which employs 16,000 men, the Hyogo foundry and forge shop and the Fukiai rolling mill, situated a few miles distant, employ 2000 and 500 men respectively; and finally 1000 Chinese are employed at the Dairen repair plant.

All the five Kawasaki vessels for the Shipping Board were sisters to the standard stock ship built by the yard since October, 1915: approximating 9100 tons deadweight; 398 feet in length over all; beam, 51 feet; depth, molded, to main deck, 36 feet; 8 feet 'tween decks; single-screw; having triple-expansion engines; a guaranteed full-load speed of 10½ knots an hour; drawing 27 feet 1 inch mean, even keel, on full-load summer draft. The sisters have been making 10¾ and 11 knots, loaded, and 14.2 and 14.3 on light draft of eleven feet, having only enough ballast to trim. There are five hatches, including one spare bunker hatch, and, serving them, two masts and ten winches and derrick posts at the foremast. The gross tonnage is about 5800.

A SUBSIDIARY STEAMSHIP COMPANY

The Kawasaki Kisen Kaisha has been a source of great strength to the parent company. Ninety-nine per cent of its stock is owned by the Kawasaki yard, the remaining 1 per cent having been divided among the principal officials of the steamship company to enable them to qualify as directors. With this company always in reserve, the Kawasaki yard was enabled, from the beginning of the war, to build merchant vessels solely for its own account, with the exception of the Shipping Board vessels, a Siamese yacht and one small freighter. These aside, all the vessels were for the Kawasaki interests and were taken over by the Kawasaki Kisen Kaisha or sold elsewhere. By the middle of 1919 twelve vessels had been sold British and eight American, of sixty-four launched since the beginning of the war. In 1918 the yard launched thirty vessels, all of which were 9100-tonners except the yacht for the Siamese government; and the 1919 output was approximately the same in number and in composition, as there were only two vessels, each of 6400 tons deadweight, that were not standard stock. It was the intention of the management to build two or three vessels a month for an indefinite period, although the recent depression in Japan may have changed its plans.

MUCH TONNAGE TO K. K. K.

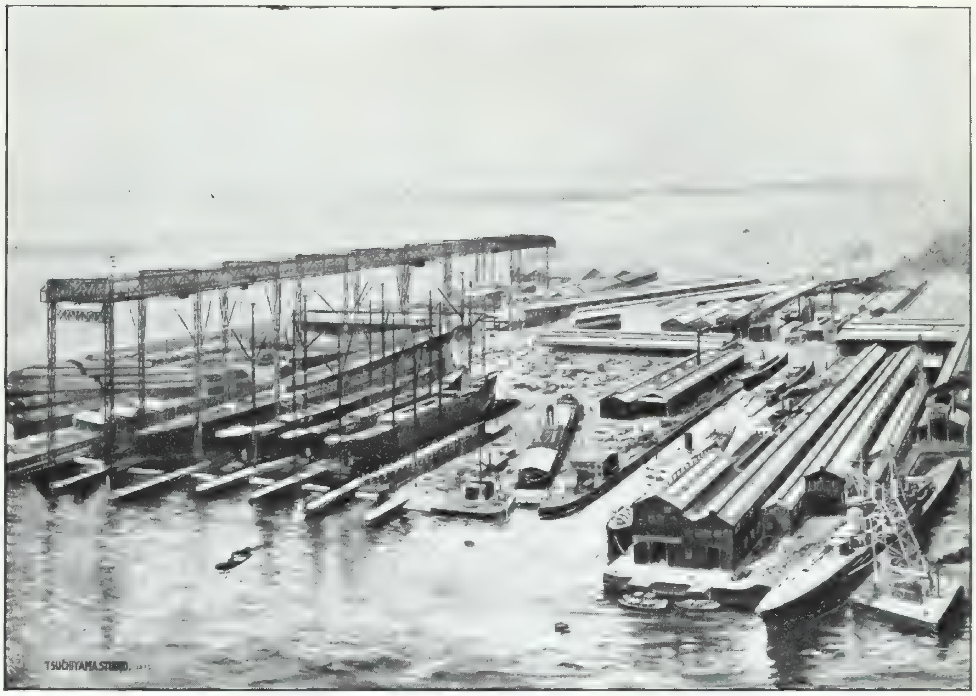
The Kawasaki Dockyard turned over more tonnage to the Kokusai Kisen Kaisha than did any other Japanese builder—approximately 275,000 tons deadweight. The Kokusai Kisen Kaisha was organized by Kakaichi Uchida, former vice-minister of communications, to take over and to operate surplus vessels held by the Japanese yards.

In addition to this merchant building, Kawasaki has done much naval work for the Japanese government. The yard delivered, in December, 1917, the superdreadnought Ise, 32,600 tons displacement, the last capital ship of the old program and at that time the largest vessel of the Japanese navy. Except for the armorplate, guns and turrets, the Kawasaki yard built her completely. Another ship of the line was the battle-cruiser Haruna, 27,600 tons displacement, launched in 1914. All in all, the yard has an annual maximum capacity of about thirty 9100-ton stock vessels, aggregating about 273,000 tons.

BUILT THE YASAKA MARU

The largest merchant vessel built by the Kawasaki yard was the Nippon Yusen Kaisha liner Yasaka Maru, 12,000 tons gross, 21,000 displacement, which was torpedoed and lost in the Mediterranean during the war. This was one of the heaviest losses, if not the heaviest, suffered by Japan.

There are five permanent ways, concrete on wood piling, and two temporary ways at the main plant. The maximum length and gross tonnage of vessels that can be built on the permanent ways is: No. 1, 410 feet, 4000 tons gross; No. 2, 475 feet, 7000 gross; No. 3, 550 feet, 20,000 gross; No. 4, 720 feet, 35,000 gross; No. 5, 530 feet, 18,000 gross. Nos. 3, 4 and 5 are served by gantry cranes, the length of the tracks being 996 feet; working length, 1015; width, inside pillars, 116.6; height, 164.6. There are sixteen derrick-posts for the other ways, handling weights up to five tons and electric-motored. Of the gantry cranes, one is of thirty tons and six are of seven tons. Of the five locomotive cranes, one is five-ton and the others range from one to one and one-half tons. Heavy lifts, such as boilers, engines, armor-plate and guns, are taken by the 200-ton floating crane. There are two other floating cranes, of fifty and fifteen tons. Besides minor equipment, the turbine shop has two seventy-five-ton overhead traveling cranes.


TSUCHIYAMA STUDIO.

Birdseye view of the Plant of the Kawasaki Dockyard Company at Kobe, taken from an artist's drawing

BUILDS VESSELS COMPLETELY

Except for patented fittings, and angles and beams exceeding six inches, the Kawasaki yard can build and engine a merchant vessel completely. It does not make armor-plate for men-of-war. The Fukiai plant probably will be equipped to turn out six-inch angles.

The principal hull shops at the main plant are: two compressor, two power, joiner, bending slabs, mold lofts, fitters', blacksmith, rivet, coppersmith, galvanizing. The engine shops include: mold, iron and brass foundry, engine, erecting, tool, copper and brass, testing, boiler, pipe and forging. The last has eight steam hammers, the heaviest being five tons. At no time do the ways tax the capacity of the engine and boiler shops, which can equip all the vessels launched. A fair average output of the engine shop is about three a month, some of which are twin-screw, but most of which are single. Six boilers, Scotch and watertube, are built a month. Curtis turbines are made for men-of-war, but only one merchantman built at the Kawasaki yard has had turbines—the Sakaki Maru, 3500 tons gross, constructed in 1913 for the Japanese Volunteer Fleet. This demonstrates the degree to which Japanese owners favor reciprocating engines. In fact, the T. K. K. liners Shinyo Maru and Tenyo Maru are the most conspicuous turbined vessels of the Japanese merchant fleet.

STEEL FOUNDRY ESTABLISHED

Ten years ago the Hyogo steel foundry and forge plant was established. It has five 25-ton Siemens-Martin furnaces and a bar and press mill. In one day of twenty hours, or two ten-hour shifts, it can turn out about 150 tons of steel castings, of a maximum size of fifty tons. There are two hydraulic presses, of 2500 and 600 tons, respectively. The maximum locomotive output annually is about 130; but in addition Hyogo builds railway and street railway coaches and freight cars. Cranes are built only for the yard's own use. Shortage of Japanese pig iron forces the Hyogo mill to use pigs from many sources: India, America, Norway, China, Manchuria, as well as Japan.

At the Fukiai mill all sorts of ship and boiler plates are rolled: ship and tank from 3/16 inch up and 8 by 30 feet, maximum; and boiler from 3/8 inch up and 8 by 30 maximum. There are three rolls. The first plates were turned out in July, 1918. Square bars range between ½ inch and 4 inches; round, up to 4¼ inches; angles, between 1 and 5 inches; channels, between 3 and 6 inches; I-sections, between 3 and 5 inches. Among the castings and forgings made are: rudder frames and stocks, stems, bracket shafts; wheel axles and centers; bridge girders; blooms; billets. In general, the plant would undertake to fill orders for all descriptions of both castings and plates. However, America remains the principal source of supplies, because Japan is sorely in need of pig iron.

At the main plant there is a graving dock, 420 feet in length (380 on the blocks); 22 feet deep on the sills at high tide; 64 feet wide at the top and 52 at the bottom; capable of accommodating a vessel drawing about 21 feet.

THE WEBB LAW IN OPERATION

By E. J. BARTELLS*

TWO years ago, on April 10, 1918, the Congress of the United States passed a law entitled "An Act to promote the export trade and for other purposes," commonly known as the Webb-Pomerene law. Two years is not a long time in the export trade and consequently a wealth of experience has hardly as yet been gained. The subject of this paper is the "Webb Law in Operation" and is therefore a topic which can be more fully discoursed upon at some later date. This law, having been so recently placed upon our statute books, gives small opportunity for retrospect. We may, however, take a look into the future and contemplate the possibilities of combining for export or foreign trade under the provisions of this act.

The law in operation presupposes the organization of certain combinations of competing manufacturers who are seeking by this means to take full advantage of the situation thus created. Various types of organization may be effected. The particular one selected in any case should depend upon the conditions peculiar to the industry and on the objects to be attained. Three types have been outlined which seem to meet all conditions. Briefly they are as follows:

THREE TYPES OF COMPANIES

Type No. 1—The Incorporated Stock Company.—In this combination the participating manufacturers subscribe to the stock of the corporation and are to all intents and purposes shareholders in the ordinary acceptance of the term. The affairs of the corporation may be managed by a board of trustees in accordance with the by-laws duly adopted. All sales are made through this company and orders are procured through or by it for the various stockholding members. The company undertakes the promotion and propaganda work and is the sole point of contact between the industry and its foreign trade. This combination is recommended as giving promise of the most effective operation and of producing the best results.

Type No. 2—Subsidiary Export Companies.—This type presupposes the organization of a subsidiary export corporation by each manufacturer and the forming of an association of export corporations for the purpose of agreeing upon prices, terms of credit, allotment of territory, etc. Each subsidiary export company, however, carries on its own propaganda and maintains its own sales force, agencies and representatives.

Type No. 3—Tentative Association.—This type is a tentative association, organized for the investigation of foreign fields, and is the forerunner of such an organization as type No. 1 or No. 2. The final decision as to permanent organization is reserved until a preliminary survey of the foreign market field has been completed.

You need not be reminded that the object of any or all of these associations or combinations is exactly identical—more business at a profit. In order, however, that this object may be attained, it is quite essential that the problem be attacked in a broad-minded manner, never losing sight for an instant of the fact that if your own foreign trade is to prosper, our foreign trade as a nation must necessarily grow in a corresponding degree. That is to say, if the expectation of any industry is to be realized, the expectation of the country as a whole must also be realized.

MARKETS AND MERCHANT MARINE READY

We have heard a great deal, read a great deal, and some of us have talked a great deal, of the wonderful opportunities now at hand for developing the foreign trade of the United States. The American dollar is now quite widely accepted as the basis on which exchange must be calculated. Our banking institutions are well equipped to assist in problems of finance and in extending credits where required. We have waiting markets, we are acquiring a merchant marine, we have capacity for production, we have the raw materials, we have learned our lesson in foreign selling—that we cannot force the buyer to take what we want him to take, but we must, in a great many cases, sell him what he wants in the way he wants it, or someone else will. We have manufactured and sold in this country many articles which are as yet unheard of in many foreign lands, but which are easily adapted to many of their requirements; we have American ingenuity and resourcefulness, of which we are justly proud, to assist us when confronted with new problems.

WE MUST CO-OPERATE

What, then, do we need to make sure that our desire for a dominating position in world commerce may be realized? The answer is "co-operation." Follow an order of goods from the time the first sales talk is made, or sales letter is written, to the time when the goods sold are in the possession of the purchaser and are paid for. Think for yourself of the successive steps to be taken and of the many parties that may be asked to co-operate in order that you may complete the sale.

We will assume, for the purpose of this paper, that full co-operation is had as between the various banking, commercial and transportation agencies necessary to the transaction. There is still one factor which we are now asked to consider and to make use of to the fullest extent: the co-operation of the United States government through the Federal Trade Commission. This body has been charged with the administration of this law, to construe its many provisions and to promulgate from time to time recommendations to Congress for its modification or change.

WHAT THE COMMISSION SAYS

On what will the Federal Trade Commission base its several decisions and where will it turn for information to assist it in the administration of the law? The question is answered by the commission itself in a pamphlet recently issued on this act. I quote as follows:

"The commission's investigations of foreign conditions, practices, and combinations in foreign countries and its recommendations to Congress thereon will be greatly facilitated by American exporters keeping the commission informed of their experiences and instances where their export business is restrained or injuriously affected by any matter or in any manner."

The Federal Trade Commission, by this statement, has placed a great responsibility upon the export associations and it should be gladly assumed and merited.

HOW CAN EXPORTERS AID?

The question now arises as to how the American exporters can be of greatest assistance to the commission in the promotion of our foreign trade as a nation. The answer to this question is "co-operation among the various Webb law associations." It is easy enough to make up combinations whose sole purpose is the development of business in the foreign field. It is another matter to get a group of manufacturers together and to convince them that they should forget, to some extent at least, their pride in their particular product in order that they may unite with others manufacturing similar products, for co-operation in foreign propaganda. We find in this country a great many manufacturers who have developed trade-marked goods and hesitate to submerge their individuality in the foreign field, overlooking entirely the fact that the benefits of co-operative efforts far outweigh any particular advantage which the establishment of their trade-marks has given or may give them. The convention will be a success if it succeeds in pointing out the many advantages which are now offered by the Webb law in operation, and establishing in the minds of those persons who are now directing the various trade organizations, the benefits to be derived from co-operative exploitation of the foreign field in accordance with this law.

FEW SUGGESTIONS FROM GOVERNMENT

American business has at times been hampered by reason of the fact that some governmental agencies have spent a great deal of the time in advising what could **not** be done, but, on the other hand, very few suggestions were ever made pointing out what could be done. The Federal Trade Commission now proposes to go hand in hand with the Webb law associations and to point out as far as possible in advance, the lines along which these associations should proceed. In order that the Webb law associations and the Federal Trade Commission may render each other the fullest assistance and that mutual confidence may be established, some means of direct contact must be provided. I believe that we should have an association of Webb law associations or an association of Webb law association managers, the object of either being to place at the disposal of the Federal Trade Commission all the resources of the member associations and to avoid as far as possible delays and waste of time incident to the calling of large meetings or conventions, the dates of which must necessarily be far apart. Such an organization could be closely knit, each Webb law association having a delegate or other representative; an executive secretary should be appointed, and a central office maintained, through which the Federal Trade Commission may communicate with the Webb law associations at a minimum of expense and in the shortest possible time. At the request of the Federal Trade Commission, or otherwise, the executive secretary could call meetings of the board of trustees. The further details of organization could be easily arranged for by a committee appointed for that purpose.

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*Manager Wood Pipe Export Company, address delivered at the Seventh National Foreign Trade Convention.

CO-OPERATION WOULD BE WELCOMED

That the co-operation of such an organization would be welcomed by the commission is evidenced by the following quotation from the pamphlet referred to:

"The commission is authorized by this law to make recommendations as to how export associations may conform their business to the law, and within its powers, it proposes to advance step by step in aid of the export needs of the country. It desires to constantly work in co-operation with those who form export associations and also with those who may consider themselves or the public in any way injuriously affected by the methods and practices of such associations."

The attitude of the Federal Trade Commission toward business and its policies in the administration of the Webb-Pomerene law is strictly constructive. The manufacturers in this country desiring to engage in export trade and to avail themselves of the provisions of this act should enter whole-heartedly into the fullest co-operation with the Federal Trade Commission.

IN A DOMINATING POSITION

"If absolute frankness and straight-forwardness is adopted as the watchword by all parties interested in the operation of the Webb law, the United States will be placed in a dominating position in the world trade at no distant date.

"In closing I want to state that the Webb-Pomerene law must be regarded as a notable instance of constructive legislation and that the Federal Trade Commission, whose duty it becomes to administer the law, has asked our assistance and has offered us a partnership with the United States government in devising the best ways and means by which our foreign trade may be further developed and advanced. Never before has such an opportunity existed for us abroad.

"Now that we have a law well adapted for American commercial expansion and an administrative body ready and eager to give the American manufacturer and merchant the full benefit of that law, the fault will be ours if we do not achieve a full measure of success. By co-operation, coupled with broad-mindedness, we cannot fail to reach the goal."

AMERICAN MARINE INSURANCE

By HENDON CHUBB[*]

IN 1918, at the request of the Foreign Trade Council, I read a paper dealing with the development of American marine insurance. At that time marine insurance was not only fulfilling its normal function of providing protection against marine risks, but it was also carrying that emergency function, which during its history it has been called upon at irregular intervals to fulfill: that of affording indemnity against losses due to war perils, and this under such conditions that the experience of former wars afforded no just parallel.

OLD DUTY REMAINS

That time has now passed and although the war has left us a legacy of special hazards, such as loss by mines and those consequent upon the political and social upheavals of many countries, yet the emergency responsibility has practically passed and with it the stimulus produced by the necessarily high war rates. There is left to marine insurance the old duty and responsibility of providing merchants and shipowners adequate indemnity against loss by marine perils for an equitable consideration. This duty, less spectacular than that of the war, is none the less of prime importance to foreign trade.

Foreign commerce is enjoying the attention of the nation to a far greater extent than ever before. The necessity of making wise provision for our large mercantile marine, built under war emergency, is engaging the attention of the nation and will require the nation's best thought for the sound solution of its problems. Marine insurance which before the war functioned quietly and unaggressively, accepted and considered only by those using it, is now receiving the reflection of the interest in the two foregoing subjects, to both of which it is a necessary complement.

IN NEW YORK AND SAN FRANCISCO

In response to this general interest I shall endeavor to picture to you how American marine insurance is functioning; how it is fulfilling the obligations resting on it at the present time, and to what extent and in what way it may be expected to meet the necessities and obligations which may be imposed upon it in the future by American commerce and the American mercantile marine.

The marine insurance market in America centers in New York, except that there is an independent and well-developd market for West Coast business that centers in San Francisco. The market may, for the purposes of this paper, be considered under three divisions, although in the placing of risks the division between the first two is scarcely recognized by the insuring public. These are:

1. American Companies.—In the New York market there were at the commencement of last year some ninety-four companies with marine and inland premiums of $181,000,000, but according to the report of the congressional committee a number of these companies did no ocean business; the total number actually doing a direct ocean business being sixty-two, with an ocean marine premium of something over $70,000,000. In 1912 there were thirty American companies doing marine and inland business, with a premium of $20,000,000, but there is no means of knowing what proportion of these companies did ocean business or what proportion of the premium would come under the classification of ocean. The want of data for the division of business of 1913 makes an accurate comparison impossible, but this much is certain, that in six years the number of American companies doing a marine business increased from less than thirty to sixty-two, and that a premium income of less than $20,000,000 has increased to over $70,000,000.

FOREIGN COMPANIES IN AMERICA

2. Foreign Companies.—Among these companies are many that have been doing a marine insurance business in this country for many years; others have entered the business under the stimulus of the larger business brought about by war risks and the tremendous advance in insurable

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[*] Of Chubb & Sons. Address delivered at the Seventh National Foreign Trade Convention.

values of vessels and commodities. At the commencement of last year there were fifty-five of these foreign companies admitted to the state of New York for marine and inland business. Of these probably not exceeding forty transacted ocean marine business, with a premium income for ocean marine business only of $39,000,000. In 1912 there were twenty-nine such companies doing a marine and inland business, with a premium income of $13,800,000, but as in the case of the American companies of the same time, there is no way of knowing what proportion this premium income was from ocean business only.

MANY ESTABLISHED FOR YEARS

Many of these companies have been established in the United States for years. Under our insurance laws they have to make statements based solely on their United States assets and are required to maintain these assets in the control of American trustees and subject only to the demands of American policyholders, and in sufficient amount to take care of all their liabilities in accordance with insurance department standards. In some cases these companies are managed by managers that have been sent out from the head office; in others they have been affiliated with management representing American companies or have placed their management in the hands of American underwriters. As regards the United States business accepted by their American departments, they are subject to the same restrictions, taxation and supervision as the American companies doing the same class of business.

3. There is a market afforded by means of brokers having correspondents in the various insurance centers of the world—London, Paris, Copenhagen, etc., and, before the war, Germany. Orders placed in these markets were placed with companies which are not subject to the regulation or taxation of the states and which cannot be sued in the United States. What proportion of the business is placed in that way there is no means of knowing; and the estimate of various experts differs widely. While it is probable that considerably less than 5 per cent of the insurance on cargoes is placed in this way, yet it is also probable that at the present time a very considerable portion of the insurance on vessels is placed with these foreign insurance markets.

Time precludes my dealing with the question of reinsurance and the method of its division among the groups referred to, nor have I attempted to separate those American companies owned by foreign companies (some six in number) from the other American companies. But the foregoing will have given you an idea of the existing market as it concerns the merchant or shipowner.

The two main heads that marine insurance naturally divides itself into are:

First: cargo insurance, which comprises the insurance on exports and imports.

Second: hull insurance, which is the insurance of the vessel itself.

Taking up the consideration of cargo insurance: The situation is that any importer or exporter can, except possibly in a few unusual cases, obtain in this market full protection on terms and under conditions that compare favorably with those obtainable by any foreign competitor, using either American companies or foreign companies domiciled here and in all ways subject to our laws; the choice resting with him as to which company he will use; the choice of the shippers being represented by the fact that this premium income is divided, according to the congressional report, 64 per cent American companies, 36 per cent foreign companies. Not only does this market cover about 95 per cent of the business placed by American importers and exporters, but the amount of business so placed bears a very satisfactory relation to the whole volume of import and export business of the United States. In making that statement I refer to the fact known to all of you that marine insurance on cargo may be controlled and provided for either by the shipper or by the consignee; so that, if any country covers in its own insurance market 50 per cent of its combined imports and exports, it would seem to be about what could fairly be expected. There are no figures available to show these percentages, but judging from a very wide experience, I know that by far the majority of our export shipments are covered with marine insurance placed here, and that by far the larger part of our imports come in protected under marine insurance arranged by the buyer and placed in this market, and that the total placed far exceeds the 50 per cent above referred to.

HULL INSURANCE DIFFERENT

Hull insurance: The situation as to this is different. A large portion of this business is placed in foreign markets with companies who pay no tax to this country and are in no way subject to the regulations of the state insurance departments. There are no figures available which make it possible to say what this percentage is; but while it is considerably less than it was twenty years ago, or even five years ago, it is probably more than it was two years ago. There are many causes for this and I give three that seem to me the most important:

(a) The relatively small volume of American hull insurance has operated to give to the foreign underwriter, insuring a larger and more diversified fleet, a much greater volume of this special business, and consequently a greater diversity of hazards and a more favorable basis for average and has created a wider market.

(b) The fact that the American brokers in placing American hull business did so through the agency of a foreign broker, the value of whose local business probably would be of assistance should his American business show little or no profit.

(c) The fact that the over-regulation and taxation of American marine insurance as compared with that existing in other important maritime nations has been especially burdensome on hull insurance.

TAXATION OUTLOOK NOT ENCOURAGING

If the war-built fleet now in the hands of the Shipping Board is sold to American firms and corporations, as now seems possible, then the disabilities referred to in (a) and (b) will be largely removed. Those referred to in (c) are most difficult to deal with. The matter is in the hands of the states, and each state has made its own laws with little regard to those of other states. The Shipping Board and the congressional committee that have been investigating this, both appreciate the need for change and revision and have represented this to the various states and there is some hope for a greater uniformity as regards regulation; although such reform, necessitating as it does action by the legislatures of various states, is difficult to obtain. The outlook as to taxation is less encouraging. With state expenses mounting and prohibition reducing state revenues, it is hard to be optimistic as regards any possible action looking to a reduction of taxation, no matter how discriminatory it may be in a business necessarily engaged in world competition.

I have shown what I regard as the situation from the public's point of view, and I now turn to that of the insurance companies.

The end of the war found the American market much expanded, partly by the introduction of new foreign capital, but more particularly by the increase in the number of American companies doing marine business. This market had on the whole made very considerable profits out of war risk insurance. While it is difficult to ascertain, it is probable that marine insurance, apart from war risk, during the war period, showed a fair margin of profit.

SOME EXPANSION IN HULL INSURANCE

It is now eighteen months since the armistice was signed, and the situation in marine insurance has, during that time, considerably changed. In the first place, the war risk insurance premiums have practically ceased, although continued to a modified extent in the insurance against the mine risks or against the possibilities of new wars or civil disturbances; but as compared with their volume during the war, they may be said to be nominal. On the other hand, the renewed activity in shipping for private account and the continued high prices of commodities have led to a very considerable expansion in the premiums for cargo insurance, and while there has been no general sale of government ships to private owners, yet there has been some expansion in the volume of hull insurance.

Now as to the hazards: They certainly have materially changed since the before-the-war period.

HAZARDS HAVE INCREASED

I do not think that any man connected with steamers will fail to recognize that under the present conditions, with steamers built for a trade often replaced by vessels built for an emergency; with engines of new design and watertube boilers replacing those with which the engine crews were most familiar; with discipline relaxed to a notable extent through the changes brought about by war, making every allowance for any advantage that may come from the more general introduction and use of wireless equipment, that on the average the hazards are greater than before the war. When you add to this the greater congestion in ports, the longer delay in unloading, carrying with it an increased fire hazard, the marked increase in thefts (a peril now generally included in the policy), you must inevitably come to the conclusion that the percentage of loss will be higher than before the war.

RATES SOMETIMES BELOW COST

Now to face this increase in hazard, which I firmly believe exists, you have a market that has been expanded and developed by a large and, on the whole, profitable war risk business which no longer exists—a market which the world over has expanded so rapidly as to outstrip the supply of men fitted by training to handle the complicated work of underwriting. The result is that today in certain classes of business, through competition and the folly of underwriters, rates have in many cases been reduced below cost. Further, it is not solely a national condition but to some extent it is an international condition, brought about by an over-stimulation of world facilities consequent upon the war. On the whole, it will have to work itself out internationally, because in international trade no important insurance market can be altogether independent of the other insurance markets unless the insured is likewise independent of the competition of the foreign market in the sale of his merchandise.

REAL CONCERN TO MERCHANT

This situation will in time right itself in this market and in the markets of the world, and the righting of it in the final analysis rests with the underwriters themselves; but while the principal duty of checking this demoralization rests upon the underwriter, yet the continued prosperity of marine insurance is a matter of real concern to the American merchant and shipowner. I know of no other important commercial country where the merchants are willing to accept so freely and for a moderate consideration in the way of reduced rates, insurance with underwriters having no domicile in the same country as the merchants, and where suits, if any, must be brought in other courts, and I believe that this policy in the end is not a wise policy; it is not a policy that has been followed by other nations important in world commerce.

STANDARD CLAUSES SUGGESTED

At this point let me say a word as to a way in which I think this Foreign Trade Council can be of great help to bankers, underwriters and merchants; it is by appointing a standing committee which will draw up a set of import and export clauses to be known as the "Foreign Trade Council Clauses," and a form of certificate that will be known as the "Foreign Trade Council Form." It is inadvisable and impossible to have uniformity in the coverage granted by marine insurance policies, but a standard set of clauses which would define attachments and duration of coverage and certain basic principles would be of practical value in establishing a point of departure for any changes which were necessary to meet the requirements of the individual.

Now a word as to the relation of the government to marine insurance. The general tendency of the times and the successful conduct by the government of the War Risk Insurance Bureau has led to some discussion as to the advisability of the government undertaking marine insurance, and I do not feel that this paper would be complete without touching on that subject.

AGAINST WAR PERILS ONLY

In the first place, I think it important to emphasize the fact that the Bureau of War Risk Insurance issued policies against war perils only and never insured against marine hazard. The problems which a government bureau doing a marine insurance business would have to meet are entirely different from those confronting a war risk bureau. They are, in my opinion, of a nature that would make their correct solution along sound economic lines impossible in a government department, even were it possible to intrust the management to the same class of men that a war emergency rendered available.

As one of the first advocates of the establishment of the War Risk Bureau, and intimately connected with it as chairman of the advisory board from the time of its foundation in 1914 until after the armistice, I can speak with some knowledge, and I unhesitatingly say, as a carefully considered judgment, that a government insurance bureau—

First—Would not be to the advantage of marine merchants or shipowners.

Second—Would hinder the natural and free development of American marine insurance.

Third—Could not be successfully conducted by the government.

Having stated why I think it should not be undertaken by the government, let me also state that I do not know of a single valid reason why the government should undertake marine insurance, and I believe that nothing but a very real necessity jestifies government in assuming a function satisfactorily carried on by private enterprise.

I have endeavored to show in this paper that, as regards exports and imports, the American shipper can today take care of his entire insurance in this market on terms and conditions and with security that compare favorably with that available to his foreign competitors. While the situation as regards hull insurance is not as satisfactory, yet the principal reason that this is not so is due to the fact that we have not had the mercantile marine to insure; that on the transfer of the government vessels to private ownership, this situation should rapidly change and it should become possible to obtain full insurance in American companies or foreign companies domiciled in America sufficient to meet any requirements.

AMERICAN CAPITALIZATION

There are today American companies authorized to do marine insurance business, with combined capital and surplus of over $280,000,000. This capital is more than enough to do the entire business of the United States with perfect safety and without taking into account the very large amount representing the American capital and surplus of foreign companies held in this country for the benefit of American policyholders. Introduction of government capital and credit would accomplish nothing but interference with the free use of the capital already available. The amount of business which these companies assume is not limited by want of capital; it has been limited, particularly as regards hulls, by the want of a large volume of diversified business on rates that promise a chance of being remunerative. When these conditions come, and given that the merchant marine is sold to private owners, the capacity of the market will be sufficient for every requirement.

The disability due to over-taxation and multiplicity of control is still here; but the passage of a model marine insurance law for the District of Columbia, as advocated by the congressional sub-committee of merchant marine and fisheries, and the further hope that this will be followed by the principal maritime states, leads me to look for some amelioration of this condition.

In my opinion, marine insurance can be fostered by the government in only one way—by giving it equality of opportunity, and equality of opportunity can only come with a minimum of interference.

BRITISH MARINE DEVELOPMENTS

Exclusive Correspondence of Pacific Marine Review

SIR OWEN PHILLIPPS, M. P., presiding on May 26 at the annual meeting of the Royal Mail Steam Packet Company, in London, referred to the future of British shipping. "Our mercantile marine," he said, "is still inferior to none, and although our former principal rivals in world commerce, the Germans, have receded at least temporarily to a position of virtual extinction, we have now seriously to take into consideration the bid made by the merchant fleets of the United States of America, Japan and Scandinavia for a larger share in the maritime trade of the world. But in spite of all the difficulties which beset us, I am convinced that British shipping can and will, provided it is not hampered by any undue interference and control on the part of the various governments departments, continue to hold its own in face of any fair competition.

CUNARD EXTENSIONS

Such remarkable progress is being made with the Cunard Company's extensive scheme of post-war construction that three new liners have been launched within the past two months, the latest addition to the fleet being the Tyrrhenia. With the launching of this vessel nearly one-fifth of the quarter of a million tons of shipping the Cunard Company have in hand will have been floated, and when the present program has fully materialized thirteen new steamers will have been added to the premier all-British shipping company's already large fleet. The Cunard are now operating forty direct services to practically all parts of the world, the establishment recently of a service between Dantzig, Hamburg and America being their latest enterprise.

With the exception of the Servia, whose keel was laid in April, arrangements are made for the remainder of the company's new fleet to be launched by the end of the present year. Vessels now under construction include four 21,000-ton liners, sisters to the Scythia, launched at Barrow in March last, and six steamers of the 15,000-ton class.

The Tyrrhenia is a fine example of a large intermediate liner. Her over-all length is 578 feet 6 inches, beam 70 feet, and molded depth 42 feet 9 inches, while her gross tonnage is estimated at 16,700. She will resemble the 600-foot class in exterior appearance. Ample accommodation of the most up-to-date character will be provided for 280 first, 364 second and 1187 third-class passengers. The Tyrrhenia will be fitted with Brown Curtis turbines driving two propellers and developing 13,500 horsepower. She will attain a sea speed of about seventeen knots in moderate weather. It is hoped the Tyrrhenia will be ready for service by the end of the year.

CONCRETE SHIPS

Although the construction of concrete ships has been practically abandoned in this country, there are other countries whose inadequate supply of steel has led them to persevere with their experiments and gradually increase their efficiency. But they are still a long way behind steel in practically every respect, an expert tells me. Two years' experience has enabled a fairly accurate estimate to be made of their capabilities and shortcomings. Under severe concentrated blows the concrete is almost invariably shattered, while a steel plate would be dented or, at the worst, started. On the other hand, damage so done is very easily repaired and at very small cost. Some weeks ago, for instance, one concrete steamer sustained injuries which looked severe, but which were repaired without difficulty by a local house builder and his assistant, whose bill amounted to $25. And these vessels have all proved remarkably free from weather strains at sea. In the matter of carrying capacity they have proved disappointing. When concrete ships were first suggested it was realized that they would have to be heavier than steel ones of similar capacity, but it was reckoned that they would carry 20 per cent more cargo than the weight of the empty hull, but the best only contrive to carry the same weight as the ship herself.

MOTOR LINERS

Although several companies have already commissioned motorships having a certain amount of passenger accommodation, the Magvana, of the British India line, is the first real liner to be propelled by internal combustion engines. When completed she will be a 9000-ton vessel, capable of carrying over 10,000 tons of cargo and some 150 passengers in roomy and comfortable quarters suitable for the Indian climate. She will have a speed of thirteen knots by two Diesel engines of British manufacture and design. When turbine engines were being thoroughly tried it was quite usual to build at least two ships with similar hulls, one propelled with turbines and the other with ordinary reciprocating engines. The Cunarders, Carmania and Caronia, are the most famous pair. Competitive trials made possible the great and rapid improvement in the new system of propulsion, and the same principle is being adopted in the present instance by the British India line, for the Magvana is to have an exact sister, the Mandala, propelled by steam engines.

If she comes up to expectations on service, the Magvana will have a great advantage over competing steamers, as it is anticipated that she will make her speed on an oil consumption of not more than seventeen tons a day.

Coincident with a period of unexampled briskness, so far as orders are concerned, the Clyde shipyards and engineering shops are experiencing a considerable amount of unemployment. The explanation is to be found in the serious shortage of raw materials. The various yards all have an exceptional amount of work on hand, and although inquiries for new tonnage are not particularly pressing now, the orders on hand already are sufficient to keep the majority of the yards working at full pressure for the next two or three years. Indeed, according to one important shipbuilder, the steel builders are faced with the possibility of having to refuse orders owing to inability to undertake delivery within a reasonable time.

RAW MATERIALS SHORT

The amount of tonnage launched this year is the third highest for the period during the past twenty years, and but for the shortage of materials and the large amount of labor engaged in repairs and reconditioning of vessels, the output would probably have exceeded even that of the record year, 1913. As it is, thousands of engineers on Clydeside are idle, and many others are working short time. The post-war development of industry in the Clyde area would have necessitated a 20 per cent expansion in the pre-war supply of coal, and, for lack of this, there is a serious shortage in the supplies of pig iron. The blast furnace output has not kept pace with new requirements, and so serious is the state of affairs that many establishments are now working two shifts only in place of the usual three in the shipyards.

Progress, as a writer in the Times says, is being retarded seriously owing to the shortage of steel plates. For the first time in the history of the Clyde the Tanfield yard recently had to import a shipload of 1500 tons of plates from Port Talbot, South Wales. Engineering departments also are short of materials, particularly boiler and ship plates. Output must inevitably come down unless an improvement in supplies takes place, and there seems little immediate prospect of that. In many cases orders are considerably behind scheduled time. A vessel now being built at Greenock for the Chinese trade should have been launched in February. It is still far from completion owing to the scarcity of plates, and in other cases engines which should have been ready in January are still unfinished owing to lack of materials. According to one important shipbuilder on the lower reaches of the Clyde, supplies of raw material in many instances are 50 per cent short of what could be utilized.

NEW MOTOR TANKER

The new motor vessel Narragansett, owned by the Anglo-American Oil Company, is said to be the largest internal-combustion engined oil tanker flying the British flag afloat. The vessel is designed for a speed of 10½ knots, but the mean speed throughout the trials exceeded 11 knots. At the launch luncheon Sir Trevor Dawson, chairman of Vickers, Ltd., said his firm had experimented with heavy oil engines for over fifteen years, having built approximately half a million horsepower. From an economical point of view, the heavy oil engines of the Diesel type were the engines of the future. The Narragansett engines only consumed 12½ tons of oil fuel daily, as compared with 25 tons of oil sprayed under furnaces, or 50 tons of coal used in the ordinary way.

The main particulars of the vessel are: Length between perpendiculars, 425 feet; breadth, molded, 56 feet 8 inches; depth molded, upper deck, 33 feet; mean draft, 26 feet; displacement at above draft, 14,000 tons; total deadweight capacity, 10,050 tons; bunker capacity (oil), total, 733 tons; speed, 10.5 knots; normal cargo, 9420 tons of oil plus 520 tons fuel, with usual stores, etc.

Hull construction: Isherwood longitudinal frame, upper and deck tanks continuous, long poop, short bridge and forecastle with connecting gangways. Fuel bunkers abreast machinery space on tank deck aft. Main cargo space, 10 tanks; usual water ballast tanks and cargo hold. Deck officers accommodated amidships, engineers under poop, crew in cubicles forward, four-berth hospital, accommodation steam-heated throughout. Awnings over poop bridges and forecastle decks, mosquito screens to doors, and side lights. Galley range for coal or oil. Steel masts, telescopic tops. Marconi wireless installation fitted. Welin boat davits. Two cargo pumps, 200 per hour each, steam driven. Main oil suction piping 10 inches diameter. Automatic atmospheric valves on tank hatches. Two 7-inch by 10-inch steam winches, one 8 by 12 inches aft.

Main propelling machinery: Vickers' solid injection type, without injection air compressor. Two main engines, each six cylinders, 24½ - inch diameter, 39 - inch stroke, designed to develop total of 2500 brake horsepower at 118 revolutions. Starting effected by air on all cylinders; cylinders put on oil in pairs. Individual cylinders can be cut out by levers at cylinders closing spray valve. Four plunger fuel pumps with mechaniaclly - operated suction valves driven by camshaft driving gear in center of engine. Oil delivered at pressure of about 4000 pounds a square inch to pipe underneath camshaft, and led separately to spray valves. Large bearing surfaces throughout; all bearings white-metalled. Camshaft solid forged steel, two three-throw pieces. Small flywheel at after end with teeth for turning gear, electrically operated.

NOTES FROM THE EAST

By AMERICUS

FOREIGN carriers and those in the United States interested more in foreign than in American institutions will do well to let sleeping dogs lie. The foregoing words present a brief summary of the policy of this country toward its new merchant marine, and in fact form the concluding sentence of an official statement just issued by Admiral Benson for the Shipping Board. Rumors and threats of withdrawing foreign steamship lines from Pacific Coast ports in the United States and of selecting Vancouver, B. C., as their Pacific terminal are, in the main, responsible for the admiral's very positive statement of what the attitude of the American government will be, in the event of such procedure on the part of our shipping rivals in the Oriental trade. The basis of this particular kick is Section 28 of the Jones bill, which permits preferential railroad rates for persons and goods sailing from the United States in American vessels. Naturally competing foreign vessels take umbrage at such treatment afforded our own vessels to the exclusion of such rates on the railroads for persons or freight which they are to carry. Their threats to transfer their business to a Canadian port might be something alarming if the Jones bill was the only act bearing on this subject. Fortunately the Esch-Cummings law, known as the Transportation Act, was framed in evident anticipation of such actions on the part of our rivals. Under the railroad law the Interstate Commerce Commission has the power to declare an embargo on shipments to any particular point, if, in its opinion, an emergency has arisen to warrant such embargo. A deliberate attempt on the part of foreign shipowners to nullify a United States law would constitute an emergency such as the law contemplates, and in fact it might well be termed a "conspiracy."

This is not the only howl that is going up from foreigners, so take it altogether the Jones bill must be a success. The fact of the matter is that this country heretofore has acted so much like a great big dummy when it came to matters of self-interest in connection with maritime affairs, that our competitors are astounded to think that we now have the good sense to guard our own interests. Perhaps the grandest howl and bluff thus far heard has emanated from the Lloyd's insurance people in dear old London. The very idea that we should attempt to do anything to help ourselves in the marine insurance business was too preposterous for those gentlemen who have been fattening on business from this country for so long a time, that they looked upon this particular branch of their efforts as a vested right. If I am any judge of our English cousins, they will never let go of a dollar of our business unless they are compelled to by the competition of our own underwriters.

As I have several times predicted in these "Notes," the formation of the American insurance syndicates has been completed and they are now ready to begin work, just as London announces her defiance. Syndicate A, so called, is an inspection bureau, pure and simple, and is expected to perform underwriters' surveys at all American ports, and in a general way to perform for American insurance companies much the same work as now performed by the London Salvage Association. It is understood that a former San Francisco insurance man, and an ex-member of the Shipping Board, Mr. Charles R. Page, has been asked to take charge of this inspection bureau. It is stipulated in their contract with the Shipping Board that this inspection is in no way to interfere with classification surveys. Condition surveys by the Martin-Gardiner inspection bureau will by special arrangement be accepted by Syndicate A, so as to avoid duplication of inspection.

Syndicate B is to take over the insurance of all government-owned and mortgaged ships, and will be composed entirely of American underwriters.

Syndicate C will be composed of two-thirds American underwriters and one-third admitted foreign insurance companies; and will confine its efforts to insuring American privately-owned ships. It is agreed that this syndicate will have the financial ability to place as high as $2,500,000 on any one risk. Although it is popularly supposed that the Lloyd's underwriters had issued their defiance as a protest against the requirements of the Jones bill, insurance men assure me that what really hurts them at this time is the insurance bill passed by the New York state legislature, the object of which is to tax all business secured by foreign countries in New York City. Heretofore much of this has been camouflaged, and foreign companies have been able to avoid the state taxes which have borne so heavily on American insurance companies.

It will take many months to fully digest the requirements of the Jones act, but every fresh development only bears out the claims of its authors that it was written solely in the interests of American shipping. Later on there may have to be a few minor alterations to have its requirements run smoothly, but they will not be of any serious nature.

Interesting developments may be expected when, in September next, the first steps are taken, as required by Section 34 of the Jones bill, looking towards the abrogation of treaties with certain maritime nations which restrict the rights of the United States to impose discriminatory customs duties and tonnage dues on foreign vessels and on American vessels entering the ports of the United States. After these treaties are cancelled or modified, then advantage may be taken of the Underwood tariff act, allowing less duties on goods imported in American vessels. It seems strange that this tariff act should ever have been passed in the form it was, as, after detailing at length what deductions could be made in customs duties, it concluded by saying that nothing in the act should be construed as in any manner impairing any existing treaty, whereas we are so bound up by treaties, to our disadvantage, that no good has ever come of the legislation passed early in the first Wilson administration. The Jones bill will remove all obstructions to the application of the Underwood measure, which can then be made of great value to our merchant marine.

Section 25 of the Jones bill, making the American Bureau of Shipping the official classification society of the government, has been made effective by the Secretary of Commerce and the chairman of the Shipping Board, respectively, designating Mr. Edward C. Gillette, superintendent of marine construction of the Lighthouse Service, and Commander Richard D. Gatewood, U. S. N., as the government members of the executive committee of the American Bureau. The latter, by the way, has been placed in charge of the construction and repair division of the Emergency Fleet Corporation. He comes of a family of shipbuilding experts, as his father before him was an eminent constructor in the navy, and his uncle, Mr. William Gatewood, is the well-known naval architect of the Newport News Shipbuilding Company. Young Gatewood has for several years been in full charge of the repair shops maintained by the government at the Panama Canal and has given them a very successful management. Bob Hague, his predecessor, after having nearly every job in the country offered to him, if one believes all the rumors he hears, has finally landed in the marine department of the Standard Oil Company of New Jersey. This, I am reliably informed, is, as they say down South, sho' enough.

Shipbuilding contracts, that is new ones, are as "rare as a day in June." A prominent daily shipping paper recently announced in large type that a contract had been awarded for two railroad floats, and when we begin to count chicken feed like that, it looks to me as if shipbuilding was getting wobbly. However, better times will soon be here, for it seems certain that after the financiers get the politics out of their systems, they will loosen up on the money bags and that we will hear of a number of good contracts being awarded for new ships. The material situation and car shortage are also having a depressing effect on shipbuilding prospects.

The law requires that the new Shipping Board shall be appointed as soon as practicable; that is a very indefinite term, as a month has already passed and no one has noticed any maritime appointments emanating from the White House. Possibly the Democratic convention in San Francisco has occupied too much of the executive's thoughts, but let us hope that we will soon hear who our maritime guardians are to be. Washington is filled with all kinds of rumors as to the possible membership, and if every one should be appointed who has been the subject of conjecture they would have to build an annex to the building to hold the commissioners. It seems reasonably certain that Admiral Benson will be re-appointed as chairman, and that Commissioner Donald will receive a one-year re-appointment, as he wishes soon to retire. Outside of these two, one guess is as good as another. There is an insistent demand from all quarters that Secretary Alexander of the Department of Commerce, be put on the board as the representative of the interior. It is reasonably easy to guess that Mr. Gillan may be appointed to represent the Great Lakes region, and that Mr. William Allen may represent the Gulf district, but when it comes to the two members from the Pacific Coast no one will even hazard a guess at this writing.

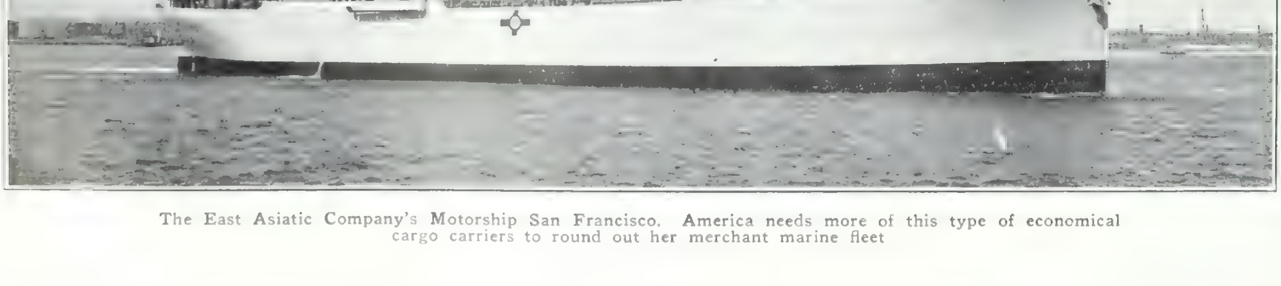
The contemplated action of the board to begin a nation-wide advertising campaign is one that is fraught with great interest to all merchant marine advocates. Already the matter has been taken up by some of the most expert advertising men in the country, and an appropriation of $50,000 has been made for a preliminary survey. The main idea is to introduce the advantages of ship securities as an investment to people remote from the sea coasts. This will help the sale of ships, contemplated on a large scale, and above all will get the people interested in shipping, who now know very little about things maritime. The new ship mortgage act will go far to protect the investments in ship property.

PROGRESS AT BALTIMORE

AT 12 o'clock noon, Saturday, June 26, with the company's band playing the "Star Spangled Banner," the oil tanker City of Freeport, built for account of United States Shipping Board, glided gracefully down the ways at the lower plant of the Baltimore Dry Docks & Shipbuilding Company.

The City of Freeport is a 6000 deadweight ton tanker, 354 feet 6 inches in length, 49 feet beam, 28 feet 7 inches depth, and having a load draft of 23 feet 3¼ inches.

The steamship Aeolus, former German liner Grosser Kurfurst, one of the largest repair jobs ever let, is nearing completion on bottom work at the upper plant of the Baltimore Dry Docks & Shipbuilding Co.



The East Asiatic Company's Motorship San Francisco. America needs more of this type of economical cargo carriers to round out her merchant marine fleet

ISLAND WRECKS, IV

By ANDREW FARRELL

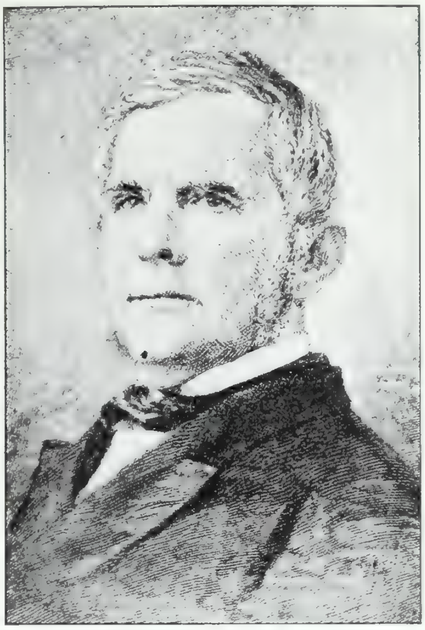
On the evening of May 2, 1866, the American clipper ship Hornet,* commanded by Captain Josiah A. Mitchell, bound from New York to San Francisco with a general cargo, crossed the equator in longitude 112:09 west, on the usual track of vessels sailing to the Golden Gate. The smart, fine-lined ship, lifting tall masts, spreading her white clouds of canvas, bowled on before a fair, six-knot southeast trade.

At 7 o'clock the next morning the first mate, Samuel Hardy, of Chatham, Massachusetts, and a seaman, bearing a lantern, went below to draw varnish. While they thus were engaged an explosion occurred, and a flame instantly leapt to the sails in the locker between decks. At that time the hatches were off for ventilating the cargo.

BOATS LOWERED IMMEDIATELY

With astounding rapidity spread the fire. Scarcely had the alarm been given when dense smoke poured from the after hatch; fire ran up the cross-jack sail, hanging clewed up; and in a few minutes another burst roared from the main hatch, firing the mainsail. Displaying acumen that the next few minutes more than justified, Captain Mitchell sent only one watch below to fight the fire, and held the other on deck to lower and provision the boats.

No difficulty was experienced in lowering the quarter boats; an eyebolt, however, stove in the bottom of the long boat, making a hole a foot square, which had to be plugged with blankets and shirts in the weeks that followed. Although sails had been provided for all these craft, access to the blazing sail-locker was impossible; so a studding sail, a main royal and some pieces of canvas lying about the decks were thrown into the boats, together with such provisions as were immediately available: four hams, twelve tins of assorted meats; a box of raisins; seven pieces of pork; a hundred pounds of bread; four buckets of raw potatoes; and of water four demijohns and a barrel, holding in all no more than twelve gallons. Captain Mitchell was able to get chronometers, the epitome, compasses, quadrants and a few blankets, but no extra clothing for anyone.



Jacob A. Westervelt, Builder of the American Clipper Ship Hornet and many other famous Clippers

In the cargo of the Hornet were 6200 boxes of candles and 2400 cases of kerosene, besides coal, iron and the usual assortment of general merchandise. A wooden vessel; hatches off; and in the holds 24,000 gallons of oil and tens of thousands of pounds of tallow.

ABANDON THE SHIP

By the time the boats were in the water and scantily provisioned, the whole ship was burning. Fire leapt from spar to spar and enveloped the rigging, sails and masts in a single vast sheet. For the crew to remain longer was impossible; and at 7:45 o'clock, only three-quarters of an hour after the first explosion had occurred, in latitude 2:20 north, longitude 112:08 west, about 1000 miles due south of Cape St. Lucas, Lower California, and 2500 miles east of Hawaii, the men tumbled into the boats and pulled away from the flaming Hornet.

Chart of French Frigate Shoals

THIRTY-TWO MEN IN THREE BOATS

Outlining spars, masts and rigging in crimson and white, the fire roared from deck to trucks, a conflagration terrific and stupefying, fed by that enormous oily cargo; lighting up the sea for scores, indeed for hundreds, of miles; and from this furnace a huge cloud of black smoke rushed to the very clouds. For a day and a night, as the Hornet burned, with a great roar but no explosions, the boats remained nearby, watching the ship rise in the water as the cargo was devoured, quite as though she were discharging at a wharf; and as the hull rose from the sea, down ate the flame, until, at 5 o'clock in the morning of May 4, the water-line having been reached, the hulk made a plunge forward and went down bow first, leaving to toss on the surface only a few charred spars and fragments of wood.

Captain Mitchell distributed the men among the three boats. He himself took the long boat with two passengers, the third mate and eleven seamen. Hardy, the first mate, took a boat with eight men besides himself; and the third was in charge of Second Officer Parr, of North Shields, England, with whom were the carpenter and six seamen. All told, thirty-two men, passengers and crew, left the ship. Provisions and water were distributed equally and masts were fitted and sails cut as well as materials and circumstances permitted. Being in the track of clipper ships bound to California, Captain Mitchell thought it best to head northwest, holding to the same course, in the hope of sighting a sail; and so, when the water had closed hissing about the hulk of the Hornet, into the northwest sailed the three, the long boat towing the two quarters.

THE BOATS PART COMPANY

Light showers fell frequently on the second day, adding four gallons of water to the scanty stock; the winds were light and baffling; and an equatorial sun, not to be despised on the water, burned the bare heads of the castaways. On the fourth day Captain Mitchell changed his course for Clarion Island, lying in 114 west longitude, 18:30 north latitude; but the boats were unable to fetch up to the land because of strong winds and heavy seas.

On the fifth, sixth and seventh days, six dolphins, a bonita and a turtle were caught and divided. Most of this meat spoiled—

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* I assume that this was the famous clipper built in 1851 by Jacob A. Westervelt & Sons. She was of 1426 tons and was owned by Chamberlain & Company, New York. Her fastest voyage from New York to San Francisco was in 1853, when she and the Flying Cloud sailed from New York on the same day and arrived at San Francisco together, on August 12, 105 days out. Captain Arthur H. Clark gives the following runs of the Hornet on different voyages, against which are set the records in days for each leg:

Hornet	Record
Sandy Hook to Equator, 19	Stag Hound, 13
Cape St. Roque to 50 south, 17	Samuel Russell, 16
50 south, Atlantic, to 50	
South, Pacific, 10	Young America, 6
50 south to Equator, none given	Live Yankee, 16
Equator to San Francisco, 19	White Squall, 14

unnecessarily, it appears, because if there was no salt (the explanation given), other means might have been used. But the meat did spoil, and all the boats' crews were put on a ration of a gill of water, a half-biscuit and half a raw potato twice a day. When there was rain, on the other hand, all were privileged to drink all that they could catch.

For the next thirteen days the winds were light and baffling. During this time the long boat continued to tow the others. On the seventeenth day two booby birds were caught and their flesh was divided. When eighteen days out, with a stiff north-east trade blowing, Captain Mitchell found it impossible to continue to tow both boats, as the strain and jerking were such as to endanger his craft, already weakened by the hole stove in her; and he therefore cast off the mate's boat in latitude 13 north, longitude 114 west. Three days later, for the same reason, he cast off the second mate. After coming alongside and sharing stores again, all the crews being in high spirits, the craft pursued their way unaided. That night they parted company, and neither of the smaller boats ever was heard of again.

THE MYTHICAL "AMERICAN GROUP"

On arriving at latitude 17 north and longitude 117 west, Captain Mitchell decided to try for the "American Group," situated, according to Bowditch, in latitude 17 north, longitude 133:30 west. Although the boat spent several days cruising over this position, there was no sign of land whatever. That islands did not exist where islands were charted is not surprising: even today the surveys of the Pacific are sadly incomplete; and there are many islands and shoals marked "P. D." (Position Doubtful) and "E. D." (Existence Doubtful).

Thus far Captain Mitchell had been endeavoring to keep in the track of California-bound vessels, but his attempt to make Clarion Island and his search for the "American Group" had led him westward; and he abandoned hope of being picked up and headed for Hawaii, 1200 miles distant. At this time no meat remained: for food there were the bare bones of the ham, the canvas in which they were rolled; staves of a butter-keg, which were the principal standby; and, lastly, the men's boots. They soaked the leather to soften it; scraped it; and ate the mush. Besides, so ravenous were their empty stomachs, they devoured handkerchiefs and pieces of cotton cloth. By some accident there was a supply of tobacco in the boat, which is credited with having allayed their thirst, although there is much to be said regarding the use of tobacco in such circumstances.

ONE FISH FOR FIFTEEN MEN

During the entire voyage the strictest discipline obtained. Watches were kept as religiously as aboard ship. All hands took turn at bailing the boat, which, having a great hole in her bottom, leaked badly. On a heavy sea, whipped by a strong trade wind, keeping her dry was not easy.

On the thirty-eighth day four flying fish struck the boat. These were seized—one can imagine just how, with fingers that seemed all thumbs, that slipped on the wet skins, while hearts pounded with fear that the food would escape. Into fifteen equal parts were the four fish divided; as was one that flew aboard next day; but, on the fortieth day, when another small fish was caught, the boat's company gave the whole to the captain, who was suffering most severely from starvation.

THEY BEHOLD MAUNA LOA

All kept up their spirits wonderfully, except a seaman, who, having a bad abscess on his hip, became despondent and lay down in the boat. The others sailed on cheerily. At 11 o'clock in the morning of June 15, 1866, on the forty-third day, three or four days before they had expected to sight land, they gazed upon the lofty summit of Mauna Loa.

Birds on Laysan Island. Many castaways have been fed by these birds and preserved to tell us their strange tales of wreck and rescue

When they were near the breakers at Laupahoehoe, Hawaii, two natives swam out to them. Upon discovering the condition of the crew the two Hawaiians shook the hands of all, with "How d'ye do?" and took the boat through the surf to the beach.

When the survivors of the Hornet arrived in Honolulu they were interviewed by a young California newspaper man. Though ill, he wrote all night; and barely managed to get his manuscript on the San Francisco schooner after she had cast off from the wharf, thus beating his rivals, who missed that mail. Prior to that time this reporter had penned the most absurd, whimsical, kindly exaggerations, at which all the Islands and most of the Pacific Coast laughed uproariously; of the Hornet he wrote quite differently; and his account of the disaster, published first in the Sacramento Union and telegraphed East to the New York Herald, made quite a stir. Upon his return to California he brazenly demanded (and received) no less than $100 a pica column for his narrative; great though this remuneration was, perhaps this particular reporter's writings were worth it. In later years he even attained some celebrity. His name was Clemens, Samuel L.

WHALER ON THE REEFS

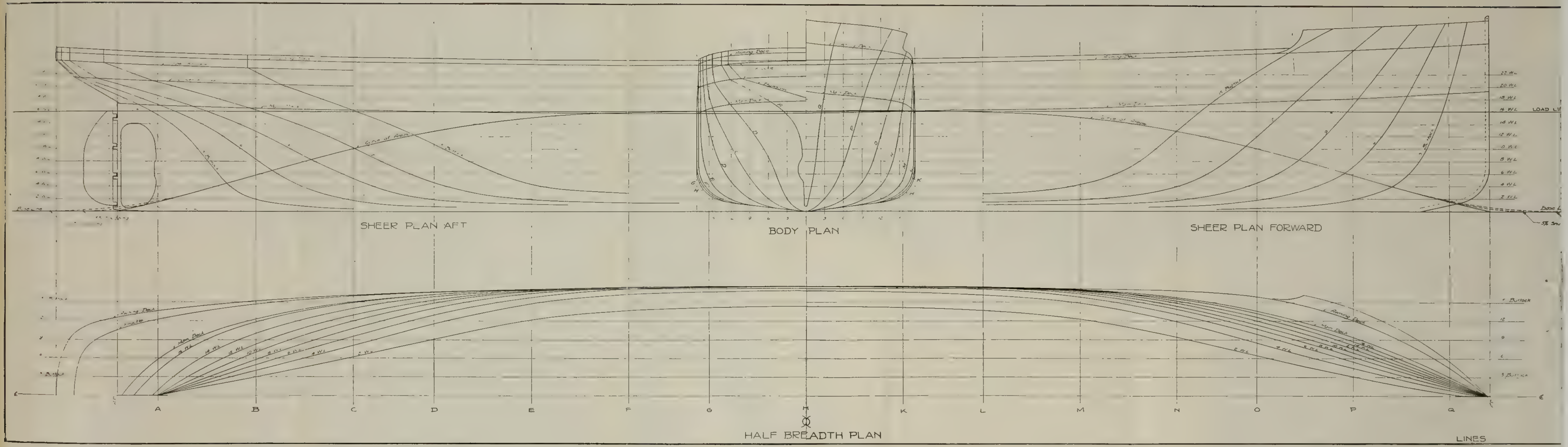
Having discharged a cargo of whale oil at Honolulu, the American bark Daniel Wood sailed for the northwest April 10, 1867. At 3 o'clock in the afternoon of April 13, the Bessie Francaise of French Frigate Shoals was eighty-five miles away, bearing west by north, half-north; and the vessel expected to pass the reef forty-five miles to windward. That night was clear and favorable, with a full moon, and the bark was under all sail.

At 1 o'clock Sunday morning, April 14, Captain J. Richmond, hearing from below the second officer sing out to the helmsman: " Hard up the helm!" jumped for the deck and ordered the vessel put about. He was too late: she struck heavily; pounded her way over the first line of rocks; and brought up on the inner ring, amid surf, about a half-mile from the place where she first had grounded. Under the blows of the breakers she began to heel over; whereupon Captain Richmond, realizing that she could not be saved and that she was breaking up, ordered the masts cut away. When day dawned the only land in sight was a small rock, to which a boat was dispatched. Fifteen miles from the wreck was found a sand-bank, bleak and bare except for stray tufts of grass.

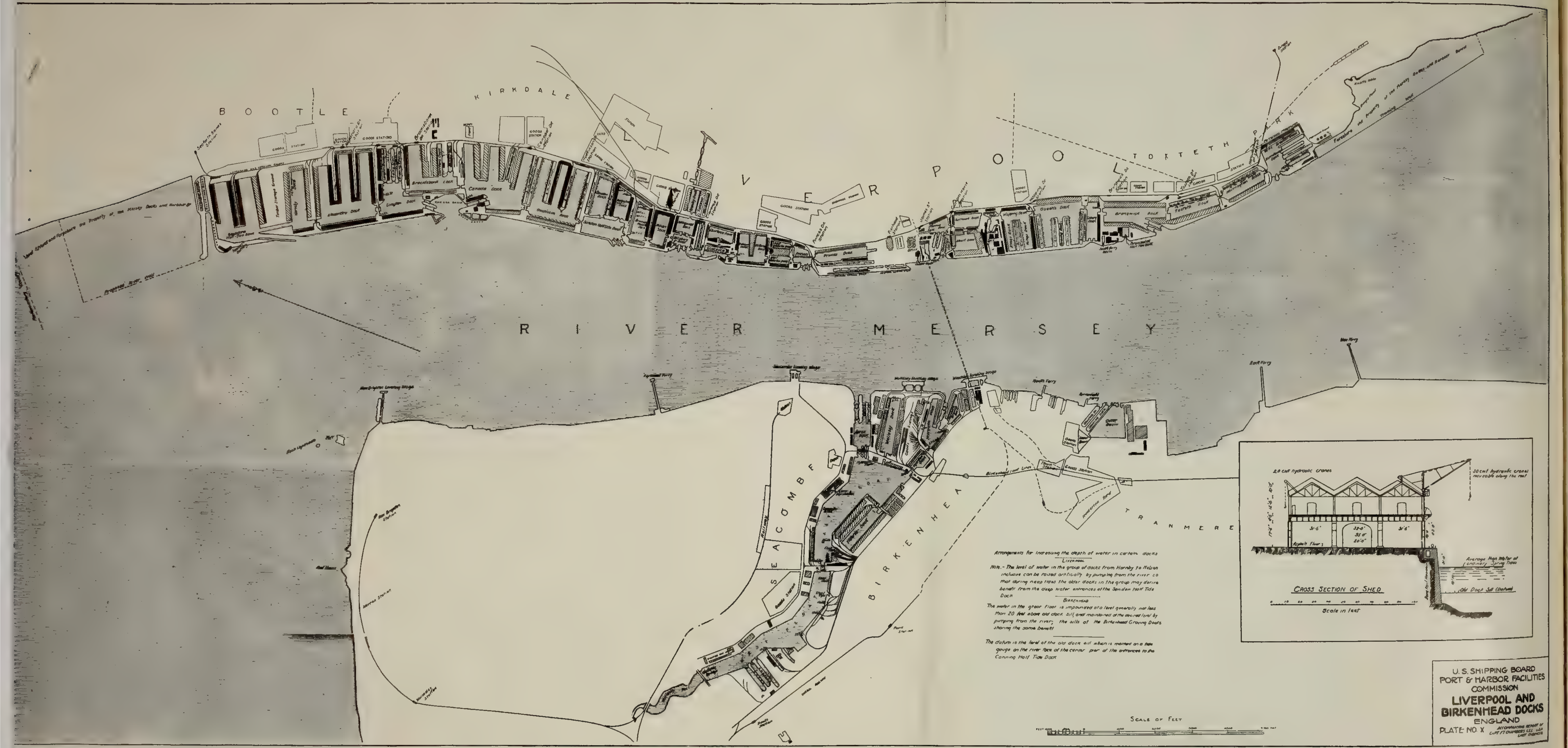
THEIR WATER SPOILED

On the next morning the crew visited the wreck and obtained bread and meat and six casks of water. (A hundred gallons of water had been taken the first day.) For a whole day and the greater

HALF BREADTH—BODY—AND SHEER PLANS OF SINGLE SCREW MOTORSHIP FOR PHILIPPINE-CHINA COAST TRADE



Prepared by RUFINO MARTINEZ, a Filipino Student at the University of California



Arrangements for increasing the depth of water in certain docks

Liverpool

Note.- The level of water in the group of docks from Hornby to Nelson inclusive can be raised artificially by pumping from the river so that during neap tides the older docks in the group may derive benefit from the deep water entrances of the Sandon Half Tide Dock

Birkenhead

The water in the great float is impounded at a level generally not less than 20 feet above old dock sill, and maintained at the desired level by pumping from the river; the sills of the Birkenhead Graving Docks sharing the same benefit

The datum is the level of the old dock sill which is marked on a tide gauge on the river face of the center pier of the entrances to the Canning Half Tide Dock

U. S. SHIPPING BOARD
PORT & HARBOR FACILITIES
COMMISSION
LIVERPOOL AND
BIRKENHEAD DOCKS
ENGLAND
PLATE NO. X
ACCOMPANYING REPORT OF
CAPT. F.T. CHAMBERS C.E.C. U.S.A.
CHIEF ENGINEER

Map Showing Docks on the Mersey at Liverpool and Birkenhead part of a night the castaways towed those six casks of water through tortuous channels to the sand-bank, where two casks, the first of the six landed, were broached. The water was salt. Sea-water had seeped through the wood, displacing the fresh. And on the morning of the visit to the wreck it broke up.

Captain Richmond had a "sister gunwhale" and a "wash-board" fitted to the larger whaleboat. For this work the only tools were a hammer, saw and dull chisel; even nails were lacking and had to be drawn from the fastenings of the other boats. When the job was done Captain Richmond announced his intention of trying for Honolulu; and on Tuesday, April 16, with the second officer and six men, he embarked on his voyage. Behind on the sand-spit remained twenty-seven men with 240 gallons of water, part of which was brackish, and a quantity of bread, which, though saturated by salt water and reduced to a pulp, was sufficient to last six weeks if used in moderation. For those in the boat the food allowance was one biscuit and one pint of water a day.

AN EIGHT-DAY VOYAGE

For the first four days out Captain Richmond met a strong east and northeast trade wind, despite which good headway was made; and the fast run was continued, for, on the morning of Sunday, April 23, the Island of Niihau was sighted; and the next morning the boat sailed for Honolulu, arriving at 3 o'clock in the morning of April 24, 1867, after an eight-day voyage.

Of the men who remained on the sand-bank, five were Americans, the others Hawaiians and Portuguese. Their daily food allowance also was a pint of water and a handful of pulpy bread; but the island was alive with birds (Molly-mocks, known from Cape Horn to the Arctic), the eggs of which were as good as those of chickens (so it was said), and were gathered by the bucketful each morning. Turtles abounded, and there was plenty of fish, if no hooks—a lack that was cured by making fishhooks of wire. The one cooking utensil was a copper pot; and for firewood they cut up the spars of the South Seaman, lost on French Frigate Shoals in 1859.

The most pressing trouble was shortage of drinking water. But it happened that one of the crew had been with Farragut at Mobile, where he had seen an ingenious distilling device used on a sand island; and one after the same pattern was made: container, a deck pot, with wooden cover; leading from this two gun barrels, one jointed to the end of the other, through a cask of cold water; from the end of the second gun barrel a piece of lead pipe carried the condensed steam into a vessel. For tools to make this apparatus the men had only the saw, hammer and chisel. Success was complete—so complete that in one day, in a two and one-half gallon bucket, they got thirty-eight gallons of fresh water. And how the eyes of the Hawaiians and Portuguese must have started from their sockets at the sight.

When the twenty-seven had been fourteen days on the shoal, the U. S. S. Lackawanna, dispatched from Honolulu after the arrival of Captain Richmond, arrived on April 28 to rescue them.

(To be continued.)

SUITS IN ADMIRALTY

Against Emergency Fleet Corporation and Its Ships

By HAROLD M. SAWYER

AS an aid to the understanding of this article, it should be premised that suits in admiralty are of two kinds: libels against the vessel, which is personified, arrested and treated as a defendant, called libels in rem, or against the thing itself; and libels against personal defendants, similar to actions at law, called libels in personam. In the former the ship, or a bond given in lieu thereof, is always security for the payment of the judgment, but in the latter the judgment is without security and purely a personal obligation of the defendants.—Editor's Note.

FROM time immemorial it has been the universal rule that the sovereign — that is, the government — could not be sued nor its property seized under judicial process without its consent. This immunity from suit is a necessary attribute of sovereignty, and so long as the sovereign is engaged strictly in the discharge of governmental functions results in comparatively little hardship. But during the war the Federal government of necessity assumed in large measure many of the functions of private business. Perhaps the most notable invasion of the field of private enterprise by the government has been and still is the ownership and operation of ships through the Emergency Fleet Corporation. Hence, the possibility of bringing suits in admiralty with respect to matters arising from governmental shipping operations has become of vital interest to the shipping world.

By the Act of September 7, 1916, Congress created the United States Shipping Board[1] and empowered it to organize a corporation under the laws of the District of Columbia, the majority of the stock of which should be subscribed by the board and owned by the United States.[2]

Pursuant to this authorization the United States Shipping Board Emergency Fleet Corporation, capitalized at $50,000,000, was incorporated under the laws of the District of Columbia on April 17, 1917.[3] All the capital stock is owned by the government, and the corporation is the agency through which, directly and indirectly, the government owns and operates the vast fleet of vessels which resulted from the shipbuilding operations of the war.

The ninth section of the Shipping Act provided that these vessels "while employed solely as merchant vessels shall be subject to all laws, regulations and liabilities governing merchant vessels, whether the United States be interested therein as owner, in whole or in part, or hold any mortgage, lien or other interest therein."[4]

The language of the ninth section has been construed as an express consent by the government to suits in rem against Shipping Board vessels provided they were employed solely as merchant vessels when the cause of suit arose.[5]

It has also been held that the authority given the Shipping Board to organize the Fleet Corporation under the laws of the District of Columbia rendered that corporation liable to suit in personam in the common law courts,[6] just like any other corporation organized under those laws. By parity of reasoning, the corporation is also liable to suit in personam in the admiralty. This ruling is entirely independent of the consent to suit contained in the ninth section of the Shipping Act. It rests upon the theory that all corporations organized under the laws of the District of Columbia can sue and be sued. Therefore the creation of such a corporation, even though all of its stock is owned by the government, is in itself a waiver by the sovereign of immunity and an implied consent to being sued.

Thus, as a result of much litigation, it was settled that Shipping Board vessels could be libeled in rem in the admiralty courts if they were employed solely as merchant vessels when the cause of suit arose, and that the Fleet Corporation could be sued in personam in the admiralty in any case which by its nature was embraced within the admiralty jurisdiction.

Recent legislation by Congress has, however, largely nullified the results of this litigation and plunged the whole question into uncertainty. The Act of March 9, 1920,[7] provides that "no vessel owned by the United States or by any corporation in which the United States or its representatives shall own the entire outstanding capital stock or in the possession of the United States or of such corporation or operated by or for the United States or such corporation, and no cargo owned or possessed by the United States or by such corporation, shall hereafter, in view of the provision made herein for a libel in personam, be subject to arrest or seizure by judicial process in the United States or its possessions."

This language means that there can be no libel in rem against a Shipping Board vessel. The act contains no specific repeals, but repeals in general terms the provisions of all other acts inconsistent therewith.

Consequently, in so far as the ninth section of the Shipping Act has been construed to authorize libels in rem against these vessels, it has been by necessary implication either repealed or amended so as to preclude such suits. It is immaterial whether the Act of March 9, 1920, operates as a partial repeal or a partial amendment. The result is precisely the same.

The Act of March 9 substitutes in all cases against these vessels where a libel in rem could have previously been sustained, a libel in personam against the United States or the Fleet Corporation. Even where the United States itself may file a libel in rem, say, for example, in a collision between two vessels, one owned by the Fleet Corporation and the other by private interests, the cross libel filed by the latter is limited to a libel in personam.

There is a clause in the third section of the act which provides that "if the libelant so elects in his libel the suit may proceed in accordance with the principles of libels in rem whenever it shall appear that had the vessel or cargo been privately owned and possessed a libel in rem might have been maintained." If this language be taken literally it renders the act unintelligible, for the right to file a libel in rem against a ship would then depend upon the election of the libelant, whereas the whole purpose of the act is to prohibit all libels in rem.

If, therefore, the act means anything, the right to file a libel in rem against Shipping Board vessels has been destroyed. Thus the libelant has been entirely deprived of the security which results from the arrest of the vessel and has been given a mere right to recover a personal judgment.

Furthermore, no adequate provision is made for the satisfaction of such judgment or decree. Section eight of the act provides that the judgments and decrees shall "be paid by the proper accounting officers of the United States out of any appropriation . . . available therefor; otherwise there is hereby appropriated, out of any money in the Treasury of the United States not otherwise appropriated, a sum sufficient" to pay such judgments and decrees.

It is doubtful if the indefinite language of this section constitutes a valid appropriation and whether or not "the proper accounting officers" would feel justified in paying out a definite amount of public money under its authority.

Again, there may be no unappropriated money on hand, a condition that frequently prevails. Hence, the only way to procure the payment of a judgment or decree would be to lobby a special appropriation measure through Congress. The expense and delay of such a course is apparent and needs no further comment. It is the old story of collecting a claim against the government.

The net result of the Act of March 9 is to render the shipping world practically powerless to hold the United States and the Fleet Corporation to any real financial responsibility arising from shipping operations.

Thus far the question seems comparatively free from doubt. But on June 5, 1920, the so-called Jones bill was approved by the President and became a law.[8] Section eighteen of this act amends section nine of the Shipping Act, but leaves that portion of the section which has been under discussion entirely unchanged. The problems presented by this amendment can be seen at a glance.

The ninth section of the Shipping Act had been construed to authorize libels in rem against Shipping Board vessels. The Act of March 9, 1920, operated either as a partial repeal or as a partial amendment of the ninth section of the Shipping Act, but in either view destroyed the right to libel these vessels. Then Congress, by passing the eighteenth section of the Jones bill, amended the ninth section of the Shipping Act without any apparent consideration of the intervening act of March 9.

As a matter of construction and if the intervening act had not been passed, the preservation of the pertinent clauses of the ninth section of the Shipping Act by the eighteenth section of the Jones bill would be construed as an express recognition of the judicial construction which had been placed on those clauses. Such a construction would lead to the result that libels against Shipping Board vessels could be maintained.

Furthermore, the Jones bill in section thirty, sub-sections P, Q, R and S, specifically provides that maritime liens can be enforced by libel in rem against any vessel, whether foreign or domestic, for furnishing repairs, supplies, towage, use of drydock or marine railway, or other necessaries. The phrase "any vessel" must include Shipping Board vessels, as they are not specifically exempted.

But, on the other hand, there is the prior act of March 9, 1920, which expressly prohibits libels in rem against Shipping Board vessels under all circumstances.

It is difficult to escape the conclusion that Congress in passing the Jones bill entirely overlooked the Act of March 9. As a matter of construction, the former emasculates the latter. The Act of March 9 clearly shows that Congress was unalterably opposed to having Shipping Board vessels libeled in rem, and it does not seem reasonable that Congress would have nullified this act by passing the Jones bill in its present form, at the same session, except through an oversight.

The fact remains, however, that the Jones bill does specifically authorize suits in rem against any vessel for the purpose of enforcing the specific maritime liens described in the act. So, to this extent, at least, it would seem that Shipping Board vessels can be libeled in rem.

Whether they can be libeled in other cases—for example, in collision and salvage—is exceedingly doubtful. A plausible argument can be made on either side of the question, but the matter will necessarily remain uncertain until an authoritative ruling is obtained from the Supreme Court of the United States.

Until then, it is submitted that the law is substantially as follows: The United States and the Fleet Corporation can be sued in personam in the admiralty, if the cause of suit arises from the operation of a Shipping Board vessel while employed solely as a merchant vessel, but there is no adequate method for the collection of any judgment which may be recovered. Shipping Board vessels may be libeled in rem for the purpose of enforcing the specific maritime liens mentioned in the Jones bill. The right to libel a Shipping Board vessel under any other circumstances, particularly in cases of collision and salvage, is exceedingly doubtful.

The situation is obviously unsatisfactory and the desirability of obtaining an early construction of the Act of March 9 and of the Jones bill is apparent.

[illegible] Act, 39 Stat. at L. Chap. 451, Sec. 11. [3] United States vs. Carlin, 259 Fed. 904. [illegible] The Florence H., 248 Fed. 1013; The G. A. Flagg, 256 Fed. 852, where the libel was dismissed be- [illegible] solely as a merchant vessel. The Jeannette Skinner, 258 Fed. 768; The Lake Monroe, [illegible] An Act authorizing suits against the United States in admiralty, suits for salvage services, [illegible] from arrest and attachment in foreign jurisdiction, and for other purposes; ap- [illegible] An Act to provide for the promotion and maintenance of the American merchant marine, to repeal [illegible] and use of property acquired thereunder, and for other purposes; approved June 5, 1920.

PACIFIC LOAD LINE DATA

By J. C. ROHLFS

THE Pacific Coast sub-committee on load lines, appointed by the Government National Committee, is making good progress towards the acquisition of statistics on which to base its recommendations for a proper freeboard on Pacific-owned coastwise and foreign trading vessels.

The committee's secretary, T. M. Potts, U. S. N., after a dilligent search of the records of the Board of Marine Underwriters, Merchants' Exchange, and the United States Steamboat Inspection Bureau, has completed a ten-year Pacific Coast casualty list, which is printed below for the information of Pacific Coast shipowners interested in the load line question. Last month's issue of Pacific Marine Review contained an article on the "History of the Load Line," and it is the hope of the committee that these printed progress reports will be preserved by the shipowners for reference in future conferences and hearings on the application of load lines to the various types of vessels plying Pacific waters.

These records show that during the ten years, from January 1, 1910, to December 31, 1919, 206 vessels, with a total net register tonnage of 138,312 tons, have been lost in the Pacific. These losses have been carefully investigated by the Board of Marine Underwriters, and in only one instance has there been any suspicion that a vessel was lost through insufficient freeboard. This was the case of the steamer Roanoke, which foundered at sea in the month of May, 1916, and the records seem to indicate that the loss of this vessel was due to improper loading.

The committee's investigations so far seem to give the Pacific Coast shipowners a "clean bill of health" so far as overloading their vessels is concerned, and to indicate that the sailing freeboards approved by the marine underwriter surveyors have been ample.

VESSELS WHICH HAVE BEEN A TOTAL LOSS

Date	Name of Vessel	Class	Nature of Casualty	Place	Net Registered Tonnage
1910					
Jan. 11	Blakeley	Brig	Ashore	Natividad Island	145
Jan. 12	Czarina	Steamer	Wrecked	North Spit	793
Jan. 17	San Buena Ventura	Schooner	Abandoned	At Sea	171
Feb. 4	Kentucky	Steamer	Sunk	Off Charleston	191
Feb. 7	Farallon	Steamer	Foundered	Struck reef, Iliamna Bay	565
Feb. 15	Czarina	Fishing schooner	Wrecked	Alaska	230
Apr. 29	Stanley	Schooner	Wrecked	Sanak Island	253
May 7	Edith	Fishing schooner	Sank	Off Waddah Islands	23
May 20	J. Marhoffer	Steamer	Burned	At Sea	334
May 17	Lizzie Sorenson	Gasoline schooner	Struck by whale	Sank off Cape Ommaney	49
May 26	Dora Bluhm	Schooner	Wrecked	Santa Rosa Islands	315
June 16	Mizpah	Power schooner	Blew up	At Sea	41
July 11	Annie E. Smale	Schooner	Ashore	Below Point Reyes	809
July 27	San Joaquin No. 3	River steamer	Burned	At Sacramento	133
Aug. 3	Jas. Rolph	Schooner	Ashore	San Pedro Terrace	517
Nov. 14	Portland	Steamer	Struck submgd. rock	Off Ketalla	348
Nov. 22	J. M. Weatherwax	Schooner	Became completely waterlogged	Off Cape Flattery	365
Dec. 12	Olympia	Steamer	Ashore	Bligh Island Reef, Prince William Sound	1730
Dec. 15	Kitsap	Steamer	Sunk	Seattle Harbor	123
Dec. 27	Louise	Power schooner	Crushed in ice	Near Cape Prince of Wales	45
1911					
Jan. 27	Cottage City	Steamer	Ashore	Cape Mudge	981
Feb. 13	Oshkosh	Marine vessel	Wrecked		2458
Feb. 25	Willie R. Hume	Schooner	Wrecked	Off Topolobampo	589
Apr. 17	Jabez Howes	Ship	Beached	Off Chignik Bay	1494
May 23	Washcalore	Schooner	Ashore	Near Cape Sebastian	303
June 28	Signal	Steamer	Ashore	Off Point Lobos	392
July 8	Santa Rosa	Steamer	Wrecked	Two miles west of Pt. Arguello	1335
Aug. 29	Transport	Sound steamer	Foundered	At Sea	99
Sep. 2	Comet	Schooner	Ashore	San Miguel Islands	368
Sep. 12	Ramona	Steamer	Ashore	Spanish Island	362
Oct. 10	Oliver J. Olson	Schooner	Ashore	Off Cape False, Mexico	596
Nov. 29	Vashon	Sound steamer	Burned	Anacortes	94
Dec. 1	Trilby	Steamer	Burned	Oakland Harbor	63
1912					
Jan. 15	Admiral	Schooner	Turned turtle	Off Cape Disappointment	26
Jan. 10	Ruth E. Godfrey	Schooner	Lost	At Sea	497
Feb. 15	Ida McKay	Schooner	Wrecked	At Sea	178
Feb. 16	Carrier Dove	Fishing schooner	Wrecked	Otter Point, Clinque Islands	82
Apr. 12	G. W. Watson	Schooner	Wrecked	Near Raiatea	397
Apr. 28	Vida	Schooner	Wrecked	Tillamook Bar	25
May 10	Joseph Russ	Schooner	Wrecked	Chirikof Island	235
May 15	Annie M. Nixon	Gasoline schooner	Wrecked	Near Prince Rupert	27
July 30	C. T. Hill	Schooner	On South Spit	Entrance Nehalem River	133
Aug. 16	E. L. Dwyer	Gasoline steamer	Wrecked	Alaska	44
Aug. 22	Wilhelmina	Merchant vessel	Wrecked		47
Aug. 28	Rosecrans	Steamer	Burned	Gaviota	1816
Sep. 14	Endeavor	Schooner	Foundered	Manulitha Reef	485
Oct. 21	J. J. Loggie	Steamer	Ashore	South of Point Arguello	220
Oct. 24	Silver Wave	Power schooner	Wrecked	York	27
Nov. 1	Osprey	Gasoline schooner	Wrecked	Coos Bay	115
Nov. 11	Klikitat	Barkentine	Wrecked	Reef at Hilo	437
Nov. 19	Condor	Power schooner	Ashore	North Beach	177
Nov. 21	E. K. Wood	Schooner	Ashore	Parier Reef	447
Dec. 7	Dora	Steamer	Ashore	At Seward	217
Dec. 30	Workman	Steamer	Ashore	South of Rio	

VESSELS WHICH HAVE BEEN A TOTAL LOSS —Continued

Date	Name of Vessel	Class	Nature of Casualty	Place	Net Registered Tonnage
1913					
Jan. 29	Samoa	Steamer	Ashore	Above Point Reyes	237
Feb. 10	Borealis	Sailing vessel	Stranded		683
Feb. 19	Advent	Schooner	Wrecked	Coos Heads	399
Mar. 22	Albion	Steamer	Ashore	Off Stewarts Point	268
Mar. 24	Chas. Nelson	Barge (fmly steamer)	Burned	Fields Landing	603
May 10	Ophir	Steamer	Burned	Frazier River	2928
June 5	Maryland	Merchant vessel	Burned		-------
June 13	Yukon	Steamer	Ashore	Cape Lazarus	14
June 19	Riverside	Steamer	Sunk	Blounts Reef	995
June 27	Casco	Steamer	Wrecked	San Simeon nr. Piedras Blancas	26
July 14	J. H. Lunsmann	Schooner	Collision	Near Black Point	952
July 14	Christello	Gasoline steamer	Burned	Vancouver	-------
July 29	Weidling Bros.	Schooner	Ashore	North Graham Island	68
Aug. 11	Point Arena	Steamer	Ashore	Pigeon Point	171
Aug. 19	State of California	Steamer	Wrecked	Gambici Bay	1260
Sep. 4	Kayak	Steamer	Wrecked	Ocean Cape	73
Sep. 26	Transit	Schooner	Wrecked	Point Barrow	496
Sep. 29	Amaranth	Barkentine	Wrecked	Jarvis Island	1062
Oct. 14	S. C. Alien	Bark	Ashore	Diamond Head	632
Oct. 17	Merced	Steamer	Ashore	Near Point Gordan	589
Nov. 3	Kake	Power schooner	Wrecked	Clatsop Spit	Small
Nov. 12	Elvira	Whaling schooner	Wrecked	At Sea (Arctic)	28
Nov. 20	Coronado	Barkentine	Foundered	Near Sechelt	1007
Nov. 29	Mary Sachs	Power Schooner	Wrecked by ice	Alaska	31
Dec. 2	Balboa	Schooner	Ashore	Grays Harbor	651
Dec. 3	Bender Bros.	Power schooner	Burned	Seattle	80
Dec. 10	Navajo	Steamer	Stranded	Near Point San Pablo	28
Dec. 20	Jeanie	Steamer	Ashore	Calvert Island	862
Dec. 23	Bertha	Fishing schooner	Burned	Seattle	12
Dec. 26	Kauai	Steamer	Ashore	Mahukona	265
1914					
Jan. 2	Pomo	Steamer	Wrecked	Point Reyes	235
	W. S.	Merchant vessel	Wrecked		-------
Jan. 16	Pathfinder	Pilot schooner	Ashore	Point Diablo	71
Jan. 19	Polaris	Schooner	Wrecked	Bolinas Point	717
Feb. 5	Vadso	Steamer	Wrecked	Portland Canal	Small
Feb. 16	W. H. Dimond	Schooner	Wrecked	Bird Island	376
May 4	Montana	Motor	Burned	Alaska	567
May 17	Bridgit	Merchant vessel	Burned		-------
June 23	Nokomis	Schooner	Wrecked	Clipperton Island	462
July 2	Gay Head	Whaling bark	Wrecked	Alaska	252
Aug. 26	Admiral Sampson	Steamer	Collision	Off Point North Point	1336
Aug. 29	Scotia	Steamer	Ashore	Five miles north of Surf	132
Sep. 11	Gamecock	River steamer	Sunk	Cascades	658
Sep. 18	Francis H. Leggett	Steamer	Foundered	65 miles S. Columbia River Bar	975
Oct. 9	Victoria	Motor	Sank	Lambert Channel	30
Oct. 14	S. T. Alexander	Schooner	Wrecked	Toku Island	695
Oct. 22	Rochelle	Steamer	Ashore	Clatsop Spit	503
Oct. 19	Santa Catalina	Steamer	Burned	St. Helens	4026
Nov. 16	Dirigo	Steamer	Foundered	At Sea	393
Nov. 24	Hanalei	Steamer	Ashore	Duxbury Reef	502
Dec. 5	E. B. Jackson	Schooner	Wrecked	At Sea	615
Dec. 18	Coos Bay	Steamer	Stranded		403
1915					
Jan. 8	Eureka	Steamer	Wrecked	North Channel	312
Jan. 20	Delhi	Steamer	Ashore	Strait Island	582
Jan. 29	Washingtonian	Steamer	Collision	Off Cape Henlopen	4064
Feb. 15	Andromeda	Bark	Wrecked	Falmouth	45
Mar. 11	William P. Frye	Four mast bk.	Sunk	In Atlantic	2998
Apr. 16	Monarch	River steamer	Sunk	Selby's	97
Apr. 23	Nonpareil	Power schooner	Wrecked	Near Unga	31
May 7	Sintram	Ship	Ashore	Egegats	1495
July 20	Bertha	Steamer	Burned	Harvester Island	752
July 26	Leelanaw	Steamer	Sunk	North Coast of Scotland	1377
July 31	Arnold	Gasoline boat	Burned	Ship Creek	389
Sep. 2	Edith	Steel steamer	Sank	At Sea	1495
Sep. 25	Acme	Merchant vessel	Burned		58
Oct. 2	Graywood	Steamer	Wrecked	Off Umatilla Light	607
Oct. 15	O. M. Kellogg	Schooner	Wrecked	Maro Reef	331
Nov. 3	Santa Clara	Steamer	Ashore	Coos Bay	1208
Nov. 24	Clare	Fishing tender	Wrecked	Wedge Island	Small
Nov. 24	Edith	Power schooner	Lost	Lynn Canal	78
Nov: 28	Sausalito	Schooner	Ashore	Waddah Island	326
Nov. 19	Winehaven	Merchant vessel	Burned		-------
1916					
Jan. 18	Prosper	Schooner	Ashore	Hanapepe, Kauai	229
Jan. 28	Aberdeen	Steamer	Wrecked	Two miles below Cliff House	394
Mar. 1	Fifield	Steamer	Wrecked	Coquille River Bar	440
Feb. 9	Excelsior	Steamer	Wrecked	Bet. Alcatraz and Angel Islands	565
Feb. 18	Pavlof	Steamer	Ashore	Pugidak Island	587
Mar. 23	Lindfield	Bark	Sunk	At Sea	2169

VESSELS WHICH HAVE BEEN A TOTAL LOSS—Continued

Date	Name of Vessel	Class	Nature of Casualty	Place	Net Registered Tonnage
Apr. 20	Gen. S. G. Mariscal	Schooner (motor)	Burned	Acapulco	105
May 9	Roanoke	Steamer	Foundered	At Sea	1654
June 14	Bear	Steamer	Ashore	Sugar Loaf Rock	2779
July 22	Shna-Yak	Steamer	Ashore	South of Point Sur	453
Aug. 28	Great Bear	Power schooner	Wrecked	Bering Sea	300
Aug. 30	Admiral Clark	Steamer	Foundered	At Sea	672
Oct. 13	Independent	Fishing steamer	Wrecked	South of Cordova	30
Aug. 4	Monarch	Merchant vessel	Burned		....
1917					
Feb. 5	Kona	Schooner	Wrecked	Kangaroo Island	642
Feb. 9	E. B. Jackson	Schooner	Wrecked	Apia	615
Mar. 6	Harold Blekum	Schooner	Ashore	Near Kodiak	185
Apr. 24	Coronado	Steam schooner	Burned	Off Eureka	381
Apr. 25	Aberdeen	Steamer	Burned	At Sea	367
May 14	Alcatraz	Steamer	Wrecked	Near Greenwood	193
May 16	St. Frances	Ship	Ashore	Unimak Pass	1757
May 18	Standard	Ship	Ashore	Cape Constantine	1461
June 17	R. C. Slade	Schooner	Ashore	Near Point Arena	601
July 8	Beluga	Bark	Sunk by raider Wolf	At Sea	435
July 24	R. P. Rithet	Motorship	Burned		900
Aug. 28	A. B. Johnson	Schooner	Destroyed by German raider	At Sea	460
Aug. 28	Cecilia Sudden	Schooner	Lost	At Sea	545
Aug. 28	Manila	Schooner	Dynamited by raider	At Sea	647
Sep. 19	Hope	Gasoline schooner	Burned	Below Stockton	9
Oct. 11	Quinault	Steamer	Ashore	Rogers Beach	486
Oct. 23	Olympic	Steam schooner	Abandoned	Off Florida Coast	454
Oct. 31	Churchill	Schooner	Wrecked	French Frigate Shoals	600
Nov. 2	Al-Ki	Steamer	Wrecked	Point Augusta	888
July 3	Delnorte	Steamer	Ashore	Near Pt. Arena	279
Nov. 9	Bowdoin	Steamer	Wrecked	False Cape, Honduras	448
Nov. 17	Manhattan	Fishing steamer	Wrecked	Forty miles w. of Cape Spencer	85
Nov. 9	Mariposa	Steamer	Wrecked	Strait Islands	1939
Dec. 23	Portland	Steamer	Wrecked	At Sea	966
Dec. 27	Encore	Barkentine	Sunk by raider	At Sea	572
1918					
Jan. 11	Portland	Motor steamer	Burned	Eighty miles off Coast	1426
Feb. 23	Noyo	Steamer	Burned		230
Mar. 19	Bertha Dolbeer	Schooner	Wrecked	At Sea	231
Apr. 15	James H. Bruce	Schooner	Wrecked	Beveridge Reef	476
Apr. 29	Koko Head	Barkentine	Burned	At Sea	1011
Apr. 30	Westerley	Steamer	Collision	Off French Coast	4247
May 22	Tacoma	Ship	Sunk by ice pack	At Sea	1672
May 31	Expansion	Schooner	Stranded	Suva, Fiji Islands	512
June 15	F. A. Kilburn	Steamer	Burned	Off Key West	612
June 17	Ravalli	Steamer	Burned	Lowe Inlet	777
June 17	Crescent	Schooner	Burned	1600 miles of San Francisco	1334
June 22	Winslow	Schooner	Sunk	At Sea	497
June 23	Rosalie	Steamer	Burned	Duwamish Waterway	227
July 2	Annie Larsen	Schooner	Wrecked	Malden Island	320
July 3	Mary Olson	Steamer	Burned	Cienfuegos	505
July 18	Ethel Zane	Schooner	Abandoned	At Sea in typhoon	408
Aug. 12	A. M. Baxter	Schooner	Ashore	Outside Suva, Fiji Islands	430
Aug. 15	St. Helena	River steamer	Sunk	Near Napa	784
Aug. 21	Madrugada	Motorship	Sunk	Off Norfolk by shell fire	1288
Sep. 16	Coos Bay	Steamer	Wrecked	At Sea	1709
Sep. 19	Star of Poland	Ship	Ashore	Japan Coast	2987
Sep. 21	S. I. Allard	Motorship	Stranded		1108
Sep. 26	Blackford	Steamer	Ashore	Off Redo	1741
Oct. 8	Westgate	Steamer	Collision	Atlantic waters	3551
Oct. 8	Breakwater	Steamer	Ashore	Off Zapotitlan	794
Oct. 9	Newburg	Steamer	Ashore	Bodega	741
Oct. 14	San Gabriel	Steamer	Foundered	Mexican Coast in hurricane	312
Oct. 28	Dumaru	Steamer	Destroyed by lightn'g	Burned at Sea	1752
Oct. 29	Mandalay	Steamer	Ashore	16 miles S. W. of Crescent City	407
Oct. 31	A. J. Fuller	Ship	Collision	Seattle Harbor	1673
Nov. 7	Ilwaco	Power schooner	Wrecked	Green Island, B. C.	94
Nov. 12	Pennsylvania	Steamer	Burned		2134
Nov. 14	West Land	Steamer	Sunk	At Sea by raider	4375
Nov. 17	South Bay	Dredger	Sunk	Off Tampico	279
Nov. 20	Camino	Schooner	Lost	At Sea	631
Nov. 27	Halcyon	Schooner	Lost	At Sea	218
Dec. 9	Benito Juarez	Steamer	Foundered	Hawaiian Islands	364
Dec. 31	Aryan	Bark	Burned	At Sea	1939
Dec. 31	Quantico	Steamer	Wrecked	Tablas Islands	1888
Dec. 31	George Loomis	Steamer	Lost	At Sea	402
1919					
Jan. 3	Iaqua	Steamer	Burned	Off Nicaraguan Coast	459
Jan. 6	Temple E. Dorr	Steamer	Burned	Off Havana	453
Jan. 23	Espada	Schooner	Wrecked	Near Suva	686
Feb. 11	St. James	Barkentine	Wrecked	Oeono Islands	1453
Mar. 25	Kitsap	Schooner	Collision	Off Kauai	451

VESSELS WHICH HAVE BEEN A TOTAL LOSS—Continued

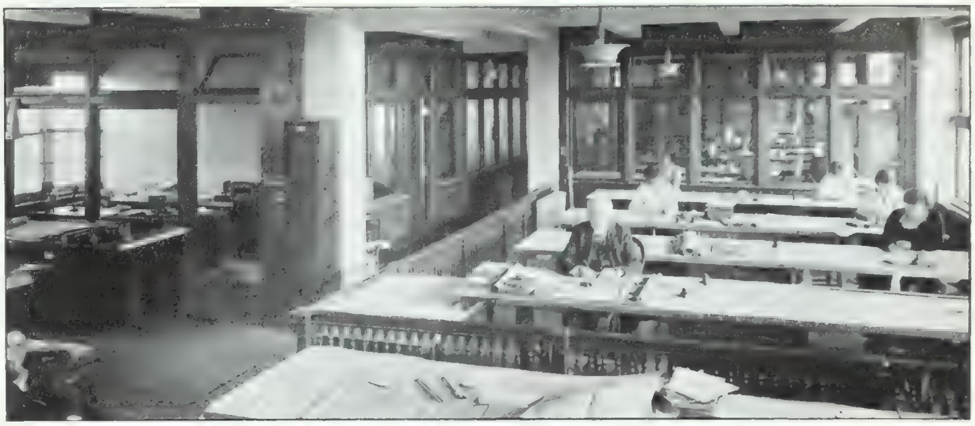
Date	Name of Vessel	Class	Nature of Casualty	Place	Net Registered Tonnage
Mar. 25	Wailele	Inter-Island steamer	Collision	Off Kauai	337
Apr. 3	Albert	Bark	Ashore	North of Pt. Reyes	624
Apr. 25	Wm. Olson	Schooner	Ashore	Island of Nilhau	491
May 23	Premier	Schooner	Ashore	Near Cape Lutke	297
July 10	Santa Christina	Motorship	Sunk by explosion	At Sea	1905
July 27	Admiral Knight	Steamer	Burned	Coast between Vancouver and Victoria	348
Aug. 24	Rustier	Merchant vessel	Burned		15
Sep. 23	North Fork	Steamer	Ashore	Near Petrolia	244
Sep. 23	West Arvada	Steamer	Struck mine and sank	Near Terschelling Light	3761
Oct. 4	Speedwell	Steamer	Ashore	Ascension Bay	574
Oct. 14	Mount Hood	Motorship	Burned	Montevideo	2433
Dec. 20	J. C. Chanslor	Steamer	Ashore	1½ miles N. of Cape Blanco	3121
Dec. 23	Firwood	Steamer	Burned	At Sea	1042
Dec. 24	Girlie Mahoney	Steamer	Ashore	Near Albion	249
Dec. 27	Okanogan	Schooner	Wrecked	On Reef Island of Kauai	606
1920					
Jan. 7	Fay No. 4	Steamer	Burned		Small
Feb. 13	West Aleta	Steamer	Wrecked	At Sea (North)	4225
Mar. 15	Ituna	Steamer	Foundered	21 miles north of S. F.	105
Mar. 25	Scandia	Gasoline schooner	Ashore	Fayak Islands	
Mar. 25	City of St. Helens	Motorship	Burned	At Sea	1212

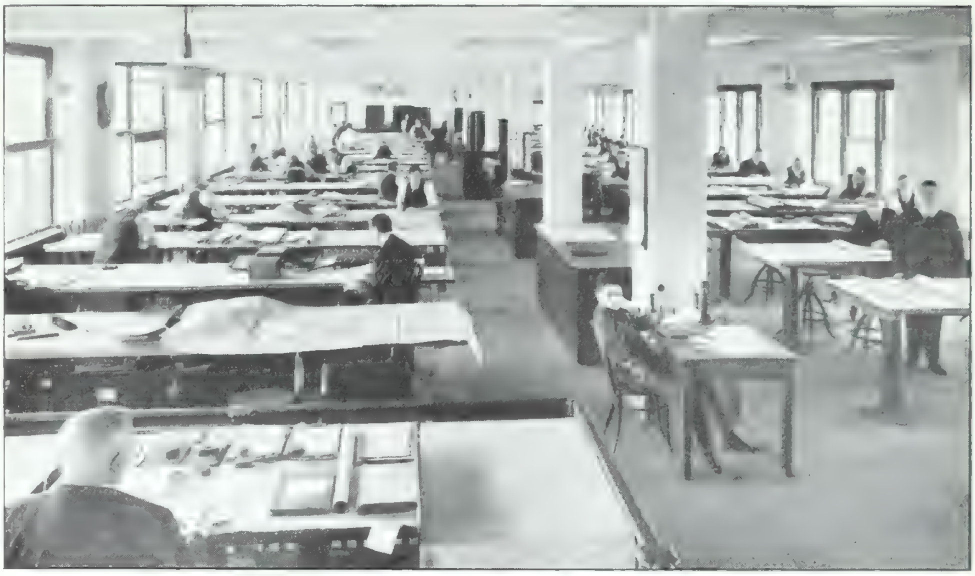
SUMMARY OF VESSELS WHICH HAVE BEEN A TOTAL LOSS FOR EACH CALENDAR YEAR 1910 TO 1919, INC.

Year	STEAMERS		SAILING VESSELS		POWER SCHOONERS		TOTALS	
	No.	Net Tonnage	No.	Net Tonnage	No.	Net Tonnage	No.	Net Tonnage
1910	8	4,217	9	2,928	3	135	20	7,280
1911	8	5,784	6	3,376	0	0	14	9.160
1912	6	3,010	11	2,942	6	437	23	6,389
1913	11	6,252	8	5,882	3	424	22	12,558
1914	11	9,633	6	3,117	0	0	17	12,750
1915	9	10,494	5	5,138	4	556	18	16,188
1916	8	7,494	2	2,395	2	405	12	10,294
1917	8	6,187	13	8,852	2	835	23	15,874
1918	24	16,533	14	14,121	1	94	39	30,748
1919	11	12,493	7	4,578	0	0	18	17,071
Total 10 years	104	82,097	81	53,329	21	2,886	206	138,312

ENGINEERING DEPARTMENT AT CRAMPS

THE following is a description of the quarters of the engineering department in the new office building erected by the William Cramp & Sons Ship & Engine Building Company at their plant in Philadelphia.


Chief Draftsman's Office


Engineering Drafting Room

NINE-STORY BUILDING

A modern nine-story concrete office building has just been completed, and the engineering department is installed on the fifth floor. The accompanying illustrations show the layout and appearances of the office and drawing room of this department. The drawing room is 152 feet long and 38 feet wide, and on account of the narrow width of this building the light is especially good in all parts of the room. It will be noted that there is a long row of boards on each side of the room and two draftsmen are assigned to each board on which detail work is done, and one man to each board where arrangements are laid out. The boards and stools were especially designed by this department and are worthy of note. From the accompanying photograph it will be seen that the boards are supported on round cast-iron pedestals, which are substantial enough not to require securing to the floor, allow knee-room under the board in wake of same, and also are best adapted for efficient janitor service by virtue of their shape. The drawers are placed in the middle of the board and are arranged to be opened from either side, which is a convenience to the draftsmen, who may be working on either side of the board. The lower drawers are used for stowing reference plans which may be temporarily in the keeping of the draftsmen. The generally neat and substantial appearance of these boards is especially striking to one entering the room. The design of the stools, which permit standing on the foot-rest without tipping, eliminates the necessity for foot stools, thereby saving additional litter on the floor and is conducive to better janitor service.

New Nine-story Office Building at the William Cramp & Sons Ship & Engine Building Company. Engineering Drafting Room occupies fifth floor of this building

FORCE IN THREE SECTIONS

The force is divided into three sections, one taking care of mechanical engineering; the second the arrangement of machinery and steam engineering piping, and the third hull engineering piping.

Especial attention is directed to the manner in which this department keeps record of its plans. It will be noted that the plan vault is located at one end of the room, in front of which is a counter, making an enclosure for the librarian. The reference prints for temporary use by the draftsmen are in files under this counter, all folded to a standard size and indexed. The original or record plans are kept in the vault. Vertical plan files are used in the vault for tracings forty-six inches and under in length, and plans that

Draftsman's Table as used at the William Cramp & Sons Ship & Engine Building Company

are longer than this are rolled separately and filed in pigeonholes. All the files are of metal, and the vertical filing feature makes them specially efficient and useful by eliminating a large amount of space which would otherwise be taken up by the old style cabinets fitted with drawers. In the vertical files the plans are placed in pockets, each of which contains a designated number of plans, and each plan is marked with the letter designating the file, a figure giving the number of the pocket and a second figure the number of the plan in the pocket. For instance, a plan marked "A-10-25" would be found in the "A" cabinet, the tenth pocket, and would be the twenty-fifth plan. These file numbers are marked on the corner of each plan, which consequently always can be found quickly and returned to its assigned place.

The pigeonholes containing the long rolled plans are of such size as to accommodate ten plans each, and each plan is rolled independently. A specially designed clip containing a round paper disc, on which the file number is printed, is attached to the end of each roll, so that "D-10-10" would represent the plan in the "D" cabinet, the tenth pigeonhole and the tenth plan in this pigeonhole.

DRAFTSMEN CHARGED WITH PLANS

When plans are withdrawn from the files, the draftsman is charged with them, and each Monday morning the plans that have not been returned to the files are re-charged to the men using them. This arrangement is very efficient in that it is based on the simple numerical system, and the fact of these figures being consecutive and always in the low denominations makes it especially intelligible to any one. The system of charging the plans, together with its follow-up arrangement, insures instant knowledge of the whereabouts of each plan. The drawings for any particular ship are given numbers, ranging from thousand to thousand for each job, but the index number for filing in the vault is entirely different, being only temporary and used only during the active life of the plan, after which the plans are placed in the inactive files, where each contract is kept separate.

The personnel of this department are particularly satisfied with their new quarters and are very enthusiastic in maintaining the department and its products on the high level it has attained.

UNION CONSTRUCTION ACTIVITIES

FOUR oil-tankers will be launched during the year by the Union Construction Company, of Oakland. First has come the Standard Oil tank motorship Charlie Watson, which was launched in July; then will follow a 10,200-ton vessel for the General Petroleum Company, to be launched probably in October; a sister vessel, of 10,200 tons, for the Standard, November launching; and an 8400-tonner for the Anglo-Saxon Petroleum Company, with launching in December. Of these, all except the Charlie Watson will be single-screw.

CAPACITY OF 10,200 TONS

The General Petroleum Company's vessel will be christened Liebre. Her general specifications will be: length between perpendiculars, 435 feet; beam molded, 56 feet; depth molded to upper deck, 33 feet 6 inches; draft, 26 feet; capacity, 10,200 long tons; Isherwood system of framing; three masts; machinery aft; pump-room forward; a speed of 11 knots loaded to summer drafts; classed 100A1 Lloyds. The vessel for the Standard will be on the same lines.

For the Anglo-Saxon Petroleum Company the Isherwood system also will be employed. This vessel will be 427 feet long over-all; 412 feet between perpendiculars; beam molded, 53 feet 1 inch; depth molded to upper deck, 31 feet, to main deck, 23 feet; capacity, 8400 long tons; mean draft, 24 feet 9 inches; speed, 11 knots; classed 100A1 Lloyds.

ONE VESSEL A MONTH

Including the Heber, launched in July, ten vessels have been sent down the ways by the Union Construction Company, and the average of late has been one vessel completed and turned over each month. All the first ten vessels have been built for the Shipping Board, the work for which will be completed with the Heber. These vessels have been of 9400 tons deadweight; 402 feet 6 inches long between perpendiculars; molded beam, 53 feet; depth molded to shelter deck, 34 feet 6 inches; to upper deck, 26 feet 6 inches; draft loaded, 26 feet 4 inches; single-screw; Isherwood system of framing; having seven watertight steel bulkheads and four cargo holds; each vessel has had three Foster Watertube boilers, built by the Llewellyn Iron Works, of Los Angeles; oil-burning; 200 pounds' pressure and 50 degrees superheat; equipped with Foster superheaters; each boiler having 491 2-inch tubes; 380 square feet of surface; induced draft. The main turbines are Parsons type, manufactured by the Midwest Engine Company, both the high-pressure and low-pressure developing 1400 horsepower, 2800 in all, at 3600 r. p. m. Falk reduction gear, at the ratio of 40 to 1, reduces the propeller revolutions to 90 a minute. These Shipping Board vessels have obtained a speed of 10½ knots an hour on a measured mile.

Since the first test pile was driven at the Union Construction Company's yard in April, 1918, the plant has obtained contracts for approximately $30,000,000 worth of work.

DUTCH COMBINE

THE Dutch press announces the passing of a memorandum of association of an incorporated company, the Netherlands Steam Navigation Company. The object of this company is the development of regular navigation lines between the various parts of the world, included in it are the Netherlands Steam Navigation Company, the Royal Dutch Steamship Company, the Java-China-Japan Line, the Royal Steam Packet Company, all of Amsterdam; together with the Holland-American Line, the Rotterdam-Lloyd, the Steam Navigation Company, the Maas & Van Nieveld, Goudriaan & Company, Steam Navigation Company, all of Rotterdam. The capital will be 200,000,000 florins ($80,392,000), of which the half has been placed and fully paid up. The central office of the company will be at The Hague. The board will be formed by the above-mentioned incorporated companies and a chairman will be appointed later.

THE MERCHANT MARINE ACT

By SENATOR W. L. JONES

As the result of the war the United States came into possession of a merchant fleet of over two thousand ships, in the building of which had been expended over three billions of the taxpayers' money. It was encumbent upon the Congress to establish a shipping policy protective of the American national interest, and to so legislate that not only these ships of the people, but other vessels of the United States privately owned, might be profitably employed.

The Congress has so legislated. The Merchant Marine Act, 1920, stands a monument, marking return to earlier policies of our government covering that period of our history in which was produced shipping owned, operated and manned by citizens of the United States and flying our flag, commensurate to our national importance in the world's commerce. Under those earlier policies vessels of the United States carried over 90 per cent of our exports and imports. When we abandoned those policies our relative importance in ocean - carrying trades diminished until, just before our entrance into the war, we carried in our own vessels less than 8 per cent of our exports and imports.

The act does not discriminate as between the vessels of foreign nations. Under its provisions they all receive "most favored nation" treatment. They do not receive, nor are they entitled to receive as a right, "national" treatment such as we accord to ships of the United States.

In this act Congress has amended a statute of the United States dealing with a purely domestic problem, making the wording of the law conform to what has always been the intent of the Congress in the original and amendatory enactment, viz., to require that only vessels of the United States should be permitted to participate in that part of the transportation which is by water when merchandise moves between points in the United States and its possessions coming within the ocastwise laws, whether such movement be direct between such points or is via a foreign port. Great Britain has protested against such enactment, notwithstanding the Congress has but restored landmarks of legislation which were maintained by our government from our very beginning down to the year 1913, when, at the solicitation of a Canadian carrier, an opinion contrary to the intent of the act was rendered by the Attorney General of the United States.

In that connection, it is of interest to know that Canadian orders-in-council have prevented artisans and skilled or unskilled laborers from entering British Columbia via Puget Sound, though not so worded as to prevent such persons from entering British Columbia when traveling over any Canadian railway from the East. The United States has not protested the Canadian orders - in - council which prevent United States transcontinental railways from participating in the transportation of emigrants to British Columbia. We recognize their right to thus legislate in discriminating against such movement through Puget Sound over American railways; but we also deny their right of protest against our right to legislate for the protection of our domestic interests.

The Congress has by law required that domestic rates upon American railways shall be just and reasonable. In the interest, however, of developing the foreign commerce of the United States, the Interstate Commerce Commission has been permitted to authorize our railways to grant, for shipments moving in export and import by water, a preferential rate lower than the domestic rate. This lower rate has heretofore been permitted whether the merchandise moved in foreign vessels or in those of the United States. The Congress now proposes that where there are available sufficient American ships to properly move the traffic, the preferential rate shall be limited to cargo moving in vessels of the United States. That is in the interest of the public fleet of the United States, as well as vessels privately owned by citizens, to aid them in their competition with foreign vessels for traffic to and from American ports.

The quantity of business moving through Pacific ports will not be permitted to be reduced through the operation of the new law; o nthe contrary, it is in the public interest that such movements should be increased, otherwise there must of necessity be increase in the domestic rail rates which would react unfavorably on living costs throughout the United States. The threats of foreign carriers to withdraw their ships have been noted, but they will not be permitted to divert business from ports through which it now moves. There is full authority in the Transportation Act, 1920, to absolutely control all import and export shipments in trans-Pacific trades, so that the Interstate Commerce Commission may require them to move under permit, thus making effective an absolute embargo which would prevent diversion of such cargo now moving through Pacific Coast ports to either Canadian, Atlantic or Gulf ports.

The Pacific Coast furnishes local cargo and market ample to insure that ships of Japan and Britain will not desert Pacific ports. The Shipping Board, however, has given assurances that American ships will be immediately allocated in sufficient numbers to replace any foreign ships which are withdrawn, and to insure uninterrupted movement through Pacific ports of Oriental exports and imports.

Will Pacific Coast ports be most benefited by service from foreign or from American ships? Pacific Coast shipyards have built many of the best vessels in our new merchant marine. There is doubtless an excess of ship construction yards, but unless American ships are to be used in Pacific Trades all our shipyards which have given employment to thousands of workmen at good wages, must close their gates and the workmen of necessity must be dismissed from employment. These are grave considerations which must be weighed as against the foreign propaganda in opposition to a provision of the new law which will insure the continued operation of American ships from our ports. Already, under existing conditions, and with the law suspended, American ships are being taken from the Pacific trades and sent elsewhere. Such action is necessary if the cargo from Seattle to Tacoma continues to be exported in Japanese ships.

A foreign ship spends little in an Amercan port except agency fees and the amounts paid for stevedoring and for water. In the main the freight moneys from a Japanese ship are expended in Japan, going to support a Japanese population engaged in ship repair, shipbuilding and other kindred Japanese industries such as cater to ships of Japan. In contrast an American ship operated from the home ports of the Pacific Coast will expend in our ports at the expiration of each voyage, approximately $50,000,000 for supplies, for ship repairs, wages for crews and other personnel engaged in the service of the operating company. Such vessels afford a valuable market, for American merchandise; they furnish employment to American workmen in American shipyards; they employ American crews whose families live here in the United States and are the constant patrons of American merchants. In fact, they bring prosperity. Retention of the American ships means retention of that prosperity. One American ship per month from a Pacific Coast port will leave more money in that port than ten Japanese ships. Twenty sailings per month of American ships means an expenditure in Pacific Coast cities of not less than twelve million dollars a year. The Merchant Marine Act, 1920, contains provisions which, applied, will insure the success of American ships. Unless applied, American ships cannot successfully compete with the Japanese, and must be withdrawn.

IMPROVED RIVETS AT LESS COST

Made by the Moore Shipbuilding Company in Gas Heated Furnaces

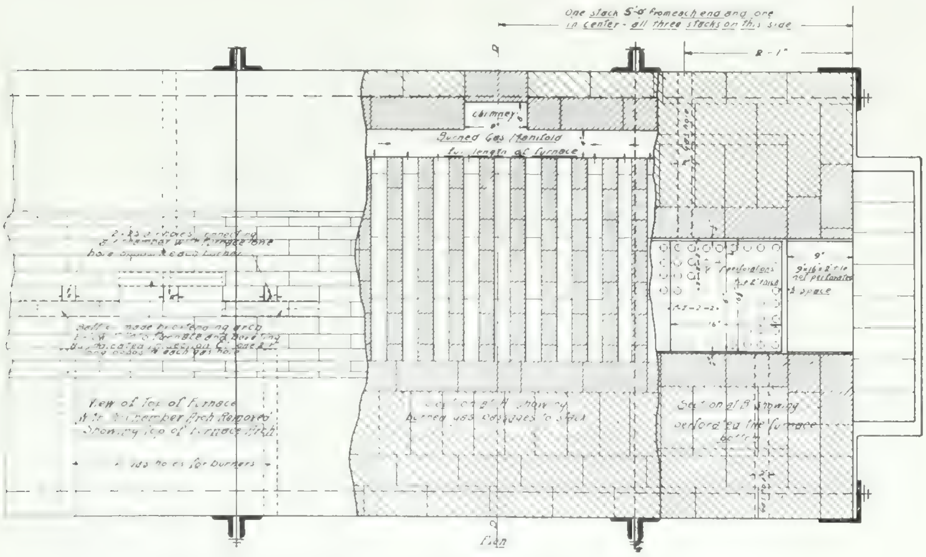
By LETSON BALLIET, M. E.

THE Balliet down-draft rivet rod furnace was designed to produce a better quality of rivet, and to reduce the scale loss that is unavoidable in the oil furnace, and incidentally to reduce the cost of production.

The detail of the furnace is complete in the illustrations, though a few minor changes may be made in dimensions to suit conditions.

Upon specifications and detail of the furnace here illustrated, it is designed to handle 3000 pounds of rivet rod per hour, under normal atmospheric temperatures of Oakland, California, consuming about 3500 cubic feet of gas per hour, allowing ample for all losses.

In the practical operation of the furnace, it is being operated for sixteen hours steadily, and allowed to stand idle for eight hours, which occasions a little excess of gas in heating up the partially cooled furnace.


One stack 5'-0" from each end and one in center - all three stacks on this side
8'-1"
Chimney
Burned Gas Manifold full length of furnace
Plan

Sectional Plan of Balliet Down-Draft Rivet Rod Furnace

Manifestly, any furnace having a down draft **must have a draft,** and if there is a **draft,** quite obviously there must be some stack losses. The amount of the stack losses depends largely upon the manner of dampering the exhaust-draft-manifold and the stacks. This damper control, of course, governs in a large measure the "suction" or amount of cold air that will be drawn in at the feed and exit doors, but the design of furnace floor, perforated and opened to the under floor passages, draws the cold air downward through openings before it passes full length of the rods being heated. The result being that the scale is about 70 per cent less than occurs in the oil-heated furnaces.

When I am wholly successful in damper control, draft government, and can furnish a gas mixture that is **almost** completely combustible so that I will have a small amount of carbon monoxide (CO) in the combustion chamber products, or no free oxygen, then I will have a neutral or non-oxidizing furnace, and there will be no scale at all formed in the combustion chamber. This point of perfection I have been unable to reach, but with careful attention to gas mixtures, drafts and dampers, a fairly close approach can be made.

If nothing but the first cost of the fuel is to be considered, the gas costs more than fuel oil, but there are a number of other things that enter into the problem.

Fuel oil is thick and viscous, and must be "preheated" by steam or otherwise before it can be well atomized through the burners, and this heating costs something. It requires either steam or air to pump the fuel oil to the burners, and either steam or air to spray it into the combustion chamber, all of which adds to the cost of the fuel oil.

The saving in weight of the scale will pay for gas fuel, **even if the oil could be obtained without cost.**

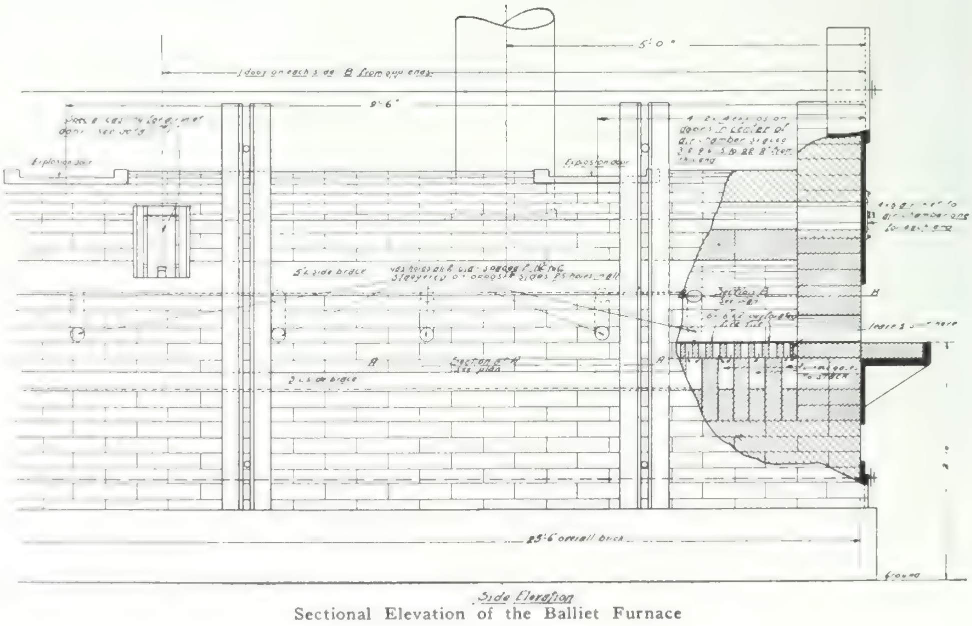
The scale is what causes the die wear, and the holding of the dies apart so that imperfect rivets are occasionally formed. With oil fuel this leads to more frequent adjustment of the rivet making machine, with a loss of time and a lesser output than the more constantly running machine with a gas fire. Even this is not all: when the machine is required to stop for a few minutes or an hour for some adjustment, the furnace is filled with rods, which lay in the intense oil fire, and draft of air, to be badly oxidized and **spoiled,** while with the gas fire the air ports in the burners are closed and rods lay in a reduced fire with a shortage of air, that is incapable of seriously damaging the rods during any reasonable period of machine idleness.

A few hundred pounds of burnt rods, or a few imperfect rivets saved from oil-heating furnace, will go a long way toward paying the cost of the gas.

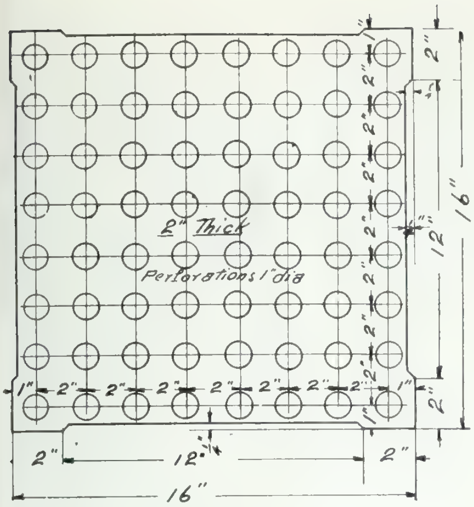
Again, the die wear being less, the machine adjustment is less and the production of rivets is increased, due to less idle moments of the machine when working gas-heated rods.

The furnace up-keep is less, the atmosphere and surrounding conditions are better for the workmen, the finished product is better, and there are fewer imperfect rivets in the output.

In the operation of the Balliet furnace, the heated gases of combustion passing under the floor prevent radiation of heat downward, and assist materially in keep-



Sectional Elevation of the Balliet Furnace



Perforated Fire Tile used on bottom of Heating Chamber

ing the inside of the furnace incandescent.

The heating of the rods is thus a combination of the three forms of heat—conduction, radiation, and convection from burnt non-oxidizing gases—and permits an accurate control of the **time of heating.**

TIME OF HEATING

The **time** of heating steel is of extreme importance. If the heating is too fast, the temperature through the piece will not be uniform, while long heating leads to the formation of coarse or abnormal size of grain, and weakens the metal.

A very bad practice is quick heating in a furnace with heat away above the correct temperature.

The difficulty is that the thin parts, corners and edges become overheated before the larger portions of the piece attain the correct temperature and this overheating of the thin parts produces large grain, abnormal expansion, and tends to produce cracks.

If the atmosphere of heating is not a reducing or neutral atmosphere, the intensified flame will decarbonize and oxidize the exterior of the steel to such an extent that thin edges of pan-headed rivets may be wholly surrounded by a ring of scale. This condition of the metal can often be noticed around the heads of snap rivets after they have been driven.

FURNACE ESSENTIALS

(a) The furnace and hearth should be of sufficient size so as not to be affected materially in temperature by the introduction of the metal to be heated.

(b) The furnace should heat at a uniform rate.

(c) The furnace should be of uniform temperature over its entire hearth.

(d) The furnace should be run under neutral or reducing conditions. (A good rough test of this is the introduction of a piece of wood or paper upon the hearth. If the paper or wood burn, the atmosphere is oxidizing; if they char, reducing or neutral.)

(e) The temperature control must be at all times exact and it must be possible of exact duplication on repetition work.

PERFECT HEAT TREATMENT OF STEEL

Steel when heated much above 1900 degrees Fahrenheit or 1000 degrees centigrade begins to deteriorate in quality, and when heated above 2550 degrees Fahrenheit is at its melting point.

Working heats for rivet rods, rivets, stay bolts and blooms to be forged, ordinarily, should not be heated above 1800 degrees. For angle bending and similar work, any heat between 1300 and 1800 degrees will give good results, with 1700 degrees as fair objective to be striven for.

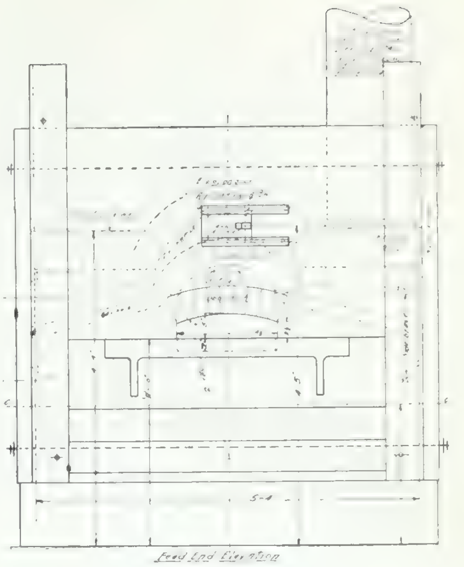
Heating steel should be done with as little contact with air as possible, as the hot metal oxidizes rapidly.

Every effort of the heat chemical engineer should be to get the heat into the metal without oxidizing the exterior. When external heat is applied by open fires, the heating should be done in the burnt products of combustion, or burnt gases without air drafts.

OXIDATION OF METAL IN GAS-HEATED FURNACES

In tests with gas-fired furnaces, with secondary air admitted through Bunsen burners, the following are some of the results obtained:

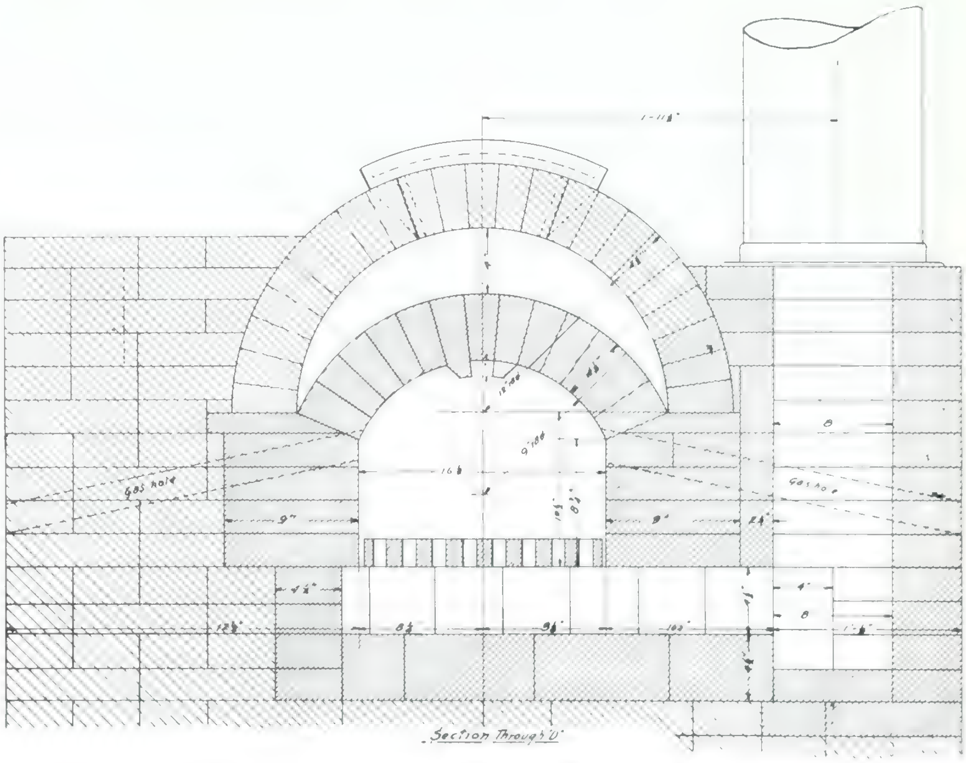
Specimens of 0.95 per cent carbon steel, ½-inch diameter, 2 inches long, with flat spots for making measurements, were left in furnace for various periods of time, removed, quenched in water, oxide-film removed and calipered.



Elevation of Feed End of Furnace

In from five to fifteen minutes' heat with a 19 per cent carbon monoxide mixture, the diameter reduction was 0.0003 inch. With a 1 per cent carbon monoxide mixture the loss was about the same. With 0.4 per cent oxygen the loss was slightly increased, and with 1.3 per cent of oxygen the loss in diameter was doubled.

It was found that in a 4 per cent atmosphere of carbon monoxide, acting on 0.95 carbon steel over a period of an hour and a half, the specimen was severely decarbonized and the product was practically soft iron.



Section through Stack on Line D (see Plan, page 92)

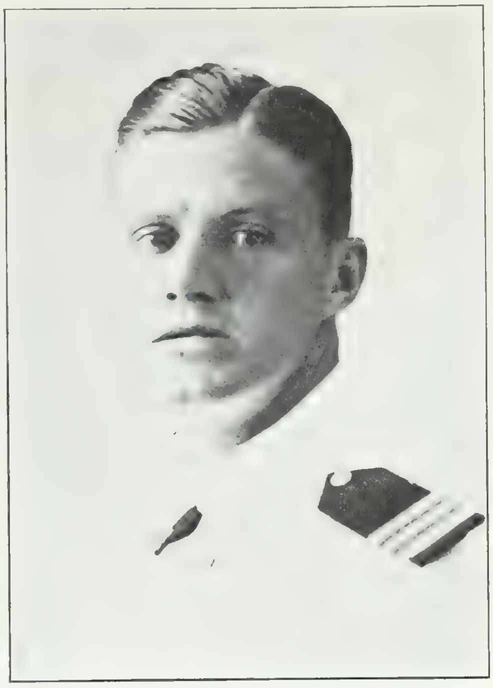
NEW DIRECTOR OF CONSTRUCTION

For U. S. Shipping Board

COMMANDER R. D. Gatewood, Construction Corps, U. S. Navy, has been chosen by Rear Admiral W. S. Benson, chairman of the United States Shipping Board, to be the new director of construction and repair for the Shipping Board, relieving Mr. R. L. Hague, resigned, of San Francisco.

Commander Gatewood graduated from the Naval Academy in the class of 1903 and graduated from a post-graduate course in naval architecture and marine engineering at Massachusetts Institute of Technology in 1906. For six years he was on duty at the Mare Island Navy Yard in charge of outside repairs and new construction, and while there was prominently connected with the building of the colliers Prometheus and Jupiter. He then served two and a half years as fleet constructor, United States North Atlantic fleet, serving as such on the staffs of Rear Admirals Osterhaus, Badger and Fletcher.

During the Vera Cruz incident in 1914 he was appointed chief censor, and as such served for about a month on the staff of General Funston, U. S. A., after which he was assigned to duty at the Philadelphia Navy Yard, where for two years he was in charge of all outside repairs and new construction, having had charge of the construction of the transport Henderson.


Commander R. D. Gatewood, U. S. N., newly appointed Director of Construction and Repair for the United States Shipping Board

From here he went to the Panama Canal as superintendent of the mechanical division. He was then re-assigned to the Philadelphia Navy Yard in connection with the design and construction of the battle cruisers United States and Constitution, now about to be constructed at that navy yard.

Commander Gatewood enters upon his new duties on July 1, and, for the present, it is understood that he expects to spend most of his time at the New York office of the Shipping Board, 45 Broadway. His other offices on the East Coast are at 140 North Broad street, Philadelphia and 1317 F street Northwest, Washington, D. C., and on the West Coast, 369 Pine street, San Francisco.

Commander Gatewood is an ardent admirer of the West Coast and its methods and expects to make an inspection trip of the West Coast offices under his jurisdiction as soon as possible after taking charge.

DOCUMENT TECHNIQUE

In Winning Foreign Markets

IN a publication on "paper work" in foreign trade, issued recently by the Bureau of Foreign and Domestic Commerce, the conviction is expressed by commercial experts that if the United States is to retain the position gained as a result of the world war, greater attention must be given to the details of export shipments and a more thorough knowledge of document technique must be shown. "At this time, when foreign trade is again slowly returning to normal," says Philip B. Kennedy, director of the bureau, "it is important that an extra effort be made to conduct our trade in the most acceptable and reliable manner. Careful study will pay large returns in the good will and confidence of foreign customers." Failure to acquire the requisite mastery will, it is intimated, seriously interfere with the development of American sales and result in regrettable friction and loss.

CARE AND CLEARNESS VITALLY ESSENTIAL

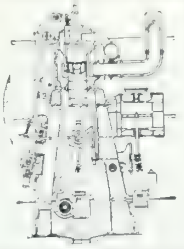
It is indicated, however, that shortcomings in respect to document technique are by no means confined to the American shippers. Misunderstandings may be attributed, in some cases, to a lack of explicitness on the part of the purchaser. The authors of the new booklet quote with approval a statement that "one of the greatest causes for delays in shipment of foreign orders has been the very human failure of the foreign merchant to express his needs and his desires so clearly that no point was without its adequate answer. It is, of course, impossible by any form or set of instructions to eliminate the human element and thus abolish at one swoop the real source of error. Nevertheless, it is not only possible but highly advisable to encourage the use of forms which provide for the essential factors in any order and at the same time supply beyond cavil or doubt all data, even though a matter of record elsewhere." At both ends of the transaction care and clearness are indispensable. With the purpose of minimizing all remediable difficulties, the monograph on "Paper Work in Export Trade" is now made available.

Dr. R. S. MacElwee, assistant director of the Bureau of Foreign and Domestic Commerce, conceived the work and planned the method of presentation and the arrangement of the documents. Dr. MacElwee's experience as lecturer in economics and foreign trade at Columbia University, as a representative of American manufacturers for many years in Europe, and as commercial agent in charge of foreign trade education for the Federal Board for Vocational Education, made it evident that there has been an urgent demand for a manual to teach document technique. The main part of the text of the new work has been prepared by Dr. Guy Edward Snider, of the College of the City of New York. Mr. Warren M. Maule, of the Federal Export Corporation, has supplied the documents used in the model transactions and has commented on the practice followed in handling the forms.

COMPREHENSIVE DISCUSSION OF BASIC FACTORS

In its 152 pages the book covers concisely the basic factors in the handling of orders from abroad. It discusses the original inquiries, the quotations, the analysis of orders, the shipment to seaboard, the operations of freight forwarders, the shipping procedure, the ocean bills of lading, the consular invoices, the financial papers, and other relevant problems. Under each of these headings, practical directions are given on all pertinent matters. Sample documents are reproduced, illustrating the correct way of preparing the necessary papers. With the book there is supplied a portfolio containing forms for practice work. A sufficient number of the forms has been included to provide a complete set of documents for each of the model transactions discussed in the text.

Oil Engines and Motorships



MOTOR SHIPBUILDING IN EUROPE

An experiment both in shipbuilding and engineering that has aroused an immense amount of interest in Great Britain is the construction of the first electrically-welded motorship, the Fullager, which has now been completed, the preliminary trials having recently been carried out. She is a small vessel intended for coastal trade around Great Britain and has been built for the Anchor Brocklebank Line. It was thought by the builders and owners that in view of the experiment involved she was quite large enough to determine whether electric welding offered sufficient advantages to warrant its application to large ocean-going ships. Her length is 150 feet, beam 23 feet 9 inches, and the molded depth 11 feet 6 inches. The carrying capacity is about 900 tons, or equivalent to approximately 26,000 cubic feet. She has been constructed by Messrs. Cammell, Laird & Company, Birkenhead, who carried out the welding on the quasi-arc principle under the supervision of the originators of this system of welding.

CAMMELLAIRD FULLAGER ENGINE

Reference already has been made in these pages to the machinery installed, which comprises a single 500 horsepower Cammellaird Fullager engine of the new opposed-piston type, which has already been described in Pacific Marine Review. It may be recalled, however, that the engine is built up in units of two cylinders each with a pair of opposed pistons, the crossheads of which are cross-connected by diagonal rods. Two sets of engines of the same design are approaching completion in the builders works, these developing 1000 b. h. p. They are for installation in the motorship Manila, a 5000-ton vessel under construction on the Clyde for the Anchor Brocklebank Line to trade to the East. There are rumors that a trans-Atlantic liner is to be built by John Brown & Company, Ltd., for the Cunard Company, in which engines of this type will be installed, but although there is no confirmation of this rumor, it is significant that Browns have recently taken up a license for the manufacture of the engines.

Referring to the Fullagar: although the preliminary trials show the machinery to be completely satisfactory, various structural alterations had to be made to the hull, chief among which was the installation of oil tanks in the double bottom instead of at the sides of the ship as originally arranged. This work is now being completed and the final trials are expected to take place soon. It cannot be said, however, that from the financial standpoint the system of electric welding has shown any advantage over riveting since the cost has been high, owing, it is believed, to the deficiencies of the workmen rather than to the system of welding. In fact, no complaint whatever is urged against this, and it is hoped that if labor adopts a more reasonable attitude toward this new development, larger electrically-welded ships will be constructed.

The Italian Motorship Ansaldo San Giorgio III

MOTOR PASSENGER LINERS

Most of the motorships that have been built have been cargo or tank vessels and in no case has there been passenger accommodation for more than about twelve persons. It is, therefore, a matter of unusual interest that one of the largest passenger-carrying motor shipowning firms in the world, the British India Steam Navigation Company (with which is allied the P. & O. Steamship Company), has placed orders for four mixed cargo and passenger ships with accommodation for 100 first-class and fifty second-class passengers. The first of these interesting craft will be put into commission during the next few months and they are being watched by the leading companies with the closest attention, since this is the beginning of a development that may lead to great events. In addition to the novelty of carrying a large number of passengers, the ships are noteworthy because the machinery is being built by a firm that hitherto has not constructed any Diesel engines. This is the North British Diesel Engine Works, which has built a large factory on the Clyde, laid out specially for the manufacture of Diesel engines for large vessels. The engines are of new design, of which full details are not yet available, but it is understood to be based upon current four-cycle practice. Each ship carries 10,000 tons of cargo in addition to the passengers and is 450 feet in length. A couple of 2300 i. h. p. engines of the eight-cylinder type are installed with cylinders 26½ inches in diameter and 47-inch stroke, running at about 95 r. p. m. These will give a speed at sea of thirteen knots on a fuel consumption of sixteen tons a day, whereas on corresponding steamers of exactly the same size and power the coal consumption is sixty-five tons a day.

UNUSUAL AUXILIARY PLANTS

The auxiliary plants on the first of these vessels is somewhat out of the ordinary. Following a practice that is becoming more and more common in European motorships, electricity is employed for all the auxiliary purposes and two engines of 400 i. h. p. are installed in the engine room, driving electric generators of 215 kilowatts. In addition, however, there are two Diesel engines of the same power direct-coupled to three-stage air compressors for the supply of injection and starting air. The object of this is to avoid the necessity of fitting air compressors to the main engines, so that in a vessel with propelling machinery of 4600 i. h. p. there is auxiliary plant of 1600 i. h. p., or a total in all of 6200 i. h. p. This arrangement perhaps is costly, but on the other hand it allows of a higher power for the propelling machinery without increasing the cylinder diameter. In the three other vessels, the air compressors will be direct coupled to the propelling plant with the result that the speed of the ships will be reduced to about twelve knots as against thirteen knots of the first vessel. Three of these ships will be engined with motors built by the North British Diesel Engine Works, and the machinery for the fourth vessel will be built by Messrs. Alexander Stephen & Company, Ltd., under license from Sulzer. These engines will be of the two-cycle type and an interesting comparison will then be available regarding the relative advantages of the two designs.

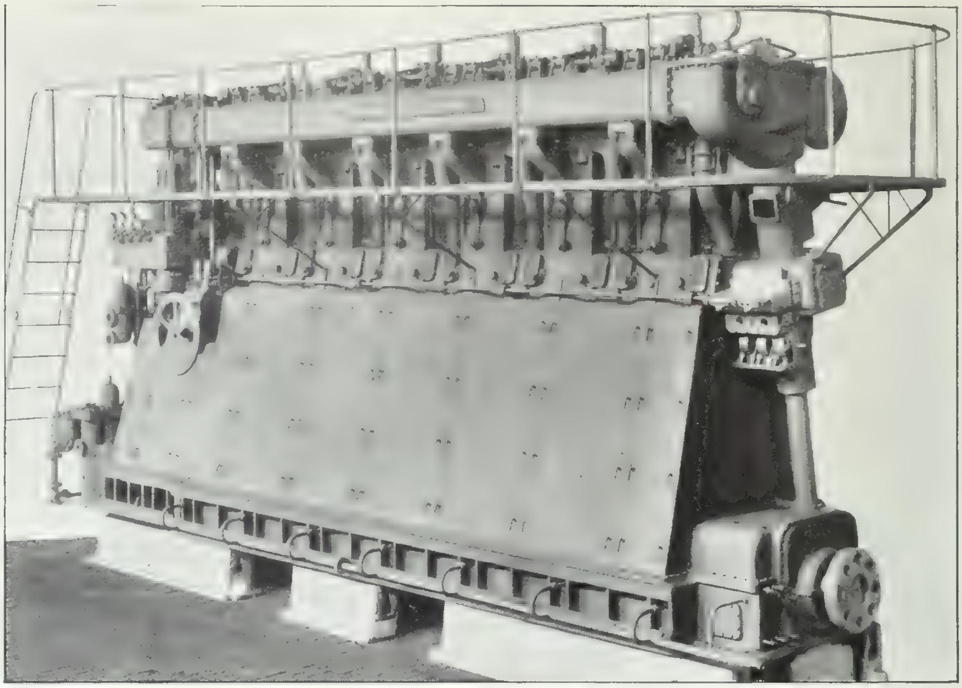
MOTORSHIPS FOR PIRRIE GROUP

A large proportion of the motorships now being built in Great Britain are for the Lord Pirrie combine, which includes many of the biggest shipping firms. Included among these orders are eight vessels for the Glen Line (four of 14,000 tons); three for the Royal Mail Steam Packet Company (of 11,000 tons); one for the Pacific Steam Navigation Company, and three more, for owners as yet not named, that will be of an entirely different type from any yet built. They will be single-screw craft, carrying about 5000 tons and equipped with a 1200 horsepower Beardmore Diesel engine. These motors will be the first large marine oil engines of the Diesel type constructed by the Beardmore Company and are manufactured under license from the Italian Tosi firm. They are four-cycle sets and include many unusual points in the design, one of which is the use of a common valve for inlet and exhaust, by means of which the arrangement of the cylinder head is considerably simplified. Reversing also is rendered a problem easy of solution and the whole of the control is effected by means of a single handwheel.

ITALIANS PROGRESS RAPIDLY

It may be a matter of some surprise that a well-known British shipbuilding firm should find it necessary to take up a license from Italian builders, but the progress which has been made in Italy in oil-engine design of late years has been very pronounced. In addition to the Tosi firm, the big Ansaldo San Giorgio Company is now producing motorships on a standardized scale and has recently completed five sister vessels, from Ansaldo San Giorgio I to Ansaldo San Giorgio V, the fifth having just run her trials. They have inaugurated a new service between Italy and the West Coast of South America, through the Panama Canal and the advantages gained in their operation may be gauged from the fact that steamers trading from Italy have to pay up to about £14 or £15 a ton for their coal. The Ansaldo Company has now received orders for some standard motor vessels of larger size, to carry 12,000 tons and to be equipped with two 1600 b. h. p. Ansaldo engines.

These motors are of the two-cycle type with port scavenging, and, according to the results achieved with the first five vessels, this system has proved very satisfactory. It differs from the well-known Sulzer arrangement in that there is only one set of scavenging ports, the admission of scavenging air through these ports being controlled by a piston valve located within the scavenging trunk. There thus is only one valve in the cylinderhead for the admission of fuel, with the result that no troubles are experienced in the matter of cracked cylinder-covers, which were a source of great difficulty in many of the early two-cycle engines with valve scavenging. All of the standard vessels mentioned above that have been built in Italy were constructed for the Societa Nazionale di Navigazione, of Genoa.



Marine Diesel Engine of the Tosi type now being manufactured in England by the Beardmore Company

TWO INTERESTING TRIALS

Two important motorships are due to run their trials in the course of the next few weeks. The first of these is the 12,000-ton Bibby liner Dorsetshire; similar in dimensions and machinery power to the large motor vessel now under construction for the United States Shipping Board. She is the first motorship built at the Belfast yard of Harland & Wolff, all the other vessels constructed by this firm having been produced on the Clyde. The second vessel is the Glenogle, the 14,000-ton 14-knot Glen liner which is the forerunner of a fleet of a similar craft. Of late workmen in shipyards have been speeding up to some extent, with the result that vessels are being completed more rapidly than was the case a year ago. It is anticipated, therefore, that the next six months will see some very important developments in motorship building in Great Britain and the rest of Europe, in view of the large number of interesting internal combustion engines now on the stocks.

A 12,000 TON BRITISH MOTOR SHIP

TWO motor ships are under construction at Harland and Wolff's yard at Belfast somewhat different in design from previous vessels that have been turned out by British shipowners. They are building for the Bibby Line for the eastern run and are 450 feet in length with a beam of 57 feet, carrying approximately 12,000 tons of cargo and a dozen passengers.

The first vessel is now practically completed and will shortly run her trials, whilst the second was recently laid down. In both cases engines of the four cycle Burmeister & Wain type built by Harland and Wolff at Glasgow are being installed. They are six-cylinder sets developing 2250 i. h. p. each, with cylinder diameter 740 m.m. and a stroke of 1150 m.m. They are practically identical in every respect to the two motors supplied by Burmeister & Wain to the United States Shipping Board for installation in a 13,000 ton vessel now being built. The fuel consumption at the full speed of 12 knots will be in the neighborhood of 14½ tons per day.

Following the practice which is now common with most motor ships, the auxiliary machinery will be electrically operated. In the engine room are installed three Diesel driven generating sets of 100 k. w. each and these supply the necessary power for operating the electric winches, electric hydraulic steering gear, and the various pumps and other machinery in the engine room. The two new vessels are to be named the Dorsetshire and Somersetshire.

DIESEL ENGINE CASTINGS*

EVERY one who has had to do directly with the manufacture of Diesel engines is convinced that the metallurgical side of the question is one of vital importance.

In cast iron, when it is cooling down from the molten to the solid state, the planes of crystallization group themselves perpendicularly to the surface of the external contour, that is to say, at right angles to the outside surface and in the direction in which the heat of the fluid cast iron has passed outward from the body in cooling and solidifying. Every abrupt variation in the external contour, every salient and every re-entering angle, no matter how small, upon the surface of a casting, is attended with an equally marked sudden alteration in the arrangement of the crystals of the metal. The natural remedy for this, therefore, is to avoid all sharp angles, ribs and sudden deviations of sectional outline, so that the metal while being poured may be allowed to flow in natural curved lines.

Every advantage should be taken of any process in manufacture that will facilitate closeness of grain with its consequent close packing and greater cohesion of the crystals. It is, therefore, advantageous to cast the cylinder liners and pistons on end, with the breach end at the bottom, thus taking advantage of the static pressure of the metal in the mould. Denseners also have been used for improving the compactness of the piston head, but the use of these requires special care or hardness will be overdone.

Hardness is a point which requires very careful watching in this class of work, as a cast-iron piston, if too hard, has a tendency to split right across when first put to work, particularly if it is subjected to full load soon after starting. A tough iron, therefore, is more desirable. The properties of cast iron which are essential to successful working of Diesel engine pistons and liners are: High tensile and other physical properties; metal which will readily take a high polish under working conditions and thus give good resistance to wear, and the ability to resist growth and cracking when subjected to the high working temperatures which are a feature of this class of engine. These conditions are only met with in cast-iron possessing the highest intercrystalline cohesion, and this is also associated with metal which gives the highest tensile strength. It is a remarkable and fortunate circumstance that all these desirable qualities are associated with cast iron in proportion to its tensile strength. This naturally narrows the choice, and materially assists in determining the proper metal to be used.

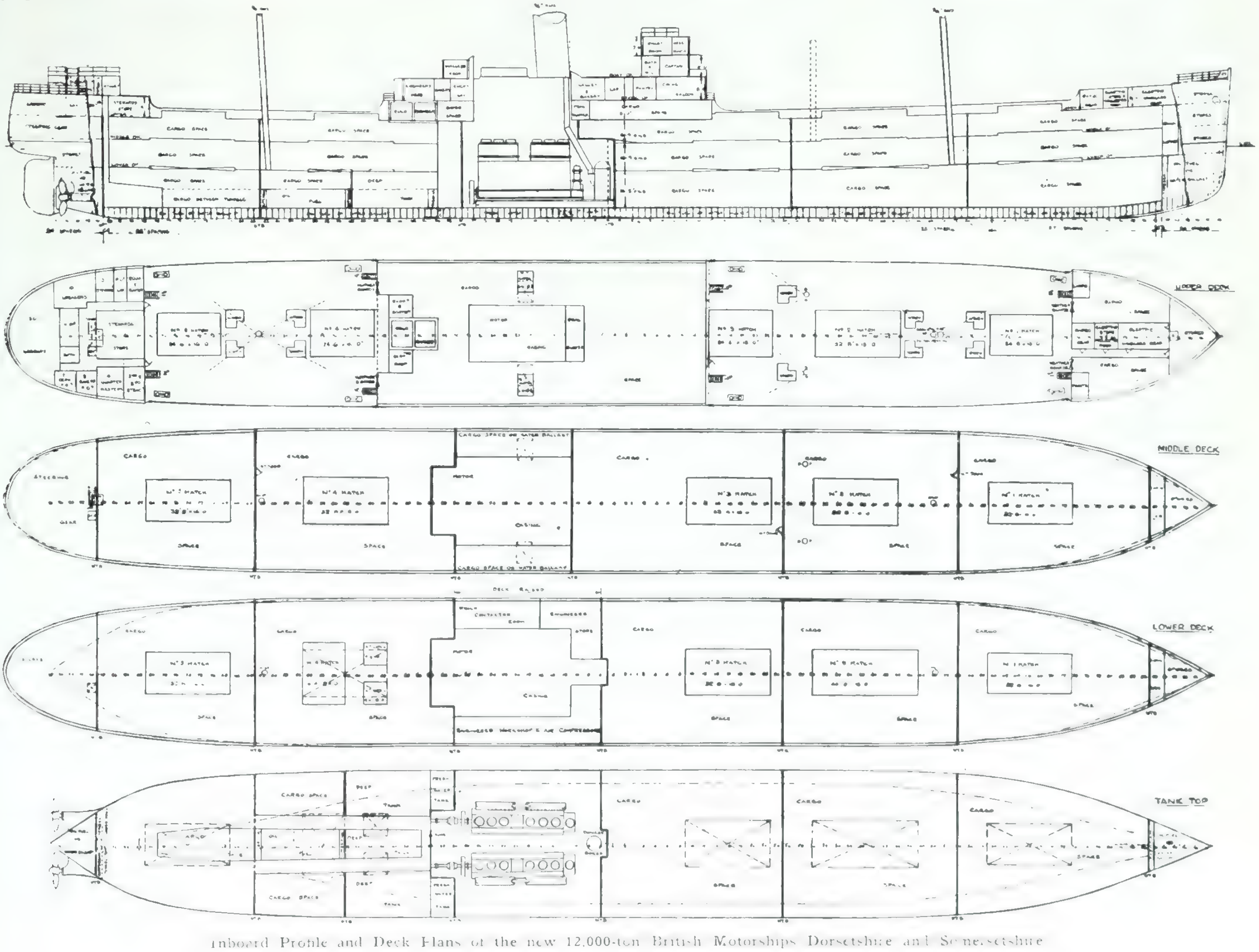
The factors which tend to give a cast iron having the highest physical properties are:

(1) Chemical composition.
(2) Casting temperature.
(3) Rate of cooling.
(4) Microstructure.

It is essential to take into account the rate of cooling when considering the chemical composition of metal to be employed in any given casting.

CARBON

The most important element in cast iron is carbon. It is not too much to say that all the physical properties of the metal depend upon the quantity of this element present and its conditions, the value of the other elements being in accordance with the effect they have on the carbon and the compounds it forms.



Inboard Profile and Deck Plans of the new 12,000-ton British Motorships Dorsetshire and Somersetshire

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* Paper read on January 30 by Mr. F. J. Cook before the North-East Coast Institution of Engineers and Shipbuilders, as abstracted by "Shipbuilding and Shipping Record."

The author's experience leads him to the conclusion that maximum tensile strength is obtained with 0.6 to 0.8 per cent of carbon, and maximum transverse strength with 0.4 to 0.6 per cent.

The element silicon is always present, in proportions most variable, while the influence it exerts on the condition of the carbon present, and consequently on the hardness and fluidity of the metal, is most marked. As the quantity and condition of the carbon have been stated to be so important, while the effect of silicon on this element is so marked, it is clear that if a formula can be adduced that will show when these two elements are in the best proportions for any given class of work, a very important stage will have been reached. With this object in view, the author has adopted the following more or less empirical formula, based upon the amount of carbon in the pearlite, and has used it with marked success in practical working:

$$Sc \quad \frac{C}{4.26 - \frac{Sil}{3.6}}$$

where Sc = ratio of silicon to carbon,
C = **total** carbon in percentage,
sil = silicon in percentage.

The elements carbon and silicon are in the best proportion for Diesel engine pistons and liners and all parts requiring highest tensile strength when the value of Sc = 0.76 to 0.82, and for water-cooled cylinder heads and castings requiring maximum transverse strength when the value of Sc = 0.83.

By many, sulphur is looked upon as the arch-enemy of the iron founder; but although its presence makes the molten meten metal thick and sluggish, thus giving rise to blow-holes, this element, in fair proportions—say 0.12 per cent—adds considerably to the wearing properties and strength of the metal. In every case, however, sulphury iron **must** be cast as hot as possible if trouble is to be avoided.

When the proportions of total carbon and silicon are those required for maximum tensile strength—as in the formula given—the proportion of phosphorus may be as high as 1 per cent without seriously jeopardizing the tensile strength; in fact, with steam cylinders and castings requiring maximum strength and of complicated design the reduction of shrinkage and the additional fluidity of the metal due to this percentage will generally result in a sounder casting, with fewer initial contraction strains. Where the ratio of silicon and carbon is different from that which has been suggested, the quantity of phosphorus becomes one of the vital elements and must then be kept as low as possible.

The attached table, which contains part of the information gleamed by the author from several years' study of British and Continental results, goes to show that where the silicon and carbon are in the desired ratios, the quantity of phosphorus present does not become so extremely important:

In each of the instances cited — and many more could be given if necessary—the results in actual working bore no relation to either the phosphorus or the manganese content of the metal, but were closely related to the results suggested by the silico-carbon ratio.

Manganese has a tendency to harden the iron both directly and by causing the carbon to remain in the combined form. In the presence of much sulphur, however, it may act as a softener by uniting with that element and forming manganese sulphide, which rises to the top of the metal and passes away with the slag. The general properties of the metal—other than a tendency to chill—are not materially affected so long as the manganese is not in greater proportion than 0.7 per cent. For castings in the making of which denseners are employed on faces which have to be machined, it is not advisable to have more than 0.4 per cent; otherwise there will be a tendency to chilling. As manganese tends to the removal of sulphur and the formation of brittle, spiky crystals, which break off under rubbing, much of this element is not good for castings which are required to have good wearing properties when working under heated conditions.

To sum up, the proportions of the various chemical elements which the author has found to give good results for Diesel engine cylinder liners and pistons are:

Total carbon = 3 to 3.2 per cent.
Silicon = 1 to 1.2 per cent.
Phophorus = not over 1 per cent.
Sulphur = 0.12 per cent.
Manganese = not over 0.5 per cent.

For cylinder covers, which require to be not quite so hard for wearing purposes, and in which metal with rather less contraction is desired, the silicon can with advantage be increased to 1.5 per cent and the manganese to 1 per cent.

After twenty years' experience with this class of metal, the author finds that the most advantageous amount of steel to be added to the mixture is 15 per cent. Experiments with varying amounts up to 40 per cent have been made, but with above 15 per cent the metal has a tendency to be too hard, which is very undesirable for this class of work. Further improvement will probably be gained by the addition of some of the rarer elements and in this direction vanadium-chrome or nickel-chrome seem to hold out some prospect of success.

There is much room for investigation into the subject of surface disintegration and wear of cylinders and all rubbing surfaces of cast iron. When cast iron is machined by the ordinary cutting methods there is more or less tearing away of the crystals. The tearing out of the softer material produces cracks or indentations and leaves the harder constituents standing up in relief. The degree of fineness of the finish will depend upon the structure of the material and the speed at which the material was cut; generally speaking, the quality of the finish will be improved as the cutting speed decreases. The resistance to wear under working conditions depends upon how far the crystals will resist breaking off—thus forming a hard, gritty, abrasive substance which increases the wear—or will spread over and form a highly polished surface. Grinding of cylinder liners and piston rings, being less drastic and exposing less of the harder crystals, appears to be a desirable method of finishing these articles, provided every trace of emery be removed. Where this is not practicable, very slow cutting speed and fine feeds for finishing should be resorted to with the object of decreasing the wear.

Considering the enormous quantities of heat which the pistons and cylinder heads have to deal with, it is imperative that everything in the nature of cooling strains in the castings should be eliminated, so that the crystallization shall be in its natural formation, allowing free and ample expansion. As all castings are more or less subject to initial strains, it is desirable that those having to work under heated conditions should undergo some heat treatment of annealing. It is to be feared, however, that frequently more harm than good is done owing to a general lack of knowledge of what is desired and of the results generally accruing from heat treatment of cast iron, and to the crude manner in which the heat treatment is performed.

While heat treatment of cast iron, even at a low temperature, affects the physical properties of the metal, a prolonged treatment at 780 degrees Centigrade is positively dangerous, as, among other things, the pearlite is then broken down and the generally desirable physical properties of the metal are destroyed.

Considering the cooling effects the cylinder liner receives when at work, and bearing in mind that it is less subject to initial casting strains, the author does not consider heat treatment of these parts necessary. It is essential that the heat treatment shall be carried out in a properly designed furnace.

	Suggested by Hurst Per Cent	German Per Cent	Another German Per Cent	Continental Per Cent	Replaced by Per Cent	Scotch Per Cent	Suggested by Author Per Cent
Phosphorus ...	0.52	0.33	0.59	0.54	1.34	0.54	Not over 1
Manganese ...	1.44	0.72	0.99	1.08	0.28	0.97	Not over 0.5
Silicon	0.9	0.83	0.91	0.92	0.8	0.77	0.76 - 0.82
Results		Good	Bad	Bad	Good	Good	**

Has never given star cracks, low tensile results, nor bad wearing qualities.

ROUND THE WORLD ON A MOTORSHIP

THE American motorship Katherine, formerly the four-masted British ship County of Linlithgow, arrived at San Francisco July 13 from New York, having completed, in the last nine months, a voyage around the world by way of Manila, Suez, London and New York, with only 27 hours and 30 minutes lost by both engines of a running time of 159 days and 15 hours. Two 320-horsepower Bolinder engines, sold by Henry Lund & Company and installed in the Katherine at the yard of the Hanlon Drydock & Shipbuilding Company last year, give such good service that they run, in the words of F. Uhlein, chief engineer, "as well as any steam engines or perhaps a little better." Of the 27 hours and 30 minutes lost, 20 hours was due to the faulty lubrication of a bearing, so that there was almost no engine trouble. The voyage was made at an average consumption of 24 barrels of fuel oil and 42 gallons of lubricating oil a day, or one barrel of fuel oil an hour, this consumption including that of the 15-horsepower dynamo engine.

In the operation of the Katherine two factors have made for her excellent record: the engine-room staff is composed of experienced heavy-oil engineers; and the vessel has been run as a motorship and not as a sailer; that is, her sails are used as auxiliaries to her engines, instead of the engines being used as auxiliaries to the sails. At no time during the entire voyage were the engines shut down and the Katherine given over to sail alone; her engines were run continuously, except for unavoidable stops; and in general the vessel was held as closely as possible to the steamship tracks. In other words, she might deviate from a steamship course in order to take advantage of a fair wind, but only when the greater distance sailed was more than compensated for by the increase of speed. How closely she was held to the steamer routes may be understood from her log, which shows that the distance sailed from New York to Colon was 1999 miles, as compared with a distance on the steamship track of 1975.

On her trial trip over the measured mile in San Francisco Bay, the Katherine made 7.9 knots. She made this same speed on the entire first leg of her world voyage, from San Francisco, although she had several days of fair winds, which permitted her to make one run of 227 miles. On the whole, however, she made, with her old propellers, only about one - half or three-fourths of a knot better speed with sail than without; and these propellers, 84 inches in diameter with a pitch of 51, were changed in New York to the Bolinder propellers, 75 inches in diameter with a pitch of 66, which gave better results.

The Katherine is an iron ship, thirty-three years old, built at Glasgow in 1887 by Barclay, Curle & Company. She is owned by the Philippine Vegetable Oil Company, which installed tanks to carry about 2600 tons of cocoanut oil. In her fuel-oil tanks she can carry 2440 barrels, sufficient for a voyage from San Francisco to Manila and return, in addition to 500 barrels that can be taken in the cofferdam. Due to cocoanut oil solidifying at relatively high temperatures, the Katherine, like other vessels designed for carrying this product, is fitted with steam coils for heating and liquifying the oil prior to discharge. Steam was held in the coils for nine days before arriving at London from Manila with a cargo of cocoanut oil. The remodeling of the vessel was planned by D. W. & R. Z. Dickie, San Francisco.

An epitome of the log of the Katherine follows:

Sailed from San Francisco October 20, 1919, 10:45 a. m.; 11 days to the longitude of Honolulu; arrived at Manila November 26, 3:10 a. m.; 36 days, 22 hours and 8 minutes from San Francisco; distance run by observation, 6987 miles; average speed, 7.9 knots an hour; port engine running at full speed throughout; starboard engine stopped 7 hours and 10 minutes (6 hours and 15 minutes on the fifth day, a high-pressure copper air coil having split; 20 minutes on the twentieth day for examination of the valves of the air compressor; 35 minutes on the twenty-second day for replacing a cylinderhead gasket); sail carried during most of the voyage; best day's run west of Guam, 227 miles, an average speed of 9.5 knots an hour, with a strong northeast trade, force 6; weather conditions, average.

Sailed from Manila January 9, 1920, 10:55 a. m.; 7 days, 8 hours and 22 minutes to the longitude of Singapore; 8 days, 10 hours and 22 minutes from Singapore to the longitude of Colombo; 12 days, 13 hours and 19 minutes from Colombo to Aden; 8 days, 23 hours and 30 minutes from Aden to Suez; or, 15 days, 18 hours and 44 minutes from Manila to Colombo; 28 days, 8 hours and 3 minutes from Manila to Aden; 37 days, 7 hours and 28 minutes from Manila to Suez; arrived at Suez February 14, 11:38 a. m.; distance from Manila by observation, 6355 miles; average speed, 7 knots an hour; both engines run at full speed during the voyage; on the second day out of Manila the squaresail was set and carried for a few days; between Singapore and Suez sail was carried for four hours only; best day's run, 208 miles; weather, largely calm and light head winds.

Sailed from Suez February 17, 6:30 a. m.; arrived at Port Said February 18, 2:10 p. m.; anchored over night at Ismailia in the canal.

Sailed from Port Said February 19, 10 a. m.; arrived at Thames Haven March 14, 7:24 p. m.; 23 days, 22 hours and 29 minutes from Port Said; distance by observation, 3486 miles; average speed, 6 knots an hour; both engines run at full speed during the entire voyage; head winds prevailed more than one-half the voyage. Sail was carried only to steady the vessel. From Manila to London the running time was 65 days, 12 hours and 19 minutes, from which is to be deducted for detentions 4 days, 6 hours and 23 minutes, leaving a net of 61 days, 5 hours and 56 minutes for 9882 miles, the average speed being about 6.7 knots an hour.

Sailed from Thames Haven April 1, 4 p. m.; arrived at New York May 1, 3:06 p. m.; 30 days, 4 hours and 6 minutes from Thames Haven; distance run by observation, 3093 miles; port engine run at full speed throughout; starboard engine stopped 20 minutes to tighten a set screw securing the eccentric; heavy head winds lengthened the voyage; no sail carried.

Sailed from New York June 10, 1:20 p. m.; arrived at Colon June 20, 1:25 a. m.; 10 days, 12 hours and 29 minutes from New York; distance run by observation, 1999 miles; average speed, 7.9 knots an hour; little sail carried; calms eight days, fair winds two days.

Sailed from Balboa June 23, 12 noon; arrived at San Francisco July 13, 9:55 p. m.; 20 days, 12 hours and 47 minutes from Balboa; distance run by observation, 3287 miles from Balboa; average speed, 6.7 knots an hour; time from New York to San Francisco, including passage of the Panama Canal, 33 days, 11 hours and 41 minutes; distance run by observation, 5331 miles from New York; no sail carried between Balboa and San Francisco; calms for sixteen days, head winds thereafter; starboard engine run at full speed throughout; port engine stopped July 6 because of bearing trouble due to faulty lubrication; time lost by the port engine, 20 hours.

When this trouble occurred the port engine had run for 152 days without a stop at sea. On the voyage around the world the total running time of the engines was 159 days and 15 hours, during which both engines never were stopped at sea at the same time; and the total time lost by both was only 27 hours and 30 minutes.

Fuel oil was taken at Suez. It was not so satisfactory as the asphalt-base California oil, but gave better results when 200 barrels of kerosene were mixed with 400 barrels of the havier oil at New York, which at that time was experiencing a severe shortage of fuel oil, none whatever being obtainable.

FUEL OIL SITUATION

TWO of the largest liners of the world, the Olympic of the White Star and the Aquitania of the Cunard Line, have been converted into oil burners and have made their first voyages using that fuel. This step is doubly important, because it not only means that a considerable portion of the British merchant marine is following in the steps of the British navy, which began to install oil-burning apparatus during the war, but also because this action has been taken at a time when the shortage of fuel oil is becoming more pressing each day. Regarding the latter point, however, there are hints that the Cunard Line is about to acquire oil fields in order to assure itself of an adequate supply.

5400-TON OIL CAPACITY

The Olympic arrived at New York July 2, after a voyage on which she averaged twenty-one knots an hour. Her day's runs were 334, 597, 512, 507, 533, 525 and 381. W. A. White, designer of the oil-burning system installed in the liner, said that she would be able to make twenty-two knots on 520 tons of oil after the stokers had become more familiar with the system. Only six hours are required to pump 5400 tons of oil, her bunker capacity, into her tanks. Nearly 9000 men were employed on the Olympic at the Harland & Wolff yard, Belfast, reconditioning her and installing the new apparatus, at a total cost of about $5,000,000. Some idea of the extent of the installation may be gained from a recital of the fact that the Olympic has 195 furnaces and twenty-nine boilers. One immediate result of the installation was a reduction of about 250 men in the number of the crew, her complement now being about 790. Coal trimmers and firemen were the men dropped.

Among other changes made in the vessel are the installation of a steering device which prevents the helmsman from putting the helm in any direction other than that ordered by the officer on the bridge; a Forbes patent log and a speedometer; fifty new lifeboats; and twelve-ton anchors, the old seven-ton anchors having been too small.

AQUITANIA DROPS 230 MEN

The Aquitania was converted into an oil burner at the Walker yard of Messrs. Sir W. G. Armstrong, Whitworth & Company, Newcastle-on-Tyne. In the beginning the Cunard Line's intention was to utilize only the coal bunker space, both side and athwartship, for oil storage, but the capacity was not sufficient, and six of the double-bottom tanks were prepared for oil. Much structural steel work was necessary in order to make the coal bunkers suitable for the liquid fuel. As is the case with the Olympic, the Aquitania can be bunkered in about six hours; her crew has been reduced by about 230 men, her firemen numbering seventy as compared with 300; and the White system of oil burners was installed. Extensive reconditioning, of course, was necessary, as the Aquitania, having made her maiden voyage from Liverpool May 30, 1914, was commandeered by the British government immediately upon the outbreak of the war and was used as an armed merchant cruiser, a hospital ship, and, after the declaration of war by the United States, as a transport for American troops.

MAKURA CONVERTED BY THE BETHLEHEM

On the Pacific Coast the conversion of coal burners to oil continues. Among the more important installations has been that in the Union liner Makura, which plies on the Canadian-Australasian route between Vancouver, Honolulu, Suva, Auckland and Sydney. This work was done at the Potrero plant of the Bethlehem Shipbuilding Company, San Francisco. Other installations continue to be made in vessels built in Japan for the United States Shipping Board.

In addition to the change in the Aquitania, the Cunard Line is building new vessels, of an aggregate gross tonnage of 200,000, all designed as oil burners. Among these are the Scythia, Albania and Tyrrhenia. The anchor Line, affiliated with the Cunard, also is building seven liners, 95,000 tons gross in all, which will burn oil. No steps have been taken to convert the Mauretania or any old vessel except the Aquitania; but the installations already made or to be made are such as to give rise to the belief that the Cunard would obtain its oil at the source.

DEVELOP PAPUAN FIELDS

To turn from the Atlantic to the Pacific: Australia has moved to secure its oil supply by entering into an agreement with the Anglo-Persian Oil Company for the establishment of a refinery in Australia, the Commonwealth engaging to supply the company with 200,000 tons of crude oil a year. The company is to have a free hand in the development of the fields of Papua, or New Guinea, which have come into public attention of late. One prime consideration of the Commonwealth government was the assuring of an adequate supply for the navy, for, said Premier Hughes, the shortage recently was so great that the navy was helpless. Backing of both the Commonwealth and Imperial governments will be given the Anglo-Persian Oil Company, the Commonwealth having been allotted 250,001 shares of 500,000, of a par value of £1 each, of the refinery company, with the agreement that the Commonwealth could purchase the company's interest at the end of fifteen years. The consumption of oil in Australia in 1919 was 51,000,000 gallons, as compared with 26,000,000 in 1910.

DRILLING BEGUN IN 1912

Drilling for oil in Papua was begun about eight years ago, under the supervision of the mines department; and again, in 1915, Dr. Wade and his assistants sunk wells, some with hand equipment. So difficult were some of the strata that boring had to be discontinued; and in general the machinery was too light to carry the well to the required depths. Oil was found, however; in one well at a depth of 300 feet, but not in commercial quantities. This oil was similar to that of Borneo and Sumatra, "and was regarded as of great value for petroleum spirit, but not so for fuel ships." Different borings have been made since, with results not definitely known. That the oil has been of exceptional quality is evidenced by the statement of a British marine engineer that a small vessel, powered with a heavy-oil engine, used the crude oil without any motor trouble resulting. This oil was obtained at Vailala, about 200 miles from Port Morseby. Up to 1918 borings had cost approximately £65,000. Papua is the largest island of the world (if Australia be classed as a continent) and is remarkably rich, both in vegetable life and minerals.

The Cunard Liner Aquitania at the Walker Yard of Armstrong Whitworth & Co., Newcastle-on-Tyne, England

BOLTS VERSUS TREENAILS

As Fastenings in Wooden Ship Construction (Part II)

By A. K. ARMSTRONG
Formerly Assistant to Chief Surveyor, American Bureau of Shipping

IT is the practice to drive all treenails and bolts with a drift; that is, into holes whose diameters are bored smaller than those of the fastenings by the amount of the stated drift. This is absolutely essential in the case of iron bolts, in order to develop enough compression in the wood to hold the fastening; the maximum effect probably depending upon a particular drift, which, in turn, depends upon the diameter of the bolt and the species of wood into which it is driven. For instance, it is possible to exert a greater splitting force on oak than on pine or fir, without failure; and bolts, therefore, should be susceptible of a greater drift in oak than in pine or fir. On the other hand, a greater drift would be required to develop the same holding power of iron in pine or fir as in oak, due to the greater softness of the two former woods. Too large or too small drifts are to be avoided in any case; since with too small a drift the full compressive value of the wood is not developed, and with too large a drift splitting of the timber is likely to develop before the full compressive value has been reached. In either case, the fullest possible value of the holding power of the fastening will not be developed.

GREATER DRIFT FOR SOFT WOODS

Ordinarily, the drift given for iron bolts in oak and other hardwoods is one-sixteenth inch; while, with softer woods, like pine and fir, a drift of one-eighth inch is often specified for bolts not over two feet long. Possibly the best way to determine the relative amount of drift required would be through observing that, under the same conditions of diameter and thickness of lumber, the bolts drive at the same rate per unit of time. In this connection, however, it must be taken into account that the scantlings of the softer woods are usually heavier than those of the harder woods, with the result that an increase in holding power is attained through the greater length, and, automatically, the greater diameter of the bolts required in the soft woods. The amount of drift is also limited by the effect of driving on the bolt, since the head may be ruptured, flattened and curled over in such a way as to become a detriment to the structure.

The same general reasoning with respect to drift for bolts applies also to treenails. The amount of drift for treenails is frequently not specified; but the practice seems to vary from driving a tight fit to allowing one-sixteenth of an inch drift in soft woods. As a matter of fact, if the treenail and the timber into which it is driven were thoroughly dry, it is unlikely that anything but driving to a tight fit would be necessary, especially below the light water line, and, perhaps, as far as the deep load-line; since the ultimate holding power of the treenail would be developed by the swelling of itself and of the planking in service. Some swelling can always be counted upon in service; and for that reason it is improbable that a drift greater than one-thirty-second of an inch would be required below the deep load-line.

LONG TREENAILS MAY SPLIT

If treenails required the same drift as bolts, they possibly would drive harder, owing to their greater diameter. The largest iron fastening in use, the one and three-eighth inch bolt, can be driven up to five feet in length by hand, and probably two feet more with air hammers. Treenails driven by hand cannot be driven single-drift (that is, in the form of a true cylinder) when over two feet in length, even when struck by two men alternately and rapidly. If longer, they break, split and broom. With air hammers, of course, there is a possibility of driving longer treenails in single drift; but the ease in driving a treenail can be considerably increased by boring the hole in two drifts and employing a tapered treenail. Tapered treenails require hard driving only over half their length; and have the additional advantage over the iron fastening in that it is easier to regulate the diameter of the hole to suit the diameter of the fastening, than in the case of the single drift iron fastening. It is possible, in this way, to drive a long treenail just as effectively as an equivalent iron fastening, although the cost of boring for the tapered treenail will be higher. Treenails less than two feet in length can be as effectively and probably more easily driven than iron bolts.

LESS TEARING OF FIBERS

The treenail has this decided advantage over the bolt or spike: its compressibility will insure less tearing of the fibers into which it is driven. In fact, the iron is so much harder than the wood that, if driven with the ordinary drift, it can find its way into the smaller hole only by compressing the wood in all directions beyond its elastic limit, and through forcing over and bending the ends of the wood fibers. On the other hand, the end grain compressive strength of the plank and frame is always higher than the side grain compressive strength of the treenail at the latter's elastic limit, so that in one direction the treenail is compressed. The side-grain of both the treenail and the timber into which it is driven is compressed in driving; so that the holding power of the treenail can be developed without undue injury to the plank or frame. The treenail is far superior to the iron fastening in this respect. When a spike is properly driven to its full length into a bored hole its holding power is increased. When not driven into a bored hole its splitting action is very great. This may cause the weakening of the frame, in which, in practice, it is not customary to bore holes for the spikes. This is especially true of easily-split woods like spruce, pine and fir. A spike driven directly into the wood tears and crushes the fibers as it goes through, which greatly decreases its holding power as compared to a spike driven into a bored hole.

The splitting action of the spike in the frame is mitigated through the fact that spikes have a length that is only twice the thickness of the plank which they fasten; and their diameter is comparatively small. A seven-sixteenth inch spike will scarcely ever be more than eight inches long; nor a one-half inch spike more than twelve inches long. Allowing for plugging this would place the twelve-inch spike not more than seven inches into the frame, which generally is sufficiently large in molding to offer the requisite resistance to splitting. Sometimes, however, five-eighth-inch spikes are employed to work heavy topside strakes or ceiling; and these, being sometimes fourteen inches long, and driven eight inches into the frame, are likely to prove detrimental in soft woods. Beyond this diameter bolts are necessary.

SPIKE LIKELY TO BEND

Owing to its thin form, and the fact that it must cut its own path into the frame, the spike is susceptible to bending in driving, especially in hard woods. In very hard woods, such as live oak, its use should not be attempted. But the spike is, after all, the real archaic fastening, surviving from the dawn of history to the present time. In the days when a rock on the end of a bough was a good tool, it served its purpose well; but the only reason why it survives in ship construction today is that it allows of a more rapid work than the safer fastenings.

Another form of fastening is mentioned by Meade, who states that treenails with a thread cut in them had been used in England and Scotland prior to 1869. Undoubtedly any properly threaded fastening that is actually screwed into the wood is less liable to deterioration in driving, and is less prone to split the material, into which it is screwed, than is the smooth fastening. In resistance to direct pull a screw fastening is far ahead of any other form.

TEARING BY SCREW BOLTS

The term screw fastening, as just used, does not cover so-called "screw bolts," which, in driving, may prove a detriment to the structure. These latter fastenings have a screw-thread at one end to receive a nut and washer after driving through from the outside of the frame and ceiling. If the point of the thread is the same diameter as the bolt, as is often the case, the wood through which it is driven is so much exposed to tearing and scarring that the holding power will be lessened tremendously and the thread itself readily made subject to injury. No bolt of this kind should be driven unless the diameter across the point of the thread is less than that of the hole, and, consequently, less than that of the bolt.

In any and all cases, every fastening, of whatever type, should be driven so as to bear solidly in wood over its entire circumference and length. Otherwise, its holding power may be so much reduced as to cause it to cease efficient functioning.

PURPOSES OF HEADS

HEADING AND WEDGING.— A head on a fastening, when properly shaped and driven home, serves two purposes:

1. It forces the members through which it passes hard up against one another; and consequently adds one of the requisites of efficient holding power: that the two surfaces in contact bear fully upon one another, thus insuring the friction that aids so greatly in preventing relative movement between them.
2. It serves to prevent any withdrawal of the fastening through the plank, or of the plank off the fastening.

The latter function is far more important in a comparatively thin plank than in a heavy member.

The head of a fastening to be really effective in bringing one member tight against another, and holding it there, should have a wedge shape. The angle of this wedge shape with the longitudinal axis of the bolt should be slight, so as to prevent splitting; but in order to get the proper effect, the slight angle should accompany a comparatively long head. In this respect the head formed on the treenail through wedging is ideal, since the wedge, being set perpendicular to the edge of the plank, forms the head in the direction in which no splitting action can take place, namely, against the end-grain of the plank, which will stand a much higher compressive stress without deformation than the side-grain of the plank. The compressibility of the treenail insures the maximum effect of heading with the least danger to the plank. The head of the bolt wedges in all directions; and for that reason it requires to be much flatter than it otherwise would if splitting across the grain did not need consideration. The latter has to be carefully gauged, especially in soft woods, since the area resisting splitting is reduced below that on which the treenail acts, owing to the presence of the countersink.

ANOTHER ADVANTAGE OF TREENAIL

The treenail also has this advantage: that the square head on which driving takes place is cut off before wedging, and any defects due to battering thus removed: whereas the head of a bolt, when once deformed in driving, cannot be rectified, except at great expense, so that the ills which accompany a deformed head are likely to remain. Further, the head on a treenail can be reformed at any time by driving an additional or larger wedge. A bolt cannot be similarly treated.

The use of button-head bolts is not good practice, in that they are liable to bring the members together through mashing the flat underside of the head into the wood. If further over-driven this mashing is accompanied by a splitting action; and, in any case, is probably not nearly so effective in working up the planking or ceiling to the frames as the wedging action of the properly shaped head. Furthermore, if any shrinkage takes place (as is almost certain) the value of the head is in danger of being lost through the surface of the wood going clear of the bolt head. It is easy to see that this is not possible with the wedge-shaped head; and, in the case of the treenail, the head can be re-formed when necessary.

The defects of the button-head bolt are also found in the heads formed over clinch rings, which, while bringing the members hard up to one another, are not likely to serve any other useful purpose, unless again re-formed — that is, if shrinkage takes place, as is generally the case. The wedged heads of the treenails where they come through on the ceiling are likely to do more effective work in keeping the timber hard up than the clinched ends of through bolts as ordinarily put on.

USE OF NUTS

The attempt sometimes is made to overcome the difficulties attending the use of through bolts with ends clinched over rings, by supplying a thread on the ceiling end of the bolt, and clinching by means of a nut over a washer. As a head to prevent the pulling through of the bolts, or pulling away of the ceiling member, this method serves admirably; but there is a question whether the force exerted by the nut succeeds in bringing the members together. Since such bolts ordinarily are used in heavy members and generally pass through three or more such members, the probabilities are that the tightening of the nut will serve only to crush the washer into the side-grain of the inner member; the friction of the wood on the bolt probably being too high to be overcome by the force usually employed in tightening up the nut.

On the whole, it is to be concluded that the wedged head of the treenail is the most efficient kind in a thin plank up to seven inches thick; since, for reasons to be given later, the treenail is probably a practicable fastening for material up to and including that thickness only. For the same reasons the point of a through treenail wedged on the thin ceiling (seven inches thick and less) is probably more effective than any clinched point of a bolt driven inward from the outside of the frame or planking; and probably more effective than a nut and washer. This being the case, the more through treenails that are driven in thin ceiling, the more effective the structure is likely to be.

RESISTANCE TO LATERAL STRESSES

RIGIDITY VERSUS HARDNESS.— Where two members are fastened together the strength of the whole can be developed only by the number and size of the fastenings put in. In this connection it is surprising to hear the statement, often made, that such a ship is over-fastened and the wood all cut away. It is doubtful whether the fastening of any wood structure can, from the standpoint of practicability, be so complete as to fully develop the strength of the wood; and any cutting away of the timber, where fastenings are uniformly distributed, should not cause any disturbance of serenity, since no cases are ever cited where a vessel was lost through so-called over-fastening. The statement above called to attention generally means that the one making it believes that the ship in question has more fastenings than he has ever seen put into similar vessels. One thing is axiomatic: if a vessel has not fastenings in proportion to her scantlings, all the timber in the world will not save her from disaster.

The function of a structure composed of a number of members is to meet the requirements of its service with respect to strength; and, as before stated, the strength can be developed only by the fastenings holding the members together. In a ship, where practically all the main members are built up of two or more pieces, the strength of the member as a whole can be developed only by preventing the slipping of one piece upon another. In the ceiling and planking of a wooden ship, slipping is retarded or prevented through fastening the pieces to a common member, as a frame; by edge-bolting, as in parts of the ceiling; and by the calking of the planking and (where necessary) the wedging of the ceiling.

MORE FRICTION; LESS SLIPPING

The fastenings through the planking, frames and ceiling serve to make a contact on the common members of the frame; and the better the fitting the better will be the bearing of the frictional surfaces, and the less the possibility of slipping. Further insurance against slipping will be in the rigidity of the fastenings; but if this rigidity of the structure as a whole can be somewhat relaxed when subject to abnormal stresses, such as arise from extraordinary storms and grounding, the greater is the probability that the vessel will survive.

The fastenings themselves require rigidity, since, if this is lacking, they will be deformed and cease to function properly. In actual stiffness or rigidity iron far exceeds wood, the ratio being as from 15 to 20 is to 1. Weight for weight, however, the iron is only two and one-half times stiffer than the wood. Stiffness measures resistance to deflection; and, accordingly, the iron or steel will not bend as readily as wood of the same shape and size. From this standpoint the iron can be used in smaller sizes than the wood; but from the standpoint of driving alone, it is necessary to disproportionately increase the diameter of the iron (as compared with the diameters of treenails for the same purpose), so that, in the lengths in which it must be used, it will not bend or buckle under the hammer. For the same reason it probably would be necessary to make the diameter of the treenails somewhat greater than the actual stiffness of the fastening would require; but, in any case, the minimum diameter of the fastening to be used is, to a considerable extent, fixed by the compressive stresses to which it subjects the surrounding wood, as discussed later.

METAL LIKELY TO BEND

If there is any lack of rigidity in the iron or steel fastening, an abnormal stress will cause it to bend sharply at the junction of the frame with the planking or ceiling strake; and since iron bends but slightly to the elastic limit, any deformation would tend to tear the surrounding and softer wood, the extent of the damage increasing as the iron's deformation increased. On the other hand, the treenail would bend much farther, and on a longer radius, to the elastic limit (that is, without permanent deformation), and its hardness being little different from that of the wood in which it is imbedded, its tendency to rend the wood would be extremely slight as compared with the same tendency in the iron or steel.

COMPRESSION.—It is to be assumed, when the stresses in the ship are so high as to cause slipping of the frictional surfaces, and the deflection of the fastening does not result, that the resistance of the planking to end-grain compression and the resistance of the frame to side-grain compression largely will govern the results. The ratio of the end-grain compression to side-grain compression in dense Southern yellow pine and dense Douglas fir, for instance is about 3.5 to 1; and if the frames are molded in about that or a greater proportion to the thickness of the planking, and the fastenings run entirely (or nearly so) through the frames, the total stresses in both members due to compression will be equal.

AN AGENT OF DESTRUCTION

If, however, the stresses are so high as to cause slip to take place, the bolt or treenail, if sufficiently rigid, will be subjected to side-grain compression; and, if the stresses keep on increasing, will fail or cause failure. In the case of the bolt, the iron or steel is so much stronger in compression than the wood that the latter is sure to fail; the hole will be more and more enlarged; and the fastening cease to function. As a matter of fact, as soon as the metal fastening has the slightest opportunity to work, it becomes an agent of destruction, and immediately begins to tear the softer wood to pieces. On the other hand, the treenail itself is susceptible to a large degree of compression without damage to itself or the surrounding wood; and its hardness and that of the surrounding wood are so nearly equal that it does not become an agent of destruction. If the stresses tend to operate across the grain of the plank, and with the grain of the frame, the likelihood of the iron working and tearing loose or of the treenail working, would be less marked; but if this did happen, the destructive action of the iron on the planking would probably be much greater.

It is to be anticipated that, under extreme conditions of severe stress (such as those resulting from a ship running aground), the all-iron fastened vessel will go more rapidly to pieces than one fastened with a combination of treenails and iron.

THE SPIKE.—So far as the spike is concerned, the effects to be expected with the bolt will be accentuated; since the spike has a relatively smaller cross-section, a lower relative holding-power, and consequently less bedding in the frame. The latter condition gives the forces transmitted by the planking a greater leverage upon the fastening, causing it to tear both the plank and the frame; and it is to be deduced from old records that the all-spike fastened ships of 300 years ago were so inefficient that they frequently went to pieces in the open sea under stress of heavy weather.

COST.—An iron bolt, 1 inch in diameter and 30 inches long, will weigh at least 6½ pounds, which, with black iron at the pre-war price of four cents, makes the total cost 26 cents. In May, 1917, with prices higher than pre-war prevailing, squared locust treenails of the same length (30 inches), 1-7/16 by 1-7/16 inches in cross-section, cost 7½ cents apiece at New England yards. To the first cost of the bolt must be added the cost of heading, galvanizing, clinch-rings, boring, counter-sinking, driving, clinching and plugging; while to the cost of the treenail must be added the cost of turning, driving, cutting off the ends, wedging and dubbing. The disproportion between the cost of both forms, once normal conditions of supply and demand are restored, will then be even greater.

THE EASE OF RENEWAL

EASE OF RENEWAL.—In order to renew a treenail, it is necessary only to knock out the wedge, and to back or bore out the fastening. The problem of renewing an iron bolt is greater, as is obvious.

LIMIT OF USE.—The question naturally presents itself, whether the treenail, if superior to the bolt fastening, should not be used throughout the vessel. This is answered by stating that through the necessities of driving and stiffness, the diameter, required for a treenail in material above about seven inches in thickness, is too great to allow of effective driving or safety with respect to boring. It seems evident that when the diameter of the hole becomes greater than about from 1/8 to 1/7 the siding of the frame timber, damage may result to the latter. Room must also be left for refastening, which may be required through renewals of the members due to worming, rot or accident. Very large diameters also would tend to bore off too much wood at one spot; which is quite different from boring off a greater quantity of wood at two or more points. It is, therefore, apparent that when the member to be fastened is about seven inches thick, the diameter of treenail which it is feasible to use has reached a maximum (1½ inches), and that the necessary strength must be obtained through using metal. The latter, as before noted, can be used in smaller diameters than the treenail.

RESISTS DESTRUCTION BETTER

The conclusions are:

1. A treenail, when manufactured from a suitable species of wood, is less likely to be destroyed by contact with its surroundings than a metal fastening, however well protected.
2. The wedged treenail probably is more effective in preventing relative motion between the parts than the bolt or spike as ordinarily manufactured and driven.
3. In any case the wedged treenail is likely to be more effective than the headed bolt or spike, since relative motion of the parts is to be expected at some period of the vessel's life.
4. Since relative motion of the parts cannot always be prevented, the treenail is the best planking fastening for any emergency, especially as the vessel grows older.
5. The failure of the iron to form as entirely a satisfactory fastening as the treenail in a wooden ship, is due in part to the great difference between the iron and wood in all mechanical properties.
6. Treenails give the greatest durability, stiffness and resilience, with a minimum of weight and cost.
7. The spike fastening is only a makeshift in modern days, being a survival from very ancient practice in building small and weak vessels; and cannot be compared to the treenail or bolt where lateral strength is required.

THE ADMIRAL LINE

UPON his return from a protracted visit to Washington, D. C., where he spent several days in conference with officials of the United States Shipping Board, A. F. Haines, vice-president and general manager of the Admiral Line, announced that definite arrangements had been completed for the assignment of the steamship Wenatchee and steamship Keystone State, the first two of the Shipping Board's 535's to be completed, to the Admiral Line for operation in the Puget Sound-Oriental service. Barring the unforeseen, the Wenatchee will be ready for delivery to the Admiral Line at Philadelphia late in September and will be closely followed by the Keystone State early in November. The next two vessels will be assigned to the Pacific Mail Steamship Company and the remainder of the allocated vessels will be alternated between the two companies as rapidly as they are completed. A total of five vessels have been definitely allocated to the Admiral Line for operation and there is a possibility of their getting a sixth vessel. These ships will be placed in the following routes:

Four vessels: From Puget Sound to Yokohama, Kobe, Nagasaki, Shanghai and Manila.

Returning via: Manila, Hongkong, Shanghai, Nagasaki, Kobe, and Yokohama to Seattle.

Two vessels: From Puget Sound to Vladivostok, Shanghai, Dairen and Tsingau.

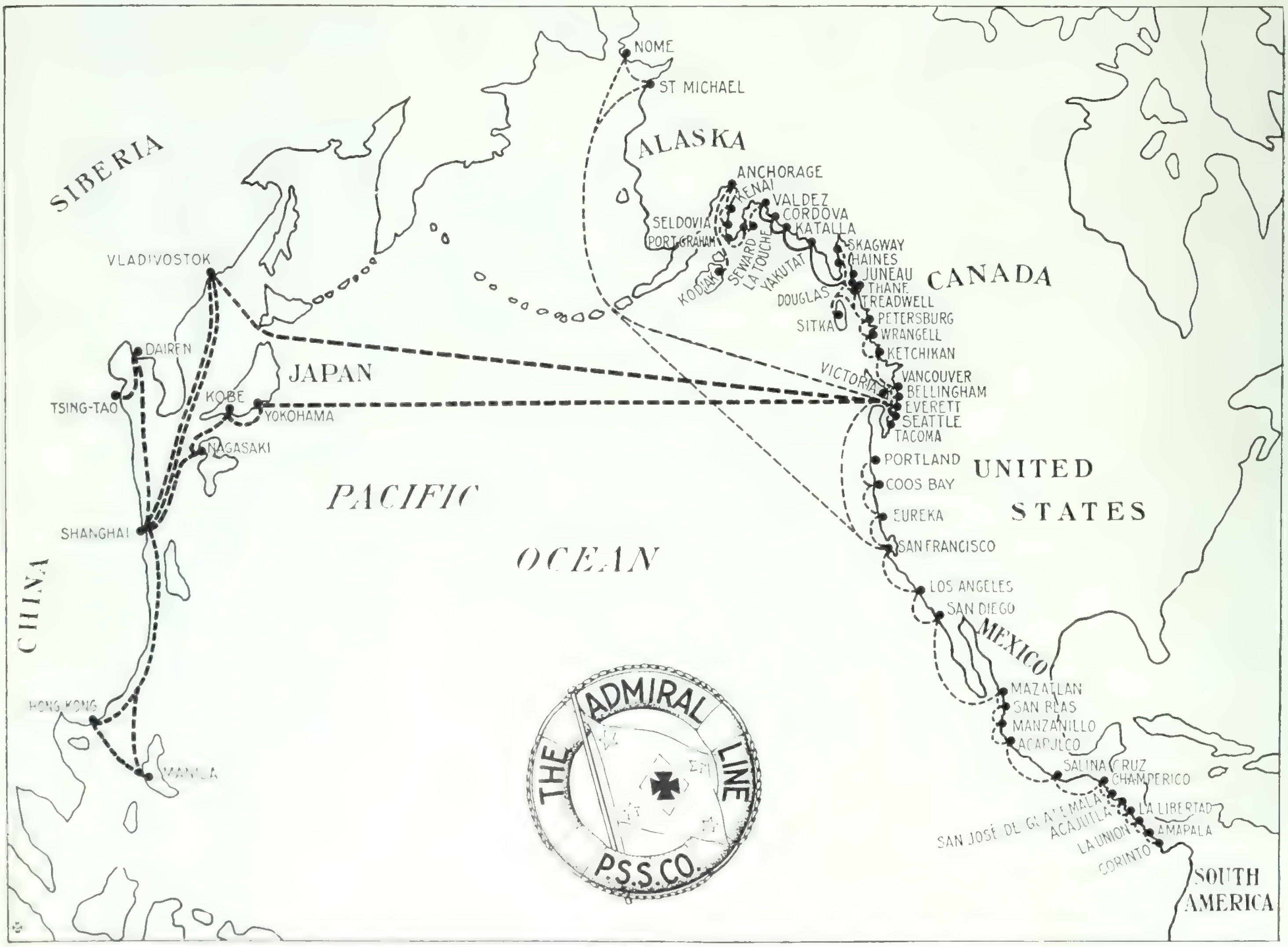
Returning via: Same route.

FIRST AMERICAN SERVICE FROM SEATTLE

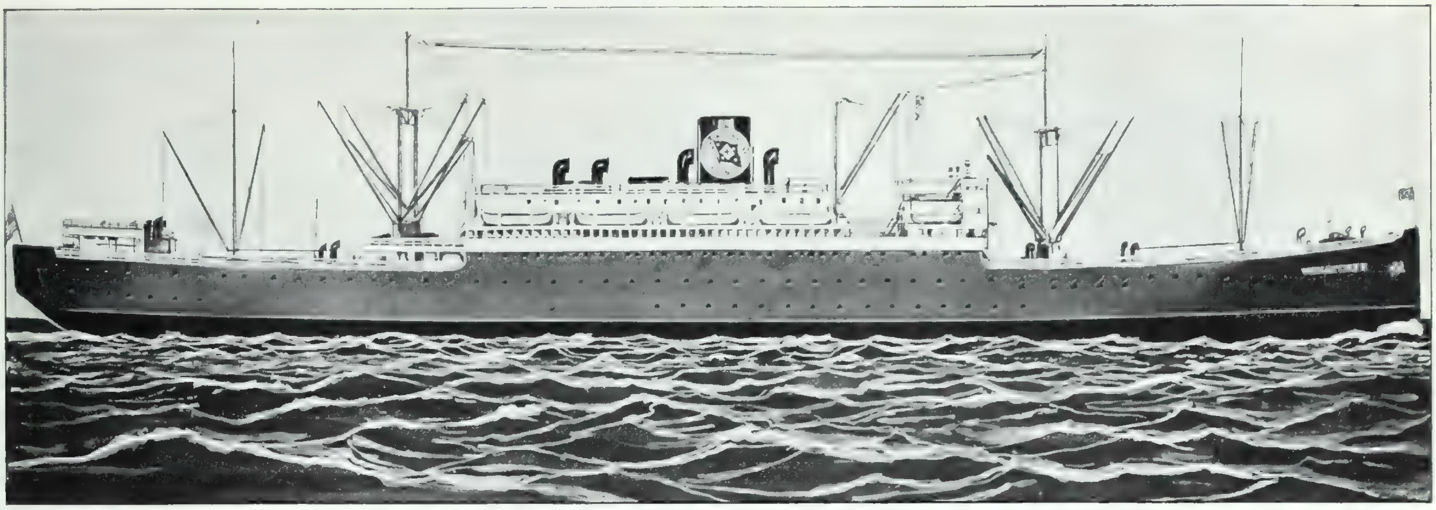
This is one of the most important and far-reaching announcements that have been made in connection with the Pacific merchant marine in many years, and it gives Puget Sound its first trans-Pacific service under the American flag. Both President H. F. Alexander and A. F. Haines, vice-president and general manager, of the Admiral Line, are being highly commended on the success of their persistent fight before the Shipping Board for recognition of the Northern gateway.

The entry of the Admiral Line into the Oriental field is another indication of the enterprise and sagacity of these two Admiral Line officials, whose development of the Admiral Line has been remarkable. From a meager beginning with the consolidation of the old Pacific Coast Steamship Company and the Pacific Alaska Navigation Company in 1916, Alexander and Haines, in a space of a few brief years and in the face of many serious obstacles, including the world war, have brought the Admiral Line into the pre-eminent position it now occupies on the Pacific. At birth, the Pacific Steamship Company was little more than a coastwise operator with a comparatively small fleet of steamships, including the President and Governor and the Admiral liners, from which the company derived its sobriquet. It confined its activities primarily to the coastwise trade with a connecting service to Alaska. But the enterprise and sagacity of Alexander and Haines, combined with their belief in the future of the American merchant marine, soon became apparent and the youngster started stepping forward.

New vessels, among which were the Yale and Harvard, were added to the fleet as fast as they could be acquired, the existing services strengthened and plans outlined for expanding the scope of operation. The first step in this direction was the inauguration in November, 1917, of a



Map Showing the Routes of the Various Services Maintained by the Admiral Line



The Passenger and Freight Liner Wenatchee Which Will Be Delivered to the Admiral Line at Philadelphia About the First of October, 1920

pioneering service between Puget Sound and ports in the Orient, with seven vessels engaged in transporting cargo from Puget Sound to Vladivostok, Hongkong, Singapore, Manila and other ports. This service soon was doubled with a new route from the Columbia River to Far East ports. A year later, November, 1918, saw the entry of the Admiral Line into Portland, Oregon. In this river port, the company opened offices and at the same time placed two of its steamships, the Topeka and Aurelia, on the run between San Francisco and Portland with Eureka, Coos Bay, Marshfield and Astoria as ports of call. This was followed by the establishment of freight and passenger service to West Coast ports of Mexico and Central America with the steamships Senator and Curacao operating on regular schedule to all ports as far south as Corinto, Nicaragua.

These developments gave the Admiral Line service to every principal port and to many minor ports in Alaska, British Columbia, Washington, Oregon, California, Mexico and Central America; its coastwise activities extending from Nome, Alaska, to Corinto, Nicaragua, with off-shore services from Puget Sound to Orient ports and a second service from the Columbia River to the Orient. The addition of the six new Shipping Board vessels to its offshore fleet will make the Admiral Line equally as dominant a factor in the trans-Pacific trade as it is in coastwise trade.

In conjunction with its own vessels and regularly - established routes, the Admiral Line has under charter, or is operating for the Shipping Board to all parts of the world, some seventy vessels, making a total of nearly 100 vessels flying the Admiral Line flag.

STRONG ORGANIZATION PERFECTED

In their organization of the Admiral Line, Alexander and Haines have surrounded themselves with the best material available and they have today one of the strongest and best organized shipping organizations in the country. In addition to the prominent officials, including H. C. Cantelow, assistant general manager; M. F. Cropley, general agent; C. E. Flye, general freight agent; R. D. Pinneo, manager foreign freight, and E. G. McMicken, general passenger agent, they maintain a total of seventy-five independent Admiral Line agencies in all parts of the world. Fifteen new agencies recently have been established at stragetic points in the Orient, where specially selected and trained staffs are looking after the interests of the Admiral Line in connection with the new Oriental service.

Though young in years, the Admiral Line is a giant physically, if the past can be used as a basis for judging the future, Alexander and Haines, with their characteristic broadness of vision, soon will have vessels carrying the American and the Admiral flags to all points of the compass.

AMERICAN SOCIETY MARINE DRAFTSMEN

THE American Society of Marine Draftsmen held their ninth annual convention in Washington, D. C., at the Harrington Hotel, June 18 and 19. A new grade of membership was established to be known as "Associate." This grade of membership will admit men occupying positions "of responsibility in the manufacture or sale of equipment and in the operation of ships." The junior grade of membership was enlarged to include "students of marine engineering or naval architecture" at recognized technical schools.

The date for the annual convention was changed from June to September in order that the convention should follow the summer recess period of the various branches of the society and usher in the season of winter activities.

The convention endorsed the "report of the congressional joint commission on reclassification of government employes," and decided that the society should use its influence to urge its early adoption.

The afternoon session of the second day was devoted to the reading of papers. Mr. James L. Bates of Washington, D. C., read a paper entitled "Notes on Preliminary Design," and Mr. E. Kirwan, Jr., of the Bethlehem branch, read a paper prepared by C. J. Early of Bethlehem, Pennsylvania, on "Joiner Work—Its Relation To and Use in Shipbuilding."

The District of Columbia branch took the delegates and executive committee on a moonlight ride down the Potomac River on Friday night. On Saturday night the convention was closed with an informal banquet for the visiting members.

The society expects to start an active campaign for new members in the fall, and Mr. J. B. Sadler of Norfolk, Virginia, was made chairman of the committee having charge of the drive.

Mr. Charles E. Deiser of the Delaware River branch, Philadelphia, was elected president; Mr. E. H. Monroe of Washington was elected vice-president, and the retiring president, Mr. A. H. Haag, of Philadelphia, was elected executive committeeman for a term of three years.

THREE SHIPS A DAY FOR THIRTY MONTHS

THE Union plant of the Bethlehem Shipbuilding Corporation, Limited, or the Union Iron Works, as it has been known for thirty-five years or more, always has enjoyed the highest reputation for economy, efficiency and speed on all types of ship repairs and construction work. This has been due to its superior waterfront facilities, its modern equipment and efficient personnel.

With the completion of the waterfront improvements now under construction and the recent acquisition of the new 12,000-ton floating drydock, this plant will in extent of facilities and equipment easily surpass any other shipyard on the Pacific Coast and will be surpassed by few yards in the world.

AMES FLOATING DOCK PURCHASED

The new 12,000-ton floating drydock was purchased from the Ames Shipbuilding Company of Seattle just prior to its completion by that company. It is now being towed down to the Union plant on the San Francisco Bay and is expected to be in full operation by September 1. It consists of four sections of 3000 tons' capacity each; each section being 90 feet long and 126 feet wide, both end sections having an apron of 27 feet, the interval between the sections being 2 feet 6 inches, or a total length over aprons of 421 feet 6 inches. It has a depth of 27 feet over the keel blocks and with the exception of a few battleships now on the Pacific Coast it is able to handle all ships that normally come into the harbor of San Francisco.

In order to concentrate its floating drydocks, the No. 3 dock will be moved to the Potrero works from the Alameda works. This will give the Potrero works the following floating drydocks:

No. 2—270 feet long; 66 feet inside width; 2000 tons' capacity.

No. 3—301 feet long; 68 feet inside width; 2500 tons' capacity.

No. 4—450 feet long; 80 feet inside width; 6500 tons' capacity.

No. 5—420 feet 11 inches long; 90 feet inside width; 12,000 tons' capacity.

(All of these docks are operated by electricity.)

The Alameda plant will have:

No. 1 marine railway, 320 feet long; 70 feet wide; 4000 tons' capacity.

No. 2 marine railway, 220 feet long; 60 feet wide; 2000 tons' capacity.

(Marine railways are operated by steam.)

Hunters Point will have:

No. 2 graving dock, 750 feet long; 103 feet wide at the top and 86 feet wide at the bottom.

No. 3 graving dock, 1020 feet long; 153 feet wide at the top and 110 feet wide at the bottom.

(Equipment for No. 2 graving dock is operated by steam and No. 3 dock by electricity.)

The graving docks are cut out of solid rock and lined with concrete.

CAN TAKE LARGEST VESSELS

The No. 3 graving dock is one of the largest in the world. It will handle with ease the largest ship afloat, either merchant or naval. It is so designed that it will receive any ship that is capable of passing through the Panama Canal.

It is just as essential to have sufficient lineal mooring capacity as it is to have a large number of drydocks and marine railways. The Union plant is not lagging behind in this most essential requisite. The relation between wharfage and drydockage has always been maintained and is now being increased due to the purchase and addition of the new docks. Wharf No. 5 is being extended 320 feet and a new wharf is being constructed 587 feet long and 60 feet wide, parallel to and 200 feet distant from wharf No. 5. This wharf is an extension to the present system and connects with the other wharves and the plant proper by a wharf 50 feet wide. This new wharfage construction will provide an additional 60,000 square feet of wharfage, all of which has been designed to carry a load of 500 pounds a square foot. The lineal mooring capacity will be increased by approximately 2500 feet, giving six additional berths, or a grand total of 21.

WILL EXTEND BULKHEAD WHARF

At the Alameda plant the present bulkhead wharf will be extended 400 feet, making it 1300 feet in length. A new fireproof electric sub-station is being constructed as well as a new paint shop, building for employment department and hospital. At Hunters Point the wharf at the entrance to the No. 2 graving dock will be entirely reconstructed.

It is noteworthy that these new piers are being built throughout of creosoted piling. To those unfamiliar with the devastation of marine life on the Pacific Coast, particularly the borings of the teredo, that statement may mean little; the fact is, however, that green piling has a life of about two years, whereas creosoted piling will endure indefinitely. With a creosote impregnation of twelve pounds to the square foot and penertation of one-half to three-fourths inch, the piling is immune to the attacks of the teredo, provided that the surface of the piling is not broken so as to expose unimpregnated wood. In brief, the Union plant aims at permanency in this new work.

RAILWAY TO BE EXTENDED

The railway system will be extended so as to serve all the new wharves under construction. These wharves will be piped for air, steam and water, and a complete electric wire system of the most modern construction will be installed.

In addition to its drydocks and wharves the Union plant's complete facilities include seventy modern fireproof buildings of 1,500,000 square feet of floor space, all equipped with modern machinery; three shearlegs; three work barges; tugs and launches, and the largest stock of material carried by any shipbuilding plant on the Pacific Coast.

Besides its wonderful record in the construction of merchant and naval vessels which is known throughout the world, it has repaired or drydocked not less than 2500 vessels in the past thirty-two months, or better than three vessels per working day, a record that speaks well for San Francisco Bay shop facilities and for the Union plant.

CAPTAIN PAYNE PROMOTED

IMPORTANT changes in the organization of the recruiting service of the United States Shipping Board on the Pacific Coast were made effective on July 1. Captain J. Howard Payne, of Seattle, formerly agent of the recruiting service, North Pacific district, was appointed assistant director by Captain Irving L. Evans, director. Captain Payne has assumed general charge of the service on the Pacific and for the present will remain also in personal charge of the Seattle office, where his headquarters are. The position of assistant director is newly-created.

CAPTAIN JORY IS SUPERVISOR

Captain J. W. Jory, formerly of the Matson service, has been appointed supervisor of the recruiting service, San Francisco, succeeding to the duties of both Captain John Leale, section chief of the navigation and engineering schools and agent of the sea service bureau, and of Captain J. N. Ansell, acting supervisor in charge of sea training. Thus the three branches of sea training, navigation and engineering schools and sea service have been consolidated under one head. The sea training bureau enrolls apprentices for training as seamen in the deck department, firemen in the engine-room and messmen in the steward's department; the navigation and engineering schools prepare men for licenses as deck and engineer officers; and the sea service bureau is the agency by which licensed and unlicensed men are shipped on American vessels. The recruiting service is maintained to train and supply officers and men to vessels.

SHIPOGRAMS

THE OPERATORS' NEW AGREEMENT

UNDER the proposed operators' agreement submitted by the general committee to the Shipping Board, the present system of computing compensation would be discontinued, and the agencies would receive fixed percentages of the gross freights: 5 per cent on the outward voyages; 2½ per cent on the homeward; 2½ per cent between foreign ports; 10 per cent of passenger revenues; and 2½ per cent on cargoes of coal, grain, sulphur and phosphate moving from the United States. The former agreement, MO3, set up a capital investment, on the basis of which depreciation was allowed, insurance and interest charged and a reserve for repairs set aside, before net revenues, in which the operators shared, were determined. As a result of the imposition of these prior charges, operation generally has not been reasonably profitable, except perhaps in the West Indian trade, which enjoyed short hauls and steadily-moving and easily-handled cargoes. In fact, some operations have resulted in deficits, leaving the operators only the agent's fee of $200 a month a ship and the minimum compensations of 10 to 7 cents a ton based on the deadweight. These returns, in some cases, probably have been no more than sufficient, or perhaps insufficient, to pay overhead costs.

OLD AGREEMENT SUSPENDED

But the old agreement was suspended, so that disbursements from earnings have been limited, with some operators, to the actual expenses of the vessels, giving the agencies no revenues for their own expenses or profits, although some disbursements under MO3 have been made, according to Pacific Coast operators. In view of this suspension, the proposed agreement would be effective from March 1, 1920, and payments for service since that time would be made in accordance with its provisions.

Agreement MO3 set up, as stated, capital investments. In the absence of other agreed values, these were $200 a ton. For the first year depreciation was fixed at 10 per cent, decreasing 1 per cent a year until it became 5 per cent; insurance was fixed at 4½ per cent; interest, 5 per cent; and reserve for repairs, 4 per cent; a total of 23½ per cent. In brief, a vessel had to earn $47 a deadweight ton in the first year, in addition to the cost of operation, before the agent could hope to share in the profits, although, of course, he was assured of his fees and minimum compensations. This method of computing compensations would be set aside for one following the customary system.

Other changes are made in the tentative agreement, most of which are for greater simplicity. The old agreement was drawn by the Shipping Board; the proposed agreement was drafted by the general committee, on which the operators largely were represented.

HOW COMPENSATION IS FIXED

Section 15 of the proposed agreement provides as follows for compensation:

"Compensation shall be allowed to the agent by the corporation as follows:

"(a) **From United States Ports:** Five per cent on gross outward freight, dead freight, demurrage, express and mail revenue, excepting that 2½ per cent only shall be allowed on full cargoes of coal, grain, sulphur and phosphate.

"(b) **Into United States Ports:** Two and one-half per cent on gross inward freight, dead freight, demurrage, express and mail revenue, the minimum inward fee at each port of discharge to be $250.

"(c) **Between Ports Other than United States Ports:** Two and one-half per cent on gross freight, dead freight, demurrage, express and mail revenue.

"(d) **Ballast Voyages:** Five dollars per day on ballast voyages, minimum $50.

"(e) **Compensation While Under Repairs, Etc.:** At the rate of $25 per steamer per day during such time in excess of ten days as a vessel is laid up undergoing repairs, inspection, survey, etc. Actual traveling expenses incurred by the agent shall be chargeable to the voyage account if the vessel is laid up in other than the home port of the agent.

"(f) **Passenger Revenue:** Ten per cent on all gross passenger revenue.

"(g) **Salvage:** Five per cent of all salvage earned for account of the vessel."

PROVISIONS OF OLD AGREEMENT

Under the former agreement, now inoperative, compensation was provided as follows (a portion of Section 10 and all of Section 11):

"In the absence of some other agreed value, said accounts shall set up as the capital investment a sum equal to the value of the vessel at the price of $200 per deadweight ton. For the purpose of determining net revenue under this agreement, the following charges shall be entered as part of the expenses of the vessel: depreciation for the first year, 10 per cent of the value; for the second year, 9 per cent of the remaining value; third, 8 per cent; fourth, 7 per cent; fifth, 6 per cent; and 5 per cent each year thereafter. For insurance, at the rate of 4½ per cent per annum. General average, collision, and other claims shall be charged to the vessel only to such extent as they are not completely covered and reimbursed by insurance.

ON SAME BASIS OF COMPENSATION

"The value as set up on the books of the operators may be understood to be for bookkeeping purposes only, and such values may vary with the trades and may be the only variable item necessary by which equitable compensation may be computed with the object of ultimately placing all agents of equal competency so far as may be reasonably practicable on the same basis of compensation.

"11. As compensation the corporation shall pay the agent as follows:

"(a) An agent's fee of $200 per ship per month.

"(b) For the period that any ship is in actual operation or commission, and for the purpose of making monthly payments, the agent will receive a minimum compensation, in addition to the $200 per month, of 10 cents per deadweight ton per month on all ships under 5000 tons (maximum $450 per ship per month), and 8 cents per deadweight ton per month on all ships of 5000 tons and under 9000 tons (minimum $450, maximum $700, per ship per month), and 7 cents per deadweight ton per month on all ships of 9000 tons and over (minimum $700 per ship per month).

PART OF NET PROFITS

"(c) There may be such customary brokerage charged against the operation of the ship as may be necessary to obtain business, providing the result of the voyage will justify same. In case of doubt or dispute as to whether the voyage does justify the charge the corporation may finally decide as to continuing the payment of brokerage where doubt exists as to justification.

"(d) The agent will also receive a commission equal to 10 per cent of all net profits on an amount up to 50 cents per deadweight ton per month. On all net profits in excess of 50 cents per deadweight ton per month, 20 per cent up to $1 per deadweight ton per month, and 25 per cent of all net profits in excess of $1 per deadweight ton per month."

SALVAGE AS EARNINGS

Section 13 of the old agreement was as follows: "All salvages shall be for the benefit of the corporation and shall be considered as part of the earnings of the vessel." The proposed agreement, it will be remarked, provides that 5 per cent of all salvage earned shall go to the operator. This is the same proportion as he would receive of the outward freight. But, in addition to Sub-section g of Paragraph 15, the proposed agreement also says, in Section 14: "All salvage and demurrage shall be for account of the corporation, and shall be considered as part of the earnings of the vessel."

There is no substantial difference between the agreements as to abrogation by either the agent or the corporation.

ONE PROVISO MISSING

One proviso of the old agreement is missing from the new. This appeared in Section 2 and was as follows: "While the agent is to be held responsible for the management of the vessels, he shall be subject to the orders of the corporation as to all matters affecting the use of the vessels when the corporation deems the exercise of such power to be in the public interest."

Section 5 of the proposed agreement provides that the agent shall have repairs made not to exceed $10,000; if more than $10,000 is required, or alterations are to be made in hull and stationary equipment, the consent of the corporation is to be obtained. In substance, this proviso merely defines extraordinary expenditures as being in excess of $10,000; whereas the old agreement made no such definition.

MUST JOIN CONFERENCES

Section 10 of the proposed agreement says in part: "The agent agrees to investigate thoroughly all claims for loss or damage to cargo, and to pay all proper claims not in excess of $500 for any one claim and to submit claims in excess of $500 to the American Steamship Owners' Mutual Protection and Indemnity Association, Inc., for decision, with full record of investigation." This provision is new.

Heretofore the Shipping Board has required operators to become members of the Shipping Board conferences, so that Section 12 of the proposed agreement merely states the fixed policy: "The agent agrees to join conference with other agents to determine rates, rules and regulations governing the trade in which the agent is operating vessels of the corporation, and to uphold such rates, rules and regulations as may be adopted by such conference."

Section 22 of the proposed agreement adds a stipulation governing arbitration, as follows: "Any question of the terms of this agreement or of interpretation thereof that may arise shall be referred for determination to a committee to be known as the Standing Committee on Managing Agents' Agreement, consisting of: 1st, Duly appointed representatives of the corporation. 2nd, Duly appointed representatives of the American Steamship Owners' Association; the United States Ship Operators' Association; the Northwest Steamship Managers' Association; the Pacific American Steamship Association; the Gulf Shipping Conference, Inc.; the South Atlantic Conference."

Section 23 provides that "this agreement shall become effective as of March 1, 1920."

A GULF-PACIFIC LINE

THAT marked development of the Pacific-Atlantic coastwise trade via the Panama Canal, which was manifest in May and June, still continues. Swayne & Hoyt, of San Francisco, have announced the establishment of a new line between New Orleans and cities of the Pacific Coast via Cartagena and Baranquilla, Colombia, and the Panama Canal, the first sailing being that of the steamship Eldorado in early August. This service not only will afford a new trade connection between the Gulf and Pacific, such as had been lacking, but also will give both the Gulf and Pacific a permanent line to the Colombian ports. In this latter aspect the service will supplement the present Pacific - Argentine - Brazil line of Swayne & Hoyt, the vessels of which ply from the Pacific Coast ports to the East Coast of South America via Magellan, returning via the Panama Canal, but do not call at ports north of Brazil.

ON MONTHLY SCHEDULE

The service is being started with Swayne & Hoyt vessels. After the Eldorado, 3250 tons deadweight, will follow the Alvarado, which is a 2750-tonner. On the Pacific Coast the ports of call will be Los Angeles, San Francisco, Portland and Puget Sound, as cargoes offer. The Eldorado and Alvarado will be followed by other steamships, probably of larger size, on a monthly schedule, the round trip requiring about two and one-half months. Opportunities for business appear to be good, both between the Pacific Coast and New Orleans and between all the American ports served by the line and Cartagena and Baranquilla. Should business increase, as is hoped, the vessels will call at Cuban and other West Indian ports.

Freights offering from the Pacific Coast to the Gulf are principally canned goods, barley, dried fruits and flour; lumber to Cuba; from New Orleans, iron, steel, machinery, agricultural implements, tobacco, cotton piece goods, canned molasses, rosin, cotton, canned and dried shrimps; and, from Colombia, coffee.

J. H. W. Steele & Company will represent the line in New Orleans. Agencies will be established in Colombia.

NORTON, LILLY EXPANSION

OFFICES have been opened in Portland and Los Angeles by Norton, Lilly & Company, agents of the Isthmian Steamship Line and the Societe Generale de Transports Maritimes a Vapeur, a French line operating eight vessels between the Pacific Coast and the Mediterranean. The Isthmian Line is owned by the United States Steel Products Company. C. D. Kennedy, formerly manager of the Portland office, American-Hawaiian Steamship Company, and more recently district director of operations, Emergency Fleet Corporation, resigned that post, effective August 1, to take charge of the Portland office of Norton, Lilly & Company. R. G. Sullivan, formerly of the Gulf Mail & Pacific Motorship Company, is in charge of the Los Angeles office. Norton, Lilly & Company already had offices in San Francisco and Seattle. W. J. Edwards is Pacific Coast manager, with headquarters in San Francisco. J. S. Ford is Puget Sound manager, with headquarters in Seattle.

ISTHMIAN LINE SAILINGS

Sailings of Isthmian Line vessels have been announced as follows: Eastbound, Steel Trader, middle August; Steel Engineer, early September; Steel Voyager, late September; Steel Inventor, early October. Westbound, Steel Trader, sailed June; Steel Worker, sailed early July; Steel Engineer, sailed late July; Steel Voyager, early August; Steel Ranger, late August; Steel Inventor, early September; Steel Seafarer, late September. The disparity between eastbound and westbound sailings is due to vessels being scheduled to load on the Pacific Coast for Europe. In any event, eastbound sailings probably will be more frequently than once a month. Ports of call on the Pacific are Vancouver, Seattle, Portland, San Francisco, Los Angeles and others as cargo offers. All the vessels are new 10,000-ton steel steamers.

WITH THE EXPORTERS AND IMPORTERS

PACIFIC RATE REDUCTIONS

IN order to place Pacific Oriental freight rates on a basis of equality with rates from the Atlantic, the Pacific Coast Oriental Tariff Bureau, at a meeting in Vancouver in June, reduced its tariffs considerably. This action was taken as a result of failure to increase the Atlantic rates at a meeting held in New York in May.

A short time after the signing of the armistice, the general merchandise rate from Atlantic ports to the Orient was fixed at $25 a ton. With this as a basis the Pacific Coast Oriental Tariff Bureau made its rates, both for freight moving overland to Pacific ports and for freight originating in Western territory. Later the general cargo rate from Atlantic ports fell to $23 a ton, accompanied by no corresponding reduction in Pacific tariffs; to remedy this condition, to bring the Pacific in harmony with the Atlantic, operators of the Atlantic, Gulf and Pacific held their meeting in New York and decided to restore the $25 rate on general merchandise, with corresponding increases in commodity rates, or approximately 10 per cent; steel, however, to remain at $20.

BRITISH GROUP HOLDS OUT

Adherence of a powerful British group to this schedule was conditioned upon approval of the principals in the United Kingdom, however. In this position the British were joined by important Japanese operators. When the home office of the British group refused to accede to the increased rates, because it anticipated a weaker market, although it was willing to maintain existing tariffs, the effort to strengthen the Atlantic rates fell through; and the Pacific Coast Oriental Tariff Bureau thereupon turned its attention to reducing its tariffs to conform to the existing Atlantic rates. The result of the two meetings, of New York and Vancouver, is, in brief, that the tariffs have been equalized, but by reducing the Pacific instead of increasing the Atlantic.

GENERAL RATE, $14 A TON

The general cargo rate from Pacific Coast ports to the Orient now is $14 a ton, weight or measurement, as compared with the former rate of $16. The reduction is of the same amount as the New York conference agreed to raise the general rate from the Atlantic, so that the relative position of the two coasts is no different from what it would have been had the Atlantic rates been increased. Steel has been reduced from $12 to $11 a ton. In this case the local and through rates are the same, so that steel manufactured on the Pacific Coast is at no disadvantage so far as the water rate is concerned. Other reductions in important commodities were: agricultural implements and threshing machines, from $22.40 to $16; automobiles, from $12 to $10; cigarettes, etc., from $14 to $11; cotton, high density bales, 100 pounds, from $1.40 to $1; standard density, from $1.65 to $1.25; soda ash, from $20 to $17; lumber, from $40 to $25.

50 CENT DIFFERENTIAL ON COTTON

The cotton rate gives the Pacific Coast a 50-cent differential as compared with the Gulf. Operators of the Gulf were willing to acquiesce in a differential of 35 cents, but not in that of 50; and they have submitted a brief to the Shipping Board, which began an investigation of the situation; in reply, the Pacific Coast Oriental Tariff Bureau also will submit a brief. Under the new Pacific schedule, the rate from the cotton fields of Texas, in which the coast operators are interested, will be $2.50 a bale, as compared with $2.55½ from the Gulf, these charges including railroad rates. A 50-cent differential, it will be observed, would give the Gulf an advantage of 9½ cents.

Inasmuch as the $35 rate on lumber had been in existence only a few days, having been reduced from $40, the new rate of $25 actually is a reduction of $15 instead of $10. The overland steel rate was fixed at the Vancouver meeting at $11 and the local at $12, but the latter was reduced to $11 within a few days. On canned goods the overland rate is $14, the local $16, the latter having been unchanged.

EFFECTIVE IN JUNE AND JULY

Seattle lumber interests, although pleased by the reduction in lumber rates, expected no immediate benefit, said a statement issued by the Seattle Chamber of Commerce, because of the shortage of tonnage.

The overland rates became effective on June 26; the local rates July 1.

Shipping men had anticipated that the Jines bill might have some bearing on the Vancouver conference and its results, but it did not, said one who attended the meeting, the foreign lines believing that the law would be adjusted to their satisfaction.

FREIGHT REPORT

SINCE our last report, dated June 11, Strauss & Company chartered the French sailer Bayard from San Francisco to the United Kingdom, Havre, Antwerp or Dunkirk with barley at 150/-, with the option of giving her orders upon arrival at San Francisco Heads to load wheat from Portland or Puget Sound at 160/-, September/October loading.

We have no charters to report from the North, as there has been more or less of a lull in the freight market due to the lower grain markets in Europe, and also to the fact that freights everywhere but on this coast seem to be depressed.

The United States Shipping Board has lately given the following schedule of rates for steamers, to be effective September 1:

For full cargoes of wheat and/or flour from Seattle, Tacoma or Portland or San Francisco, $28 a long ton, net, prepaid, to one port United Kingdom or on the Continent, Antwerp-Hamburg range; $29 Continent, Bordeaux-Dunkirk range; $30 Mediterranean, Gibraltar - West Coast of Italy range; $33 Mediterranean, Adriatic Sea-Alexandria range, including Greece; parcels $1 a ton additional, respectively.

For two ports United Kingdom or two ports Continent, Bordeaux-Hamburg range, $1 a ton additional; two ports, one United Kingdom and one Bordeaux-Hamburg range, $1.50 a ton additional; two ports in any one Mediterranean range, $1 a ton additional; two ports, one in each Mediterranean range, as above, add $1 to the highest rate in the Mediterranean, payable on the whole cargo.

For full cargoes of barley the rate is $30 a ton to United Kingdom and to the Continent between Bordeaux-Hamburg, inclusive, $31 a ton; for parcels of barley add $1 a ton, respectively.

The following rates have also been made to outside ports, namely: $31 a ton, either to Christiania, Copenhagen, Gothenburg, Malmo, Stettin; to Stockholm, $35; to Helsingfors, $42; to Lisbon, $29; to Constantinople, $35; to Batum-Poti, one port $37.50, two ports $40.

There have been no sales reported.

General business has been good.

The barkentine Hesperian, chartered by Hind, Rolph & Company from Newcastle, Australia, to a nitrate port, $17.50; option of port in Chile south of a nitrate port, $18.50; option Callao direct, $19.50. Schooner Resolute, chartered by J. J. Moore & Company from Australia to Honolulu, $9.75. Thistle, chartered by Balfour, Guthrie & Company, coal from Australia to Antofagasta, 90/-. Steamer Egeria, chartered for coal to Honolulu at $9.50 by J. J. Moore & Company.

J. J. Moore & Company chartered the schooner Resolute at $34.50, lumber to Sydney from the North; also the Puako, $35, Sydney; also Forest Dream, $35 Sydney, $37.50 Melbourne, Adelaide or Port Pirie; and the wooden steamer Snoqualmie, $33 Sydney. The sistership of Snoqualmie, the Broxton, was chartered by the Canadian Trading Company from British Columbia to Melbourne at $40, Canadian currency. Balfour, Guthrie & Company chartered British sailer Shandon on private terms from Eureka to Sydney or Melbourne. Balfour, Guthrie & Company chartered the schooner Annie M. Rolph at $37.75 per thousand from Columbia River to Port Pirie.

The Ocean Lumber Company chartered the steamers Argus and Antinous for ties to one or two ports in the United Kingdom at $45, less 2½ per cent.

The Pacific Export Lumber Company chartered the new steamer Pansa from the Shipping Board for lumber from Puget Sound to Calcutta at reported rate of $50 a thousand.

Dant & Russell chartered United States Shipping Board steamer from Columbia River to China at $25.

Swayne & Hoyt have arranged cargoes of lumber by their Shipping Board steamers on berth from the North and here to Buenos Ayres at $40 a thousand, and we understand rice is being taken by them on the basis of $18 to $20 a ton to the same port.

The Robert Dollar Company have arranged a cargo of coal for their steamer Melville Dollar at $6.40 from Norfolk to San Francisco.

W. L. Comyn & Company have also chartered their motorboat Chalamba at the same rate for the same business, although this last vessel has the option of Puget Sound discharge as well.

W. L. Comyn & Company chartered their other motorboats, Coolcha, Cethana and Culburra, all with sulphur from Galveston to Portland, at $12.

W. R. Grace & Company closed steamer Forest King at $30, lumber from Grays Harbor to Callao. The demand for the West Coast fell off entirely for the last three or four weeks, and this steamer was in such a position, and Grace & Company were the only firm who could supply lumber for immediate loading; hence the comparatively low rate of freight, although we question whether any one is in a position to bid over $30 today, although owners might get a higher rate by giving several days' refusal.

The schooner Georgina is reported chartered by Wolff & Kirchmann from Sydney to San Francisco.

We regret to state that freights in different parts of the world are lower. The shortage of coal on the East Coast and the interior of the United States has caused a temporary (we hope) stoppage of exports for Europe, and therefore many steamers have been suddenly left without business, and the result has been that very low rates of freight have been offered to shippers for early loading, on the East Coast of the United States as well as from the Gulf ports, which rates, added to the rail rates from this coast, are much lower than vessels can be procured to go from here or the North.

Nitrate freights are also neglected. Steamers have been chartered to load nitrate to the West Indies and to the East Coast and Gulf ports at from $12.50 to $13.

Nothing has been done on time charters on this coast lately. Oriental business is so bad that it is impossible for our charterers to pay the rates asked by the shipowners. We notice, though, that time charters are coming down even in the Atlantic, where there is more opportunity for charterers. We note the steamer Walter A. Luckenbach, 6208 tons, has been chartered for one round trip trans-Atlantic at $5 a ton on the dedaweight. Japanese time charters are also lower. Several steamers have been chartered at 7 yen for round voyages to either Australia or India, and we understand one large steamer has been chartered for one year by a large English concern as low as 6½ yen, which is $3.25 a ton a month on the deadweight.

Unsettled conditions all over the world no doubt are affecting general business, with the result that tonnage is accumulating and therefore shipowners are weaker.

PAGE BROTHERS, Brokers.

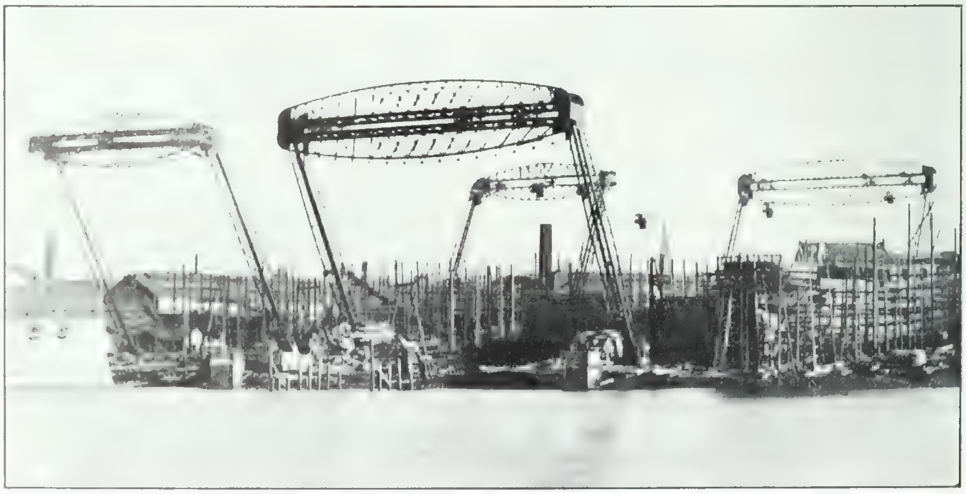
HOSTILITY TOWARD THE WEBB ACT

THE Webb-Pomerene act, which is the theme of an article by E. J. Bartells, of the Wood Pipe Export Company, in this number of Pacific Marine Review, has aroused fear in New Zealand, according to a report of Consul-General Alfred W. Winslow, stationed at Auckland.

"It would be well to understand that the Webb-Pomerene act is looked upon with a great deal of suspicion and should be used very judiciously in this dominion," said Mr. Winslow's report. "Many here fear it is a move to capture this business by flooding the market with goods at a discount, with the view of raising prices when supplies from other countries have been driven from these markets. Resolutions covering this question have been passed by chambers of commerce and other commercial bodies urging the New Zealand government to take action regarding the matter, recommending a high tariff and even prohibition of imports."

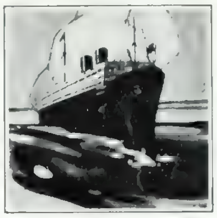
Mr. Winslow quotes a resolution adopted by the Auckland Chamber of Commerce:

"That this meeting strongly emphasizes the necessity that an order in council be issued as follows: That on and after April 1, 1920, all United States invoices be accompanied by a declaration, under penalty, affirming that the price charged is not higher or lower than the price charged for home consumption in the United States of America at the time of shipment. That a copy of this resolution be at once forwarded to the prime minister, with a covering letter, urging upon him the necessity of instant action, in order to conserve the interests of the importers of the Dominion, and to take any such further steps as may be necessary to combat the effects of the act."



Aerial Cable Cranes Over the Shipbuilding Ways at Palmer's Yard, Jarrow, England

Marine Insurance



RECENT DEVELOPMENTS

By C. F. HOWELL

BY all odds the most sensational occurrence in American marine insurance during the past month, or, for that matter, for many years, was the announcement by British marine insurance companies that, "owing to recent drastic legislation in the United States," they would be compelled to discontinue writing in this country except through their regular branch offices here. News of this determination was cabled to the leading American brokerage houses from their London correspondents, who found themselves suddenly unable to place the business that was being sent along as usual from this side; and cables carried the same advices from British home offices to their American representatives. The result was, momentarily, considerable excitement and confusion in the New York market, where practically all of the leading American marine offices are located. What was the "drastic legislation" referred to? The newspapers leaped to the conclusion that reference was had to the new Merchant Marine Act, and Senator Jones, who fathered that measure, was interviewed in Washington. But the better informed among marine insurance men knew what was meant, and the replies they received to their cabled inquiries confirmed their judgment that it was the New York State law that had upset the apple wagon. The representative of Pacific Marine Review was shown one of these cables and there it was in black and white, "inability to conform to the new regulations of the New York State law." The requirements of Section 45, the language of which is given below, oblige foreign admitted insurance companies to place their business through their American offices only, to pay the state tax of 2 per cent, and to maintain full reserves here on their United States writings. Heretofore a considerable amount of business originating in this country was being written "overhead" in London, even by admitted companies, who thus saved the tax and agency commissions also. Despite the denial by some of them, in their sworn replies to the New York State questionnaire, that this was being done, adjustment statements showed that it was. Insurance Superintendent Jesse S. Phillips' attention was called to this fact, and he secured the amendment to the existing law at the last session of the legislature that made future offenses of this character punishable with a fine of $500 for the first offense, $500 additional for each month thereafter that the offending corporation continues doing business here, or the revocation of the company's license. Lloyds was particularly upset, because, with the leading British companies deciding to write only through their American offices, they would be without the guidance of the warranties given out by the latter as to rates and conditions, when placers went down the line in London and got their commitments initialed. Having little reliable American data of their own, they were literally at sea. The result will be to make the New York marine insurance market an extensive one. Most of the business formerly cabled over to London by American brokers and which was being written at the home offices of the companies admitted to do business here, or by non-admitted companies and Lloyds, will now pass through American branch offices, most of which are located in New York City. The decision, therefore, affects our shipping interests as well as our marine underwriters, because the former were accustomed to getting a shade in rates by sending their risks to London. Hull coverage is more involved than cargo. It is estimated that 60 per cent of the former goes "overhead" to London, and but 5 per cent of the latter. The large New York insurance brokerage houses are hard hit. Business cabled by them to London is being turned down flat. They are desperately hoping for some ruling by the New York insurance department that will modify the law (a forlorn hope, indeed) as otherwise they will lose millions of dollars in marine insurance premiums. American underwriters are smilingly tranquil. With the pooling arrangements just signed by the Shipping Board, under the provisions of the new Merchant Marine Act, they apprehend no difficulty in taking care of the demands for coverage by their compatriots.

SECTION FORTY-FIVE

The amended Section 45, of the New York State Insurance Act, relates to reports of insurance corporations organized outside of the United States, which must be filed with the New York department. It is effective December 31 next, when annual statements are filed. It reads as follows:

"If a corporation, incorporated under the laws of any state or country outside of the United States, such report with respect to the business done and assets held by or for the corporation, shall (only) contain a statement of the business done and assets held by or for it within the United States for the protection of all policyholders residing within the United States, and shall not contain any statement in regard to its assets and business elsewhere, **except that such report shall contain a statement of all its insurance transactions outside of the United States with insured corporations, partnerships, associations or individuals resident within the United States, and affecting risks resident, located or originating in the United States, notwithstanding such transactions were not done through an attorney, manager or agent of such corporation within the United States; and such insurance corporation shall as to all such transactions report premiums, pay taxes thereon and hold reserves thereon, and such corporation shall be charged with the same duties and liabilities and its policyholders resident within the United States shall have the same rights as if such transactions had been done through its attorney, manager or agent within the United States."**

POOLING AGREEMENTS SIGNED

An event which, in his announcement, Admiral Benson, chairman of the United States Shipping Board, pronounces "epochal," is being hailed with great rejoicings by the marine underwriters of this country. It is no less a transaction than the signed acceptance of the pooling agreements provided for under the new Merchant Marine Act by fifty or more of the strongest marine writing insurance companies on this side of the water. Three syndicates are arranged for, and the text, which is given herewith, will be seen to have been accurately forecast in the July issue of Pacific Marine Review. Charles R. Page, a former commissioner of the Shipping Board and a steamship expert of long experience, has been appointed

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

manager of Syndicate A. The milk in the cocoanut lies in the fact that only American-owned companies may participate in the first two Syndicates, and that the participation of admitted foreign companies in the third is limited to one-third of the amount underwritten—the control resting with the Americans. The full text of this "epochal" arrangement reads as follows:

SYNDICATE A

1. Organized to perform at cost surveying inspection and loss surveys for the United States Shipping Board in respect to all steel vessels owned by the board or sold by it on a part payment basis, and to perform similar service in respect to any vessels for any other shipowners and marine underwriters upon payment of reasonable charges for such service. The syndicate shall create and maintain an organization for inspection, damage and loss surveys, and to advise all interested parties with respect to matters relating to inspection, repair, equipment, loading, management, operation, efficiency, safety and damage to and salvage and loss of vessels. It is not the intention, however, that this syndicate shall take the place of or perform the work of a classification society. Vessels shall be inspected at least three times a year, and the maintenance inspection shall show the condition of hull, machinery, galley, crew's quarters and all parts of the vessel.

2. Membership is limited to strictly American companies, but is open to all such companies that meet reasonable conditions of solvency and fair dealing.

3. The books and accounts of the syndicate are always open to audit by a representative of the Shipping Board. Moreover, the Shipping Board or Emergency Fleet Corporation may designate a representative to be ex-officio a member of the board of managers of the syndicate and who shall be privileged to attend all meetings.

4. The Shipping Board has the right to withdraw from the agreement on ninety days' notice, prior to any expiration date. Similar right of cancellation is also given to the syndicate members.

5. The Shipping Board agrees to enter, or cause to be entered, all steel vessels owned by it, and all such vessels hereafter sold on a part payment basis, and such vessels heretofore sold as the board can lawfully cause or require to be entered with the syndicate. The Shipping Board also agrees that it will afford a reasonable opportunity to surveyors or other representatives of the syndicate to make the surveys called for in a United States port, or in such foreign port as may be agreed upon from time to time. It is also agreed that with respect to all vessels hereafter sold the Shipping Board will require that the purchaser shall carry out the recommendations as detailed in the syndicate survey reports.

SYNDICATE B

1. Organized to insure all American steel steamships which the United States Shipping Board may hereafter sell to others to the full extent of the unpaid purchase price thereof, and also, to a like extent, such other American steel steamships heretofore sold by the Board that are acceptable for insurance to the syndicate. The syndicate is to have an underwriting capacity of not less than $2,000,000 upon a single hull. Every company subscribing to the syndicate has allotted to it a definite percentage of every assumed risk. Rates of premium and policy forms may be altered as conditions require upon ten days' written notice to the Shipping Board. The liability of the companies is several and not joint.

2. Membership is limited to strictly American companies, but all such companies are acceptable if they meet reasonable standards of solvency and fair dealing.

3. The Shipping Board may terminate the arrangement upon ninety days' notice without prejudice, however, to any risks or obligations previously assumed. A similar right of cancellation is also given to the syndicate members.

4. The subscribing companies agree to reinsure only with strictly American companies.

5. The books of the syndicate are at all times open to audit by a representative of the Shipping Board.

SYNDICATE C

1. Organized to insure all American ocean-going steel hulls when approved and accepted for marine insurance by the syndicate managers, and owned by private persons or corporations or in which they have an insurable interest. The syndicate has a total underwriting capacity of not less than $2,500,000 upon a single hull.

2. Membership is divided into two groups. One group, representing at least two-thirds of the amount underwritten on any risk, consists entirely of strictly American companies, i. e., chartered under the laws of the United States or of any State thereof, domiciled therein, and not controlled by foreign interests.

The second group representing not to exceed one-third of the underwriting capacity of the syndicate, shall consist solely of subscribing companies of foreign countries duly authorized and licensed to transact marine insurance in the United States.

3. Each syndicate subscriber may accept additional insurance on American hulls outside of the syndicate arrangement, but cannot do so at rates lower than those quoted by the syndicate. Nor can such additional insurance be reinsured in part or in whole outsides of the syndicate unless the syndicate declines to accept the business.

4. Any subscriber may, ninety days after filing written notice of its desire and intention to withdraw from said syndicate, withdraw therefrom without prejudice to any risks or obligations previously assumed. The machinery for obtaining substitutes for the withdrawing members is fully provided for and the same may also be said of syndicate B.

INLAND MARINE INNOVATIONS

It is interesting to take note of the steady development that is being effected in the handling of inland marine business, one of the more notable phases of which has been the introduction of the agency basis to this class by one or two of the more progressive insurance companies. In one instance a manual has been prepared by the home office, and agents have been given authority to follow it in the writ-

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA
W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING
F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK
AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

ing of various classifications up to certain limits. Thus, much time and expense will be saved, with an accompanying improvement in service for both company and assured. Unfortunately, there has been no success in the attempt recently made to secure co-operation among inland marine writing companies by the organization of a conference. It would have been a good thing. In the minds of many laymen there is more or less of confusion in distinguishing the fields of ocean and inland marine; the connection is intimate. Early in the present year, in response to urgent demands of the trade one aggressive insurance company came out with a policy novelty that has met with a most favorable reception. It is a motor truck contents floater, covering contents of automobile trucks against the perils of fire, self-ignition, lightning, cyclone, tornado, flood, collision, overturn, and collapse of bridges. There is also an inland and coastwise transportation floater covering property while in the custody of railroads, express companies, licensed public carriers and United States coastwise inland steamers, against the perils of fire, lightning, cyclone, tornado, flood and transportation and navigation. These comprehensive covers are obtainable in combination with riot, strike, civil commotion, and explosion. Salesmen's floaters, personal effects floaters, and tourist baggage insurance are inland marine lines that are steadily developing and which afford the public remarkably full protection. It is believed that big things are ahead for the agents who will push these attractive covers and let the insuring public know what is obtainable. The introduction of the agency system will certainly help both the agent and the assured.

HAZARDS OF PORT CONGESTION

The interruption of transportation facilities by constantly recurring strikes has had a serious effect on port conditions. The scarcity of bunker coal, added to the labor difficulties, has tied up whole fleets of vessels in the harbors of the Eastern seaboard, and cargo is piled high on the wharves, and the adjacent warehouses are packed to overflowing. This has resulted in a demand for such shore coverage as is not provided for in the marine policy, and also a very substantial increase of theft and pilferage exposure. There is going to be a harvest of claims from the latter sources alone. Underwriters are eagerly encouraging any and every effort that promises to restore normal conlíditions and get cargo movements back to something like their regular schedules.

WRESTLING WITH PILFERAGE

There has been none too much success in the effort to get our marine underwriters together in a co-operative effort, backed by a substantial majority, to draft and agree to a policy clause that will define their proper liability as regards theft and pilferage and short-delivery claims. The committee of the American Institute of Marine Underwriters, to which we alluded in our last issue, has little progress to report. In response to its inquiries a number of prominent commercial organizations have signified their willingness to meet with the underwriters and discuss ways and means of reducing the nuisance; but certain important offices among the insurance companies stand out against a concerted movement under the selfish apprehension that they will be thereby sacrificing certain competitive advantages. In this regard they are behind their British and French rivals, who have already adopted governing clauses and are now engaged in co-operating with shipping managers and merchants in an attempt to improve the terms of bills of lading. This is a much more difficult problem than drafting a theft and pilferage agreement. But progress is being made with it, at least to the extent of encouraging meetings from time to time of shipowners and merchants for the discussion of common problems, and the proposed formation of representative associations of merchants for the consideration of difficulties of shipping transatcions, similar to those bodies now in existence in the Australasian and South African trades. One prominent company of shipowners of England has already taken the bull by the horns by cabling instructions to its representatives at various ports of call to the effect that all cargo is hereafter to be carefully tallied on discharge even at the cost of delaying the vessel. Delaying the tally until the goods have left the dock has been found to be fatal to the detection of the guilty.

THE SCANDINAVIAN VIEWPOINT

It was natural enough for the Scandinavian re-insurers of American marine lines to feel a keen disappointment when instead of substantial checks coming to them from this side they began to receive bills for balances due, but there have been good reasons for such a reversal of their bright anticipations. It is reported on good authority that a delegation of marine insurance officials is coming to this side to investigate conditions here, and certainly there will be difficulty for American underwriters to collect their reinsurances from Scandinavia until absolute proof is submtted of the validity and propriety of such demands. It is felt, over there, that they have been handed more claims than should have been transmitted and that Yankee sharp dealing gave them the very worst of their treaty bargains. While this may have been the case in isolated instances, it is certainly far from true as a rule. The Scandinavian treaties have been of the "wide open" order. Eager for American business, the Norsemen have plunged into this market at a time when marine insurance conditions, all over the world, have been in a decidedly unhealthy state owing to the subsidence of war insurance profits and the advent of the reconstruction era. The Shipping Board vessels, constructed under the necessity of top speed, have contributed more than their share of claims, and sound boats have been sadly neglected in the matter of essential repairs. Added to this is the unfortunate arrangement, in vogue in New York, that is known as the broker-underwriter combination, and under which rates and conditions are unscientific and seriously biased in favor of the commission end of the business. This plan of operation will certainly have to be discarded; but had the Scandinavian studied American insurance conditions a little more thoroughly they could easily have selected their treaty-confreres more wisely than they have done. In spite of all they may say, the fact remains that for a long time prior to the war American business was profitable for both direct writers and reinsurers, and undoubtedly will soon be so again.

AGGI WINS SUIT

JUDGE M. T. DOOLING, of the United States District Court, Northern District of California, has handed down a decision holding the American steamship Edgar H. Vance responsible for the loss of the Norwegian bark Aggi. The circumstances attending the loss of the bark were these: She was taken in tow at San Francisco on the morning of April 29, 1915, by the Vance, en route to Balboa. When the Vance and Aggi departed from the harbor a gale was blowing, the wind being estimated then at sixty miles an hour and later at 110. Twenty--four hours after departing from San Francisco the Vance was forced to abandon the Aggi, which endeavored to make Los Angeles under sail, but, finding that impossible, as she could not weather Santa Rosa Island, stood for Santa Barbara between Santa Rosa and San Miguel Islands. She stranded between these islands and became a total loss. This loss having been paid, the underwriters and owners of the Aggi later entered suit against the Vance, asserting that the departure of the steamship with the bark in tow was negligence, in view of the weather. In reply, one defense put up was that the loss of the Aggi was due to the fault of the master. Judge Dooling's decision was:

In the Southern Division of the United States District Court, for the Northern District of California, First Division, in Admiralty

Aktieselskabet Aggi, a corporation, et al., libelants, vs. The American steamer Edgar H. Vance, etc., respondent: Nehalem Steamship Company, a corporation, claimant; W. R. Grace & Company, a corporation, third party.

McClanahan & Derby, Denman & Arnold, and F. R. Wall, Esq., proctors for libelants.

W. S. Burnett, Esq., McCutchen, Olney & Willard, proctors for claimant.

This is an important case, involving intricate questions of fact and of law. The testimony was all taken by deposition, and a voluminous record was presented to the court for consideration and study. Such consideration and study have been frequently interrupted, and even now I have not the time at my disposal in which to do other than announce my conclusions. These are:

1. That it was negligence on the part of the master of the Edgar H. Vance to take the Aggi into the storm then raging, with the knowledge that he had of existing conditions, and without inquiry as to whether such conditions were improving or becoming worse. Upon this proposition I find much less difficulty than upon the one that follows, because of the unusual character of the latter.

2. The loss of the Aggi is to be attributed to the original fault above mentioned, because the condition of the master of the Aggi and of the pilot on board was solely due thereto; and if they themselves were at fault in the navigation of the Aggi in the particulars claimed by respondents, at and prior to the time the vessel was stranded on Talcott Shoal, such fault was due to their condition of mental and physical exhaustion, occasioned by their constant endeavors to save the vessel from the storm and its consequences, into which the negligence of the Vance had originally brought them.

It follows from the foregoing that a decree should be entered fixing the responsibility of respondents, and referring the cause to the commissioner to ascertain and report the amount of the loss.

TWO CENTURIES OF MARINE INSURANCE

THE Royal Exchange Assurance Corporation and the London Assurance Corporation celebrated, on June 24, the two hundredth anniversary of their founding. Charters were granted to the two companies on the same day, June 24, 1720. Prior to the organization of these corporations marine underwriting had been exclusively in the hands of individuals, principally those of Lloyds' coffee house, whose influence had been potent enough to defeat, for several years, proposals that Parliament grant charters to corporations; but, at length, charters were granted when the two companies agreed to pay into the exchequer £600,000. This sum eventually was reduced to £150,000, which was paid.

Although the charter of the Royal Exchange was granted in 1720, the history of the corporation dates back to 1564, when the Mines Royal Company was organized, to be merged with another in 1714 under the name of Mines Royal, Mineral and Battery Works. This company was not in the insurance business, but decided in 1718 to enter that field. This decision was followed by the granting of the charter in 1720.

TEAK SHIPMENT

THE American steamer West Neris brings 132,000 feet of teak from Saigon for the account of J. H. Dieckman, Jr., importer of hardwoods in San Francisco. This shipment consists of teak logs and planks. J. H. Dieckman follows a very consistent policy in insisting that all his shipments be carried in American steamships.

From a marine insurance standpoint it is interesting to note the great amount of money represented in premiums which are paid on hardwood lumber shipments, especially if the shipment is made in part as deck load. On a recent shipment on board the City of Portland, containing approximately 600,000 feet of teak, the office of J. H. Dieckman paid an insurance premium of $12,000. This large insurance premium is paid upon receipt of insurance policy and is a considerable factor in the price of hardwood.

INSURANCE ON THE PACIFIC

PRECISELY what was the effect on Pacific Coast business of the recent closing of the London market to American marine risks is difficult to ascertain, although there were some reports of risks being declined and, on the whole, a general belief that permanent, or, rather, long-continued closing would work to the great disadvantage of American business. In support of this view was cited that for years London has taken much business that the American market did not or could not absorb; this was true as late as the first of the year, when renewals of policies on one relatively small fleet were taken in part by London, the remainder, however, being placed in San Francisco. On the other hand, although some business was turned down, other offerings from the Pacific apparently were accepted.

LAW IS PUZZLING

Among San Francisco underwriters there was a feeling of bewilderment at the provisions of the recent New York law that resulted in the closing of the London market. Section 45, as amended, provides, in brief, that foreign companies writing risks on American business outside of the United States (for example, in London instead of through a branch in America) should "report premiums, pay taxes thereon and hold reserves thereon" in the state of New York. As one underwriter summarized it, insurance on California rice, placed directly in London, would be compelled to pay New York state taxes, under penalty of fines or of expulsion of the underwriting company from New York. He, and others, were doubtful of the constitutionality of the law, at first blush, although inclining to believe that it must have been passed upon by competent authority before being enacted. Other New York laws in the past have reacted upon insurance companies, in that the companies were forced to discontinue writing certain business that, although permitted by their charters granted by their home states, was forbidden by the New York laws, with the result that the companies were required either to discontinue issuing the forbidden policies or to withdraw altogether from New York. In some cases these policies could not be written anywhere in the United States because of these state laws. A broker was of the opinion that the law would be upheld, in case of suit, despite the fact that it taxes business originating in other states; although he had not obtained a well-considered opinion, attorneys with whom he had discussed the act were of the belief that it was valid. One reason for this view is that New York has the power to fix regulations for the licensing of companies doing business in the state, and one of the regulations now is that taxes shall be paid on premiums received as the result of risks written abroad.

FIGURING RESERVES DIFFICULT

On the whole, he thought that the payment of taxes probably was less burdensome than the holding of reserves in America, etc., also required by the law. In this view he was joined by Hendon Chubb, who, in an interview published in New York, said: "I do not understand that there is any very strong objection to the taxation feature, but apparently the London companies find the reporting of these risks and the figuring of reserves a very difficult matter, owing to the way in which business is handled in the London market, and understanding the London method as I do, I can readily see the difficulty which compliance with this will entail." Some British observers have gone a step farther than most American and have arrived at the conclusion that the effect of the law is world-wide and that any risk, which the insurance superintendent of New York might hold to be American, comes within the act, regardless of where written and where the vessel.

WROTE BUSINESS SEPARATELY

One broker said that the object of the law, to make business done in London subject to taxation in America, could not force British companies to write these risks through their New York offices, and that the marked result of the law would be to reduce the insurance market open to the American shipowner and merchant, because the New York agencies of the London companies had been managed virtually as separate organizations, in that both the home offices and the agencies had written business independently of each other, regardless of the lines that the other had out, which resulted in the agencies and head offices offering distinct markets. For the immediate present this broker anticipated no marked effect, inasmuch as the large lines had been placed; the permanent closing of the London market, of course, would have a pronounced effect, and he anticipated some action to "get around an impossible situation."

MONOPOLY UNDESIRABLE

Although heartily in sympathy with efforts to increase American marine insurance, the broker asserted his belief that any attempt to place all American business in the United States — that is, in short, to give American companies a monopoly—was undesirable; if American facilities were sufficient to cover what he characterized as the "peak load," the normal business offering would be insufficient to maintain the different concerns; and even London, he continued, had found it necessary to place portions of risks in America and elsewhere, as America has placed risks in London; wherefore he deduced the necessity of two or three world markets. In connection with this phase of the discussion he cited that the United States government had avoided appearing as endeavoring to build up a monopoly for American companies. To attempt to get business by means of legislation was a grievous error, he held. The older companies and brokers recognized that competition must fix marine insurance rates, because there is no scientifically precise method of computing them.

In considering the available American market for marine insurance, and discussing whether there was sufficient coverage for business in the event that the London market remained closed indefinitely, San Francisco underwriters, of course, took cognizance of the formation of the new syndicates, but also manifested a disposition to wait until more details of the organization were made public.

BRITISH VIEW GIVEN

On the British side there was a reaffirmation of the statement that the United States required the London market. In this connection a British agent pointed out that the British market has extended over the world, taking risks on vessels of all nations and of all descriptions, so that a general risk was obtained; the risks were spread out to a degree not possible, at this time, for American companies. This argument probably represents accurately the British view of the situation, and reflects the belief that some action will be taken to straighten out the tangle.

San Francisco apparently was better informed than New York regarding the cause of the action in London, because the New York law, and not the Jones bill, was named in dispatches from London to San Francisco offices; whereas the East thought for a day or so that London had acted in this manner as a retaliatory measure inspired by the Jones bill.

LEVISON IN LONDON

Marine insurance of San Francisco has not reflected greatly the commercial depression of Japan; Seattle's market, having a closer connection with Japan, probably has felt the panic more. The tone in San Francisco has been quieter, probably in conformity to the usual traditional waiting of the year of a presidential election, which affects business generally, domestic as well as foreign.

J. B. Levison, president of the Fireman's Fund Insurance Company, attended the International Congress of Chambers of Commerce at Paris, where he and Raphael Weil represented the San Francisco Chamber of Commerce. Mr. Levison conferred with Joseph Hadley, European marine agent of the Fireman's Fund, in London, and sailed for New York on the Aquitania on her first westbound voyage since she was reconditioned.

(Continued from page 66)

Having thus found all the weights that make up the five items, and the center of gravity of the vessel both in the light and loaded conditions, the attention of the designer must next be directed to the determination of the final lines which will give the best results, i. e., lines that will reduce the resistance to a minimum. Before this can be done it will therefore be necessary to calculate the values of various constants, known as Froude's constants. These values, obtained by the use of the formulas given in Baker's Ship Form, Resistance and Screw Propulsion, are as follows:

(1) Length constant $m = 5.09$.

(1) Skin constant $s = 8.65$.

(3) Speed constant $k = 1.77$.

(4) Length speed constant $l = 0.781$.

(5) Resistance constant $c = 1.809$.

(6) Ratio of speed of ship to speed of wave whose length is $(P \times L)$ $p = 0.657$.

In the final analysis of the lines, when purely power and resistance are considered, it would indicate from the foregoing constant values, by comparison with those of Froude's, that a smaller beam than that assumed would give somewhat better results. However, stability considerations and the necessity of providing the required passenger accommodation space on both the main and awning decks, as well as the necessary space for the efficient installation of the machinery, would make the adoption of a smaller beam than here assumed out of the question. It is also found that for speed below 13 knots, a parallel middle body of from 10 to 20 per cent could advantageously be introduced, 30 per cent being the maximum that can be inserted without material increase in the power per ton. Likewise, a greater speed up to $V = \sqrt{L}$, could have been used for this vessel. Here, again, the particular service to which the projected vessel will be put does not warrant a higher speed $V = \sqrt{L}$, equivalent to 14 knots at sea, which will more than double the power required to drive the ship at 10 knots at sea. On the other hand, if cargo carrying capacity alone were to be considered, a larger block coefficient up to 0.70 could be used with very slight increase in power as shown by the cross curves in Figure 2. For these reasons the beam, speed and block coefficient selected had to be held.

With the final lines completed, it is only necessary to lift off the ordinates at the different water lines in order to prepare the displacement table. At the same time a small wooden model is usually made which actually reproduces to a small scale the external shape of the hull, and on which are laid the frame and deck lines, shell plating, bulkheads, bilge keels, etc. The body plan plays an important part for calculating the statical stability of the vessel, either by Barne's method or by the use of the integrator. Nothing now remains to be done except the preparation of the various detail drawings, together with the launching calculations and diagrams, which are necessary in the building of the vessel.

GENERAL DESCRIPTION OF VESSEL

The construction and equipment of the proposed vessel with all of its machinery will be in accordance with Lloyd's Rules and Regulations, and the Rules of the Supervising Inspectors of Steam Vessels of the United States.

Length over all	230′ 0″
Length between perpendiculars	220′ 0″
Beam molded	35′ 0″
Depth molded, to main deck	15′ 9″
Depth molded, to awning deck	23′ 6″
Draft, designed load	16′ 0″
Block coefficient	.65
Mid-area coefficient	.918
Prismatic coefficient	.708
Hull coefficient	.463
Machinery coefficient	.16
Fuel coefficient	.51
Admiralty coefficient	193
Height center of gravity above base loaded	15.37′
Displacement, designed load, tons	2,288
Displacement, light condition, tons	1,031
Deadweight, 16-foot draft, tons	1,257
Cargo capacity, 51,160 cu. ft., tons	989
Engines—Full Diesel, McIntosh & Seymour type M-6-C-50, cylinder diameter 25-inch, 42-inch stroke.	
Brake horsepower	1,200
Revolutions, r. p. m.	115
Propeller diameter	11.6′
Propeller pitch	12.29′
Propeller area, helicoidal, 3 blades, square feet	39.78
Propeller area, projected, 3 blades, square feet	31.89
Speed, still water, knots	11
Speed, at sea, knots	10
Passengers, first class	56
Passengers, second class	24

A FAST RUN TO SYDNEY

THE five-masted barkentine Anne Comyn, built as a Ferris-type wooden steamer and converted into a sailer, arrived at Sydney July 5, fifty-two days from San Francisco. This passage, although by no means a record, is such as to justify the faith of those operators who believed that the Ferris and Hough hulls could be converted into sailing vessels successfully. In holding to this belief riggers and operators faced much incredulity and doubt, especially in the East, where the project, a year or more ago, was scoffed at, and its failure set down as certain. To Captain A. F. Pillsbury, at that time district manager of the Shipping Board, San Francisco, and T. L. Tomlinson, assistant in charge of ship construction, goes the credit for initiating the plans of conversion early in 1919. The Anne Comyn is owned by the Pacific Freighters Company, which has other vessels of the same kind, all rigged by the Haviside Company. A photograph of the Anne Comyn formed the cover of Pacific Marine Review of July.

This voyage brings up the ever interesting question of record runs.

TWENTY-NINE DAYS TO AUCKLAND

A Wellington resident, having a penchant for research in nautical history, recently discovered that the bark Novelty, of Auckland, arrived at Auckland December 28, 1851, after a voyage of twenty-nine days from San Francisco. She was a vessel of only 255 tons. In commenting upon her voyage the Wellingtonian observes that she must have had strong trade winds for almost the whole of the passage. The four-masted iron bark Lucipara, 1943 tons gross, sailed from San Francisco to Newcastle in thirty-eight days in 1908; the ship British Ambassador sailed from San Francisco to Newcastle in thirty-nine days; the ship Dunsyre a few years ago made the voyage from San Francisco to Wellington in the same time; and the old Glory of the Seas sailed from San Francisco to Sydney in thirty-nine days and back in forty, although this does not appear to be the San Francisco - Sydney record.

NEW VESSELS FOR GENERAL STEAMSHIP

TWO new vessels have been assigned by the Shipping Board to the General Steamship Corporation, which is operating lines to the West Coast of South America (Colombia, Ecuador, Peru, and Chile) and to Australasia (Australia and New Zealand). The Depere, a new 5300-tonner from the Hanlon yard, will be added to the South American service, making five vessels for that trade route and affording a sailing about every twenty days instead of monthly as heretofore. The West Carmargo, an 8800-tonner from the Schaw-Batcher yard, will be the fourth vessel for the Australasian service. Sailings every month instead of every thirty-five days will be maintained hereafter. Both vessels will be in service early in August.

Lumber on the outward voyage and coal on the homeward make up the larger portion of the cargoes on the Australian route.

NEW GASOLINE TUG

A GASOLINE tug of unusual size and power, the largest and heaviest-powered vessel of its kind in the world, was launched in July by W. F. Stone & Son, wooden shipbuilders of Oakland, for Young Brothers, Ltd., of Honolulu. She was christened Mikioi; is 95 feet in length overall; has an engine rated at 500 horsepower, but which developed 600 horsepower by the brake test; has an estimated speed of 12 to 12½ knots an hour, and fuel capacity sufficient to carry her for twelve days at full speed.

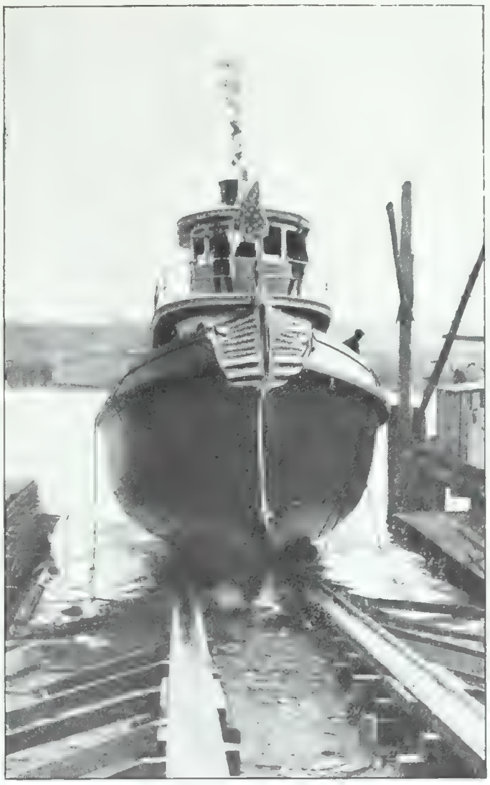
MOST TOWS ARE SHORT

Young Brothers have the only commercial towing fleet in the Hawaiian Islands. The Mikioi is the fourteenth vessel of the company, and all her predecessors have been gasoline-driven. In general, long tows are few, most of the work consisting of towing in and near Honolulu harbor, with trips now and then to Pearl Harbor, or to a more distant place, so that gasoline has been found to be the most satisfactory drive. In addition to the shortness of most of the towing, other considerations, such as the fact that the Young employes are skilled in the operation of gasoline engines, the relative newness of the Diesel engine in the Islands, and the lesser weight of the gasoline engine, militated against a heavy-oil engine for the Mikioi.

The tub was designed by W. F. Stone & Son. Her beam is 21 feet; draft, 11½ feet; gross tonnage is estimated at 110 and net at 65; the displacement will be about 200 tons. Her engine, built by the Standard Motor Construction Company, of Jersey City, New Jersey, has six-cylinders, double-acting, and direct-reversible. The cylinders have a 12½-inch bore and a 13-inch stroke. A 6½-inch shaft runs to the propeller, which is 6 feet in diameter, four-bladed, of Columbia manganese bronze, and has a 54-inch pitch. At full speed the engine will run 350 revolutions a minute.

FIRING EVERY THIRTY DEGREES

No primary batteries are used for ignition. Firing is done by jump sparks from two 12-pole Bosch magnetos (twenty-four firing points in all), each cylinder having two separate plugs at the top and two at the bottom, an arrangement by which missfires are prevented. There is little vibration, because a firing occurs at every 30 degrees of the revolution of the crankshaft; or, in other words, the engine is the equivalent of a twelve-cylinder. For the main engine there are thirty-two forced feed oilers, every movable part being lubricated by forced-feed oil. A water system cools the engine, including the pistons, connecting rods, inlet and exhaust valves; and the crankshaft also has been fitted for water-cooling. A Kingsbury oil thrust has been installed. Instead of having a wooden rudder, the Mikioi has a steel balanced rudder and a cast-steel shoe, which, besides other advantages, offers less drag through the water.


Launch of the Gasoline Tug Mikioi at the Oakland Shipyard of W. F. Stone & Son

Fuel is carried in five tanks, two of which are forward of the engine-room and three aft, the total capacity being 13,000 gallons. Another tank holds 500 gallons of fresh water.

TWO 12-H. P. AUXILIARIES

Besides the main engine, there are two 12-horsepower auxiliaries for generating electric current and compressing air. These auxiliaries are of the type adopted by the allied governments, including that of the United States, for submarine chasers. There are eight air-tanks, charged with air at a pressure of 250 pounds, which is used for starting, stopping and reversing. These auxiliaries can pump fifty-five gallons of free water a minute and compress twenty cubic feet of air in the same time. The electric set is of 4½ kilowatts capacity.

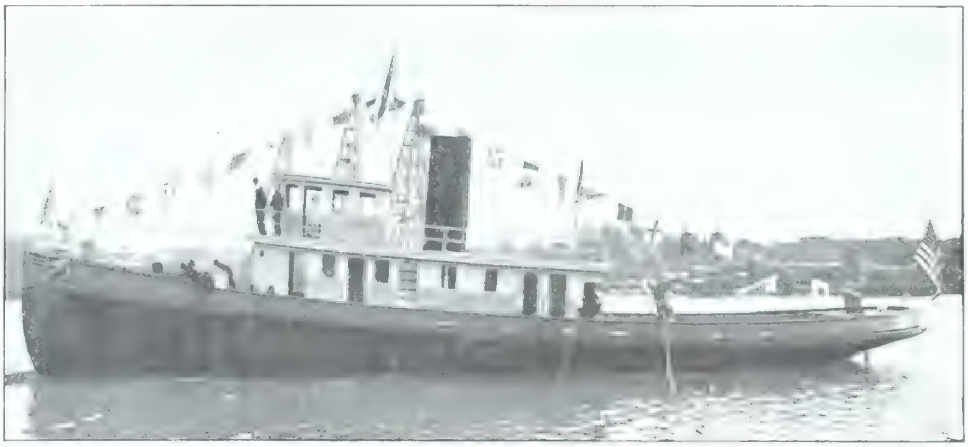
There are two capstans on deck, one for the forward lines and the other situated aft, alongside the main towing bitts. The capstan engines were built by the Hyde Windlass Company, after the design of the Hyde steam engines, but with some minor modifications to permit the use of compressed air as a motive power. The after engine is rated at 10 horsepower, and has a 6½ by 8 inch cylinder; and the forward engine is rated at 6 horsepower, and has a 4½ by 6 inch cylinder.

CARRIES CREW OF FOUR

In the deckhouse are two cabins, each having two berths; a galley, messroom, lavatory and storeroom. There is room for four men in the forecastle. On the upper deck is the pilot house and captain's cabin. A crew of five men will be carried normally; but on the voyage from San Francisco to Honolulu the Mikioi will have a master, mate, two engineers, a cook and two quartermasters. For this 2100-mile voyage the tug will be fitted with two temporary masts to give auxiliary sail power, advantage thus being taken of the fair northeast trades and propulsion being assured in case of engine trouble. There will be three sails: forestaysail, lug foresail and a mainsail.

W. F. Stone & Son designed another vessel for Young Brothers, the Makaala, which was built, however, by the Inter-Island Steam Navigation Company, of Honolulu. So successful was this tug that the United States government purchased the plans of the Stone yard and used them for the construction of several 65-foot boats for the different navy yards.

The cost of the Mikioi was about $90,000. Her hull displays wooden shipbuilding at its best.


Gasoline Tug Mikioi Built for Young Brothers, Ltd., of Honolulu by W. F. Stone & Sons, Oakland

Photos copyright, Walter A. Scott, S. F.

An auxiliary schooner for the Fanning and Washington island copra plantations, to replace the old British steamship Kestrel, is being built by W. F. Stone & Son, of Oakland. She will be used to carry supplies to the two islands, to take away their copra, and also to recruit laborers in the Gilbert group. In general design she will be similar to vessels built by W. F. Stone & Son for Burns, Philp & Company, of Sydney, which operates a fleet in the South Sea trade.

The vessel will be a three-masted topmast schooner, powered with a 150-horsepower, three-cylinder Union engine. There will be one deck. Forward and aft will be two cargo holds, having a cubic measurement of 22.694 feet and capable of carrying about 275 tons of copra. In addition to being used for cargo, these holds also will be quarters for the laborers while en route to and from Fanning Island, so that as many removable berths as possible will be installed below; and the vessel will have, in addition, about 3000 feet of deck space in which natives can be quartered.

For the officers and crew quarters will be provided as follows: in the main deck house, cabins for captain, mate, engineer, and five passenger cabins with two berths each; store, bath, lavatory and pantry; in the forward deck house, crew's quarters for eight men, cook's room and galley. In small side houses forward will be lavatory and shower baths for the crew.

The schooner will be 138 feet long overall; 123 feet 6 inches between perpendiculars; 32 feet in extreme beam; 13 feet in molded depth; of about 350 tons gross and 225 net. She will be built to Lloyd's specifications. Her boats will consist of two 20-foot surfboats and one dinghy. Refrigerating machinery will be in the hold, aft of the engine-room. The vessel will be completed for delivery in October or November and will be ready for sea except for perishable stores and provisions.

The Kestrel, which formerly was a Canadian fisheries patrol vessel, plies out of Honolulu to Fanning, Washington and the Gilberts.

HONOLULU NOTES

TWO hundred feet have been added to the width of Honolulu harbor through the completion by the Hawaiian Dredging Company of the initial Federal government contract for the dredging along Sand Island from the channel entrance to the point of entrance into Kalihi Basin. This work, together with the dredging of fifty feet, 1000 feet wide, into Kalihi Channel, is the first part of the ultimate improvement to be done by the government designed to place the Kalihi Basin, with a navigable area equal to that of Honolulu harbor at present, in direct connection with Honolulu's deep-water port. This will not only more than double the area for wharves and docks at Honolulu as far as the Kalihi Basin is concerned, but it will make possible the construction of wharves along Sand Island, directly opposite the business section of the city.

Governor Charles J. McCarthy, accompanied by Lyman H. Bigelow, chairman of the board of harbor commissioners, has visited the scene of the present completed dredging work and reports the satisfactory consummation of the contract. The next contract to be let by the government will be that for the dredging of the Kalihi Channel for a width of 800 feet, the property owners on both sides to dredge out 100 feet from the shore line, making the completed channel 1000 feet in width and with a depth of thirty-five feet.

The material dredged by the company has reclaimed a large portion of land on the John Ena estate, between the pineapple cannery in Iwelei and the cane fields at the extreme western end of the harbor.

Announcement has been made by the harbor commissioners that as soon as plans are complete for an extension of Pier 10, at the foot of Fort street, Queen street, now adjoining and running parallel to more than half the harbor docks, will be widened into an esplanade. The plans of the board provide for the razing of several buildings recently acquired from Allen & Robinson and the Honolulu Construction Company between Kaahuman and Fort streets. This will provide a pier head for Queen street and give ample space for handling freight.

Notification has been received by Major General Charles G. Morton, commanding the Hawaiian department of the United States army, that the war department has assigned the army transport Cantigny, now in course of construction, to the San Francisco-Honolulu regular service. The notification stated that the new transport will be ready to steam from the Atlantic Coast to San Francisco by the middle of August and it is expected that she will arrive here on her first trip by the end of that month or the first part of September.

Shipments of sugar from Hawaii to San Francisco since the middle of January, when the present season began, had reached a total of 364,100 tons by the first week of July. The shipments were divided 356,000 raw and 8100 refined. The estimate for the year is about 575,000, but this probably will be increased now that the plantation strike has ended and with the return of the Japanese on Oahu the six plantations on this island are rushing cutting work on cane that should have been ready for the mills a month ago.

Although neither the Hawaiian Sugar Planters' Association nor the Japanese labor organization will make public any details as to the nature of the settlement by which the Japanese have called off the strike which began in January of this year, it is understood that assurances were given by the planters that the wage system would be readjusted at the close of the present season. It is comomn talk about Honolulu that the basic wage of the laborers will be increased, but that a material reduction will be made in the bonus schedule. Practically all Japanese and Filipinos who were out on strike have returned to the Oahu plantations, the only ones in the Territory effected by the walkout order last January.

It is expected that the Matson Navigation Company will be given possession of Piers 8, 9 and 10 at the foot of Fort and Bishop streets by the close of the present year, bids having been advertised for this month for the construction of necessary sheds over the concrete wharves. The wharves were constructed two years ago with the understanding that they would be devoted to the exclusive use of the Matson company, but so far they have been unavailable to the company because of the lack of sheds for the protection of perishable freight. At present the Matson liners (one of which, and sometimes two, are always in the harbor), are using Piers 15 and 19, the latter being located almost at the extreme western end of the harbor and accessible with difficulty to the public. With the return of the Maui, Matsonia and Wilhelmina to the regular run between this port and San Francisco, the Matson wharves are congested at all times and more room is necessary for 'the satisfactory conduct of the growing business of the company.

Although the project for the improvement of Nawiliwili harbor on the island of Kauai has received the approval of the war department, the work must await funds from a separate bond issue which cannot be floated until June of next year unless an amendment be made to the improvement bond act by the special session of the territorial legislature, which probably will be held in the fall. Colonel H. C. Newcomer of the United States army engineers' corps has announced that the arrangements made by the Kauai chamber of commerce for railroad connections between Nawiliwili and the southern section of the island have been accepted by the war department, but that work cannot begin until the Territory has deposited with the Secretary of War the required $200,000 as the Territory's share of the contract cost.

PACIFIC PORT NOTES

FUEL oil for naval and merchant vessels is a burning question these days. At ports far removed from one another the shortage of stocks for merchant vessels has become acute; on the Pacific Coast the navy has enlivened a situation, which was not without interest before, by the means adopted to obtain fuel for its vessels. Various ultimata have been spoken; threats have been made, precisely on what authority is not clear, to take the needed fuel by force if necessary; and the Department of Justice has been brought into the situation in different ways. As to the price to be paid by the navy there is emphatic disagreement, the navy offering $1.72 a barrel, whereas bids have been greatly in excess of that amount. That the navy is urgently in need of oil is evident; that a real shortage in general exists is no less apparent; the situation is such that the owner of mercantile tonnage burning fuel oil cannot avoid wondering what would be his predicament should the navy suddenly be summoned, by international emergency, to go to sea in force.

Sydney now has appeared as another port in which fuel oil is at a premium. The American consul has suggested that oil-burning vessels be diverted from the Australian trade and has cited the experience of two American vessels, which were compelled to have their oil-burning equipment changed to coal at that port because they were unable to obtain fuel. Vessels that have not sufficient oil capacity for a round trip should be withdrawn from the Australian trade. In the meantime, however, the United States Shipping Board has gone ahead rapidly with the construction of fuel oil stations, in Manila, Honolulu and Shanghai, which will be of enormous advantage to vessels owned by the government, and has taken steps to call in all government tankers operated by private companies. These will be operated by the board hereafter, with a consequent reduction in the cost of fuel for government merchant vessels, inasmuch as about one-third of the supply had been purchased by managers as needed, the remaining two-thirds having been furnished by the board from its contract sources. Construction of new tankers, on the Atlantic and Pacific, both for the Shipping Board and private companies, is the outstanding feature of new work. When vessels now building have been completed, the board will have a fleet of no less than 100 tankers or so. All in all, the prospect offers encouragement, provided that there is no actual shortage of oil at the world's wells. That calamity would be something else again.

Bids for 125,000,000 barrels of fuel oil (approximately sufficient for the next five years, the estimated amount being 135,000,000 barrels) were opened by the Shipping Board July 15. In general, the larger oil companies did not bid, and many of the tenders were conditioned upon government loans for construction of refineries, etc., and transportation of the oil in government tankers. The following shows the prices of last year, this year and the recent bids:

	Spring 1919	Present Price	Bids July 15
Boston	$1.05	$2.50	$2.90
Philadelphia	1.10	2.07	2.30
Galveston	.97	1.34	2.45
Baltimore	1.05	2.07	....
New Orleans	.90	1.40	2.45
New York	1.05	2.07	....
Norfolk	1.05	2.37	2.75
Jacksonville	1.15	1.50	2.70
Panama	....	1.13	2.71

The Pacific will be taken care of under the Oil Lands Leasing Act.

The American Steamship Owners' Association has organized a tank steamer committee to handle questions relating to the operation of tank vessels. D. T. Warden, of the Standard Oil Company of New York, is chairman. The committee will have in charge the obtaining of an adequate supply of officers; demands for overtime pay by officers; increasing tanker tonnage; structural improvements.

Vancouver, B. C.

A DEMAND of an increase in wages, from 80 cents an hour with $1.10 an hour for overtime to 90 cents an hour, overtime $1.25, has been made by the Vancouver longshoremen. Thirty days' notice has been given. The demand probably will be submitted to arbitration.

Due to inability of the Canadian government and the Canadian Pacific Ocean Services to come to terms regarding the transportation of mails to Asia, the Japanese and Blue Funnel liners are handling the mails.

At the annual meeting of the Harbor Marine Veterans' Association, held in Victoria, Captain M. Orford was elected president, succeeding Major Bullock-Webster.

Three raw sugar cargoes from Cuba were received at Vancouver during the latter part of July.

On her last voyage as a Pacific liner of the O. S. K., the steamship Chicago Maru arrived from the Orient. She will be replaced by a larger vessel. The Chicago Maru will be used in the around-the-world service of the O. S. K., starting from Kobe.

Seattle

THE Merchants' Exchange of Seattle has started a movement to consolidate the different commercial organizations. Said O. D. Fisher, president of the Merchants' Exchange, in outlining the plan: "In other sections of the world ports of Seattle's size and importance have their bourses, where the bankers, steamship operators, coffee dealers, tea dealers, flour men, and, in fact, representatives of every trade, meet daily to transact business. We have many such trades in Seattle; for instance, the peanut trade, soy bean oil, lumber, salmon, canned milk, and dozens of others." Said the Seattle Times: "A foreign trade clearing house, such as now is being discussed, could not fail to promote all the commercial interests of this city and tributary territory."

The Eagle boat Bothwell, one of five vessels turned over by the Navy Department to the Coast Guard Cutter Service, arrived in Seattle early in July and departed within a few days for the Pribilof Islands to guard the seal herd. Another Eagle, the Earp, will be dispatched to Honolulu.

The fishing vessel Over the Top was launched by the Elliott Bay Shipbuilding Company in July, marking the resumption of building operations on the Duwamish waterway site of the company.

Customs collections in the Puget Sound district for the year ending June 30 were $4,985,451.34, the largest collections of the district for any year. Collections for the fiscal year ending June 30, 1919, were $3,226,609; and for the year ending June 30, 1914, $1,868,637.

Rogers Brown, formerly president of Rogers Brown & Company; James Farrell, formerly vice-president, and Karl N. Edwards, also formerly vice-president, have organized the importing and exporting company of Brown-Farrell-Edwards & Company, with head offices in Seattle.

A shortage of fuel oil for the Lake Union power plant, which entailed a decrease in the supply of electric current, was warded off by the chartering of the Shipping Board tanker Devolente by the General Petroleum Corporation to transport a cargo of 55,000 barrels to Seattle. This supply will be sufficient to last during the dry months, should the autumn rains begin to fall in November.

An investigation made by George F. Nicholson, chief engineer of the port commission, shows that the new Smith Cove Pier B not only is the largest commercial ocean pier in the world, but also is the largest of any kind in America, having an area of 916,860 square feet as against 876,000 of the Chicago municipal recreation pier and 450,000 of a pier in Halifax.

Large quantities of box shooks again are being sent to the Orient, after a slump that lasted for eighteen months. The first shipment went to Singapore to the Asiatic Petroleum Company, which will use the shooks for making cases for oil cans.

A Shipping Board course for marine engineers was begun at the University of Washington July 6, to continue to July

31, under the direction of Professor E. O. Eastwood. Heretofore engineers who desired instruction in turbines have been sent to the factories.

A contract for changing the Japanese-built vessel Eastern Importer from a coal-burner to an oil-burner was awarded to the Todd Drydocks, Inc., for approximately $100,000. The vessel is a 9100-tonner built by the new Mitsui yard at Uno, Okayama. J. F. Duthie & Company were awarded the contract for converting the Eastern Exporter, a sister ship, the cost being approximately $100,000. The Eastern Importer has been allotted to the Pacific Mail Steamship Company for its around-the-world service.

Following upon the lifting of restrictions on trade with Russia, the Universal Shipping & Trading Company has announced that it would place a fleet of wooden vessels in the Seattle - Vladivostok trade.

For the first five months of the year, Seattle's water-borne commerce showed an increase of $6,809,268 as compared with the corresponding period of 1919. The commerce for the first five months of 1920 was $308,382,182. Imports, both domestic and foreign, gained, whereas exports declined.

Millions of dollars will be spent by the Navy at Bremerton within the next few months. Repairs on three dreadnoughts, the Mississippi, New Mexico and Idaho, will cost $2,000,000, and several hundred thousand dollars will be spent on smaller vessels.

The J. H. Price Construction Company launched the 3300-ton wooden motorship Muriel at the Anderson yard for the Muriel Motorship Corporation. The vessel is 259 feet long and will be powered with Skandia engines.

A telegram received by the Seattle Chamber of Commerce from Admiral Benson, chairman of the Shipping Board, stated that the headquarters of the new North Pacific district would remain in Seattle, notwithstanding protests made by Portland.

Tacoma

EMPLOYES of the Todd Shipyards Corporation in Tacoma and New York will share in a bonus, aggregating $1,000,000, which recently was announced by the company. From one to fifty shares will be given each of the employes who shares in the bonus. Four years ago, when the company took the first contracts to build for the allied governments, William H. Todd, president of the corporation, promised that a bonus would be given; in carrying out this pledge, Mr. Todd will distribute the stock, now worth about $165 a share and paying 10 per cent dividends. The premium plan will be continued for another four years.

The Admiral Line and the San Francisco & Portland Steamship Company have requested permission of the Interstate Commerce Commission to increase their rates on freight from interior Northwestern cities to California, which comes under the jurisdiction of the commission because of the rail haul involved. Gross earnings of the Pacific Steamship Company in the Seattle-California and San Francisco-Southern California services during 1919 aggregated $4,785,681.98, as compared with operating expenses of $5,084,589.63, leaving a deficit of $298,907.65, says a brief filed by the company with the commission. In 1917 the deficit was $18,673.53. Although the business done in 1917 and that done in 1919 were approximately the same, operating costs increased 10 per cent, the principal increases being felt in the latter part of 1919, when an increase of approximately 30 per cent was granted crews of vessels and 20 per cent was granted stevedores. Fuel oil costs have gone up 80 per cent, from 89 cents to $1.60 a barrel; repair costs have more than doubled; food costs increased 50 per cent from 1917 to 1920; overhead charges are 20 per cent greater; marine insurance costs more, due to the greater values of the company's ships; and, finally, operating costs continue to increase, an advance of 15 per cent having been made in the first four months of 1920 as compared with 1919. The steamship companies are asking an increase of 24 per cent, which also is being asked by the railroads.

The brief shows that the twelve ships which the company operates in the Seattle-California, Portland-California and San Francisco-Southern California routes represent a total purchase price of $5,382,102.07, with an insurance value at the end of 1919 of $6,191,000 and a net book value of $4,431,151.04. The prices paid for the ships follow: Aurelia, $55,000; Topeka, $75,000; Curacao, $170,000; Admiral Dewey, $415,939; Admiral Farragut, $415,939; Admiral Schley, $415,939; Governor, $1,450,000; Homer, $25,000; President, $1,400,000; Queen, $340,000; Spokane, $300,000; and Admiral Sebree, $319,285.07. The vessels were bought before the war or in the early years of the war.

The steamship Redhook, named for the district in Brooklyn in which the Robins Drydock & Repair Company, a Todd yard, is situated, has been launched by the Todd yard, Tacoma. The vessel is the first of two built by the yard for its own account; is a standard 7500-tonner, and was christened by Miss Ella Hart, daughter of Governor and Mrs. Louis F. Hart. The second of the two vessels, and the last merchant ship that remained on the ways at the Todd yard, was launched in July and was christened Hoboken. She was the twenty-fifth vessel launched.

Tacoma led all Washington cities in exports during April, with a valuation of $12,208,007, according to Roscoe M. Drumheller, collector of customs. Tacoma's imports were valued at $2,790,074. Total imports for the state were $32,713,226, and exports, $25,158,134.

The Wright shipyards, which built Ferris type vessels during the war, have been sold. The ways and buildings will be razed. The land will revert to the Northern Pacific Railroad, from which it was leased.

Grays Harbor

THE lumber schooner Forest King, last of the Forest Line fleet to be completed, made her trial trip across the Grays Harbor bar the middle of July and was pronounced by marine men one of the finest vessels ever built at a North Pacific yard. The Forest King formerly was the government hull Academia, one of the last constructed for the Shipping Board at the Aberdeen yards of the Grant Smith-Porter Company. The vessel was sold a few months ago and was brought to Grays Harbor for the installation of oil-burning engines and for refitting as a lumber schooner. The carrying capacity is 1,600,000 feet of lumber. On its maiden voyage the Forest King will take a cargo to Peruvian ports.

Grays Harbor lumber shipments made the poorest showing in June since last November. Only 22,001,000 feet of lumber left this port by water during the month, carried by twenty-three coastwise and two foreign ships of 11,859 tons. During May thirty-two vessels, of 16,351 tons, cleared with 28,548,000 feet of lumber. During June of last year twenty-eight vessels cleared with 26,663,000 feet, or over 4,000,000 feet more than was carried out by water during the corresponding period this year.

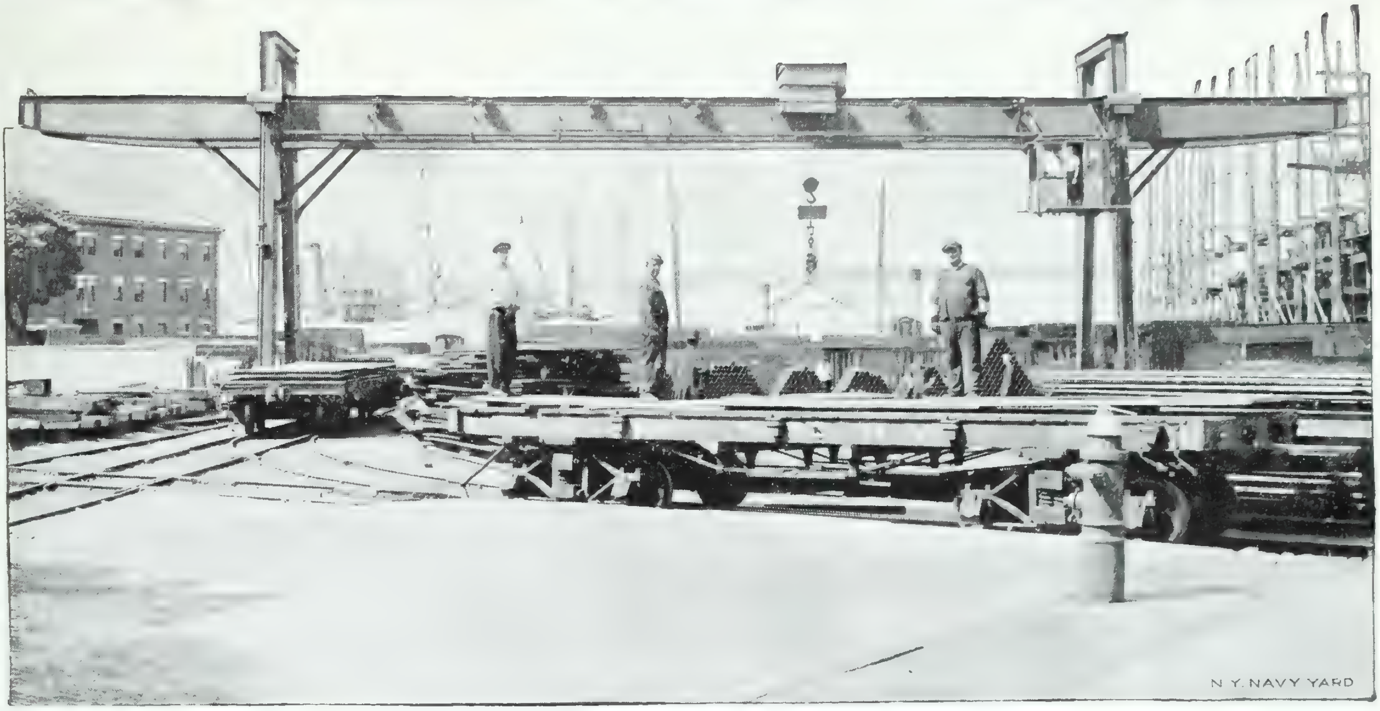
Harry Ashbury, captain of the schooner Fred J. Wood, which loaded early in July at the E. K. Wood Lumber Company's mill at Hoquiam for Adelaide, Australia, claims great speed honors for his vessel. The latest performance, according to Captain Ashbury, was a record run to Australia in which it made thirty days' better time than its sister ship Fearless, also of the Wood fleet.

What is declared to be the largest log in the world was the unique exhibit of the Hoquiam, Washington, district at the annual conclave of Shriners held the last of June at Portland. The giant spruce log measured 12 feet 6 inches in diameter at the butt, was 28 feet long, and weighed approximately 48 tons.

(Continued on page 118)

SHIPBUILDING SHOPS—I

This page is the first of a series devoted to the applications of NILES-BEMENT-POND MACHINE TOOLS and allied products to marine engineering practice in every department and shop that the modern shipyard comprises.



In the Yard

IT would be harder to find a better place than the shipyard for illustrating the sturdy durability and production-promoting qualities of Niles Cranes. Here the crane and its parts must constantly resist the attack of the elements in all kinds of weather, must be more continually on the job, taking night tricks as they do as well as the all day watch.

Over the ways, at the drydock or on the pier, wherever heavy parts must be swung into position or heavy cargo shipped or unshipped, it will be found that Niles Cranes not only cut the handling time in half but stick on the job consistently.

The crane illustrated here is one of thirty-five Niles Cranes that are on the job in the New York Navy Yard. The wide range of capacities and designs in which Niles Cranes are made offers an opportunity of choosing the crane that will best solve the problem at hand. The experience of our engineers in the application of special type cranes to many different industries is at your service.

Built in Capacities up to 250 tons or larger. We also build Gantry, Wall and Jib Cranes as well as Traveling Trolleys. Let us mail you the catalog on the type of crane that will fit your job.

[6]

NILES-BEMENT-POND CO.

GENERAL OFFICES, 111 BROADWAY, NEW YORK

Astoria

ASTORIA'S port commission has adopted a grain handling and storage schedule that is much less than that of Portland. In an effort to bring about a compromise, Portland issued a call for a conference of port officials of Seattle, Astoria and Portland, but Astoria was not represented. Astoria's contention is that, although Portland has attempted to arrive at an agreement for a uniform tariff for all ports, Portland nevertheless has reserved the right to offset the additional pilotage and demurrage charges, to which vessels going up the river are subject, by granting rebates. Countering these attempts, Astoria has assumed the position that each port should be able to stand alone and that it will reap the advantage of its proximity to the sea.

A report of Colonel J. R. Slattery, United States Army engineer in charge of the Portland district, says that the Columbia River deepened and widened itself during the year. The minimum depth at the bar is forty-two feet; an entrance channel 3500 feet wide has a depth of forty feet; the minimum channel depth between Fort Stevens and Portland is thirty feet; and the width of the channel at the river's mouth increased 1000 feet during the year.

For improvements to the Columbia and Willamette Rivers below Portland there will be available, from the recent appropriation, $226,000, making, with unexpended balances of former appropriations, $432,000 for channel work between Portland and the sea.

Portland

PORTLAND'S off-shore trade is increasing steadily. During June seventeen deep-water carriers sailed with cargoes of lumber, wheat, flour and general cargo valued at $6,500,000. Additional charters are being reported, among them being eight by Max H. Houser, who will load old crop wheat. The lumber trade has shown some indications of reviving, after the slump resulting from the panic in Japan. A vessel of the Mitsubishi fleet was chartered for early August loading, to carry about 3,500,000 feet. This charter was the first since the decline. Although exporters believe that the lumber market is improving, they anticipate a gradual rather than a rapid recovery.

A recent reduction, announced by the Pacific Coast Oriental Tariff Bureau, in the trans-Pacific lumber rate, from $35 to $25, has been extended to cover all cargoes not actually moving early in July.

The Portland Chamber of Commerce has consolidated all the activities of the shipping committee and other committee into one group, which will be known as the foreign trade department.

Two keels have been laid by the Northwest Bridge & Iron Company for tankers building for the Swiftsure Oil Company. The Northwest Bridge & Iron has a contract for seven of these vessels, all of 12,000 tons, to complete which will require a year or more. Additional men will be employed by the yard, increasing its force from about 500 to 3000.

Fear that the creation of the Puget Sound and Columbia River district of the Shipping Board would work to the detriment of Portland, inasmuch as headquarters of the district will be in Seattle, led the Portland Chamber of Commerce to gather data and prepare arguments for submission to the Shipping Board in an attempt to prevent consummation of the plan. By a resolution adopted July 8, the Shipping Board created the new district, which will have charge of both operation and repairs of the North Pacific.

The navigation school of the Shipping Board has closed, after having graduated 200 officers for the merchant marine during the last three years.

Captain E. D. Parsons, manager of the Columbia River Bar Pilot's association, died July 9. He was forty-eight years old. For several years he was in the service of the Pacific Coast Steamship Company and the Union Oil Company.

D. C. Kennedy, district manager of operations, Portland, who resigned to become manager of the Portland office of Norton, Lilly & Company, has been succeeded by James W. Crichton, formerly Mr. Kennedy's assistant.

San Francisco

AN Atlantic-Pacific passenger service (something that has been lacking since the withdrawal of the Finland and Kroonland during the war) is promised by the Pacific Mail Steamship Company when five of the Shipping Board 535's shall have been turned over to the company for the trans-Pacific trade. With those large vessels plying to Honolulu and the Orient, the small liners Colombia, Venezuela and Ecuador will be withdrawn from the Oriental trade, and with the Cuba, formerly the Sachem, will be used in the San Francisco-Baltimore service, calling at Los Angeles, Central American ports and Havana. There will be a sailing each two weeks. Should additional vessels be allotted the Pacific Mail for the Philippines-Malay Peninsula-India service, the steamships Santa Cruz and Colusa, now employed in that trade, also will ply coastwise between Baltimore and San Francisco. The Pacific Mail already has a San Francisco-Baltimore freight service. In thus entering the coast-to-coast trade the Pacific Mail is returning to the original service of the company, inasmuch as it was organized to operate vessels between New York and the Pacific Coast via the Isthmus of Panama.

J. A. McGregor, special representative of the United States Shipping Board Emergency Fleet Corporation in Japan, and J. L. Luckenbach, his assistant, have returned from Yokohama, where they had been for eighteen months supervising the construction of thirty vessels in Japan and four in China for the board. The last Japanese vessel has been launched, and the first of four building at the Kiangnan yard, Shanghai, took the water in June, so that the program is approaching completion. The four sister ships of the Kiangnan yard will be the largest ever built in China, 10,000 tons deadweight. They will be christened Mandarin, Celestial, Oriental and Palanquin.

Launch men employed by the San Francisco companies, who struck late in June, remained out during July. The men demanded an eight-hour day, $1 an hour for all Sunday and holiday work, and recognition of the union. About 150 men walked out.

Insurance of wooden vessels, many of which, both sail and steam, are owned on the Pacific Coast, will not be affected by the organization of the new syndicates. Syndicates B and C will insure only steel vessels.

A statement issued by the Southern Pacific Railroad says that the application of the company to the Interstate Commerce Commission for permission to operate steamships to Houston, Port Arthur, Freeport and other ports had no bearing on the vessels plying between Galveston, New Orleans and New York. The commission denied the application, holding that to grant it would not be to the public interest. Inasmuch as the steamships and the rail lines would be in competition, permission of the Interstate Commerce Commission was necessary.

A cafeteria for its employes has been opened by the Matson Navigation Company on Pier 32. Two rooms are provided, one for the stevedores and the other for the office force. Club rooms also will be opened. A committee of five employes has charge of the cafeteria.

Captain William Finch, senior commander of the White Star Line, retired from the service when the Baltic arrived at Liverpool early in July. Captain Finch was in command of the Arabic when she was torpedoed by a German submarine. In former years he served on the Pacific.

D. C. Cook, formerly of the Trans-Oceanic and Pacific Mail services, has been appointed general agent of the General Steamship Corporation at Sydney. Robert Hutcherson has been appointed general freight agent of the Parr-McCormick Steamship Line, succeeding J. C. Strittmatter, resigned. G. B. Thornton has been made dock superintendent. The Pacific Steamship Company has made new appointments in the Orient as follows: R. W. Price, agent at Shanghai; W. B. Smith, Singapore; C. R. Sharpe, Manila, and H. K. Laidlaw, transferred from Yokohama to Dairen.

(Continued on page 120)

DOWN THE "TRADES"

THE service plan of Prest-O-Lite is more constant than the north-east trade winds—winds which constantly blow and upon which, from the time of the Vikings, navigators have depended for propelling their ships—Also like the "trades" it is wonderfully flexible for

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The Universal Gas with the Universal Service

has a service plan which adapts itself to every fluctuation of the welding and cutting industries—ample for all—yet if only one cylinder of Prest-O-Lite gas is needed the service functions as efficiently.

You will be interested in the facilities of our 40 plants and warehouses—Ask us for all details.

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PW-504

Rollins-Burdick-Hunter Company, marine and fire brokers of Chicago, have opened Pacific Coast offices at 216 Pine street, in charge of A. R. Candlin, a well-known Coast underwriter. Charles R. Page, formerly of the Fireman's Fund Insurance Company, more recently with the Shipping Board, the Atlantic, Gulf & West Indies and Clyde and Mallory steamship lines, has been appointed manager of the service syndicate, newly organized by the Shipping Board.

Tentative forms of through export bills of lading, to be submitted prior to August 1, have been called for by the Interstate Commerce Commerce Commission from the railroads. In connection with this call a meeting was held in San Francisco by representatives of different organizations to take steps to secure revision of bills of lading in conformity with the desires of shippers.

The American Steamship Owners' Association, the principal organization of shipowners, has turned down the demand of radio operators for increases in pay of from $125 to $200 a month for chief operators and from $100 to $150 for second operators, with an eight-hour day and overtime at 80 cents an hour. Under this schedule a chief operator would earn $306 a month and a second operator $256, which would give the second operator more than the first mate, on some ships, and the chief operator almost as much as the captain.

The 5500-ton freighter Jeptha was launched at the yard of the Hanlon Drydock & Shipbuilding Company, Oakland, in July. She was christened by Miss Irene D. Palmer, telephone operator at the Shipping Board offices, San Francisco. The steamer Mursa, 9400 tons deadweight, was launched by the Moore yard and christened by Mrs. Harry Haviside, San Francisco.

The Drake's Bay Whaling Company has been organized with stock of $300,000. A plant at Drake's Bay will cost about $125,000 and two whaling vessels $150,000. Two vessels are being built by Barnes & Tibbitts, Oakland.

At the meeting of stockholders of the China Mail Steamship Company, held at the company's offices in San Francisco July 1, the following officers and directors were elected: Chin Lain, president; Yee Ling, first vice-president; Lee Sing Hing, second vice-president; M. Q. Fong, secretary; Ho Chuck King, assistant secretary; Mark Thue, treasurer; Lew Hing, chairman of the board; Chin Lain, W. U. Lum and Mun L. Eli, managing directors. The directors elected were: Chin Lain, Lew Hing, Mark Thue, M. Q. Fong, Yee Ling, Lee Sing Hing, Lo Lok Chai, Ong Sin, W. U. Lum, Mun L. Eli, RalphB. Wong, Ho Chuck King, Hom Yung, Tong Yet Hing and Lee Lin.

The Luckenbach Steamship Company, which has resumed its Atlantic-Pacific coastwise service, has announced that its vessels will call at San Diego regularly. San Diego has been anxious to have coastwise service restored, especially since the completion of the San Diego & Arizona Railroad has given the city direct connections with the "back country," upon which it hopes to draw for a greatly increased volume of business. Although the longeshoremen's strike in New York continues to handicap steamship operators, the situation as regards the Luckenbach Line improved during July.

In order to prevent congestion of sugar on the wharves of the Crockett refinery, the sailing schedules of the Matson Navigation Company have been changed to provide for the departure of the steamships Manoa and Wilhelmina from San Francisco for Honolulu and from Honolulu for San Francisco on Wednesdays instead of Tuesdays. Heretofore the steamships Maui and Matsonia have sailed from both terminals on Wednesdays and the other steamships on Tuesdays. The Manoa will arrive on Wednesdays and the Wilhelmina on Tuesdays. This new arrangement will obviate having two steamships at the Crockett wharves at the same time.

Los Angeles

THE harbor commission is preparing to spend about $1,000,000 of the harbor bond funds on improvements at the foot of Canal street, Wilmington. Permission has been asked for the dredging of slips 1 and 5 in the inner harbor, the dredging alone to cost about $250,000. No new business is expected for the port as a result of these projected improvements, aside from the vegetable oil products plant, but the business of the Pacific Mail may be transferred from the outer to the inner harbor. City Engineer J. A. Griffin has submitted estimates of the cost of various improvements under consideration, as follows: construction of concrete wharf on the Terminal island side of the channel and removing transfer sheds and railway tracks, $1,747,900; cost of same work, timber being used, $1,222,900; building of a truck road and drawbridge over the Los Angeles-Long Beach channel, $960,000; same work, but over longer route, $1,120,000; completion of harbor boulevard, $675,000; improvements on municipal pier No. 1, $110,000.

A. L. BECKER

The employes of the Schaw-Batcher Company on July 3 presented to Mr. A. L. Becker, retiring general manager the handsome clock illustrated herewith. Mr. Becker has opened offices at 310 Sansome street, San Francisco, as a consulting Marine Engineer and Naval Architect. His long experience as a practical marine engine and ship builder and his technical training peculiarly fit him for the service.

Named in memory of the late David Hollywood, works manager of the Southwestern Shipbuilding Company, the steel freighter Hollywood was launched at the company's yard June 25. This vessel was the last of eighteen freighters, each of 8800 tons, built for the Shipping Board; but work is proceeding on one 9000-ton tanker and two 10,000-ton tankers.

The steamships Yale and Charles, the latter of which formerly was the Harvard, recently purchased from the government by the Los Angeles Steamship Company, have arrived at Los Angeles from the Atlantic. Both will be reconditioned, at an expense of $1,500,000 or more. There has been no announcement as to the trade in which they will be used, although both the Los Angeles-Honolulu and Los Angeles - San Francisco runs have been considered.

The Angeles, hull No. 21 of the Los Angeles Shipbuilding & Drydock Company, made the voyage from Dairen to Portland, 5290 miles, in seventeen days and thirteen hours, at an average speed of 12.5 knots an hour. The Angeles was launched December 27, 1919, and was delivered March 16, 1920. She is operated by the Columbia Pacific Company. Captain Jack Kittlesen, master of the Angeles, said, in a letter received here, that while his vessel was lying at Shanghai trying to get return cargo at $17 a ton, the Shipping Board rate, the Eastern Soldier, built in Japan for the Shipping Board, was taking cargo for Puget Sound at $3 and $4 a ton.

The Luckenbach Steamship Company has been granted the north 600 feet of shed No. 1, pier No. 1, outer harbor. Offices have been opened in the Central Building.

Harry Pidgeon, 51 years old, of Wilmington, has arrived at Honolulu, having sailed from Los Angeles in a thirty-four-foot yawl.

—building better ships

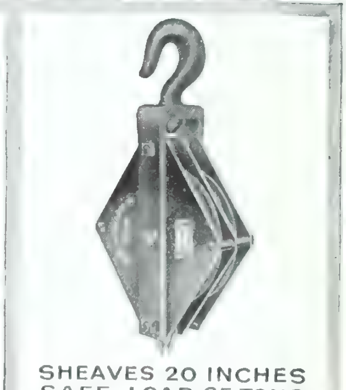
is the accomplishment of American shipyards. Not that they rest satisfied with the results already attained. Far from it. They are constantly striving for perfection in all details, assisted as they have been in the past, by the loyalty and co-operation of their workers.

In providing our shipyards with scientifically-determined standards of strength and endurance, Parish Safe Load Tackle Blocks have placed rigging equipment on a new basis, and wherever they have been used have demonstrated their importance in the building of better ships.

Parish Blocks have been designed by engineers for a definite, standard safe working load. Each block has this load stamped upon it in clear, distinct figures. All specifications provide for a margin of safety far beyond the working load, insuring safety and reliability at all times. Materials are inspected and tested for conformity to specified standards, and workmanship is exceptionally accurate.

PARISH BLOCKS

A GUARANTY OF SAFETY



SHEAVES 20 INCHES
SAFE LOAD 25 TONS
BREAKING STRAIN 100 TONS

PARISH SUPPLY & MFG. CO.
2860 QUINN STREET
CHICAGO

Gentlemen:—

I am interested in knowing the standards of design and construction of Parish Safe Load Tackle Blocks. You may send me copy of your catalogue of Malleable Iron and Steel Shell Blocks and Fittings.

Include with the catalogue the Tables of Safe Loads compiled by your engineers and also tables of safe loads for wire rope when used with tackle blocks.

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Individual____________________

Official Title____________________

Street Address____________________

City ____________ State____________

PACIFIC MACHINERY

AN EFFICIENT POWER HAMMER

By E. N. MOOR, JR.

IN the Beaudry Champion power hammer are found some features which are original and which tend to make this machine one of the most efficient tools of this type. The tool has many claims in its favor, the foremost of which are the elasticity, control and force of the blow struck by it.

The ram is allowed a maximum freedom of throw which causes it to rebound the instant the blow is struck. It is made of steel and runs in V-slides with a taper gib on one side for adjustment and for wear. Figure 1 shows a cutaway section of the ram which gives a clear idea of the track construction. Two steel spring arms, with hardened tool steel rollers at their lower extremities, operate within the ram, which, with increased speed of the hammer, acquires increased travel and force of blow. This simple and positive action of the spring arms perfectly controls the ram and allows it to rebound the instant the blow is struck without reaction or jump, or sudden undue strain on any of the hammer parts. The elasticity and force of the blow are thus obtained, and by it the full stroke can be had on varying thicknesses of stock, and no change of adjustment is necessary excepting for unusually heavy or special work.

The anvil and frame construction is similar to that found on the regular single arch steam hammer. The anvil is separate from the main frame casting, and is held to the foundation by its own bolts. To it is keyed an independent and adjustable shoe die, to which in turn is keyed the bottom die.

Figure II shows a side elevation of the machine arranged for belt drive; a direct motor drive may be applied by installing a constant speed motor on a bracket bolted to the rear of the column and belting to a special pulley with friction clutch contained on the crankshaft. This makes a very satisfactory arrangement where it is not convenient to set the hammer directliy under a line shaft, or where the shop is equipped with motor drive tools.

An end view giving an idea of the side clearance is shown at Figure III. Bars of any length may be worked either way of the dies.

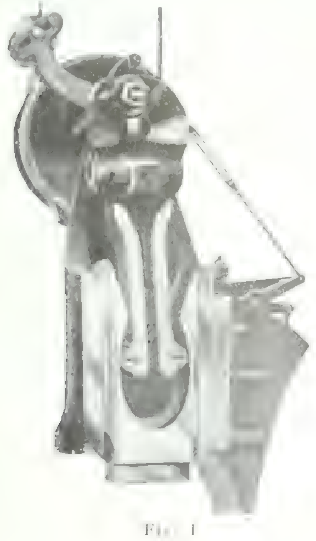


Fig. I

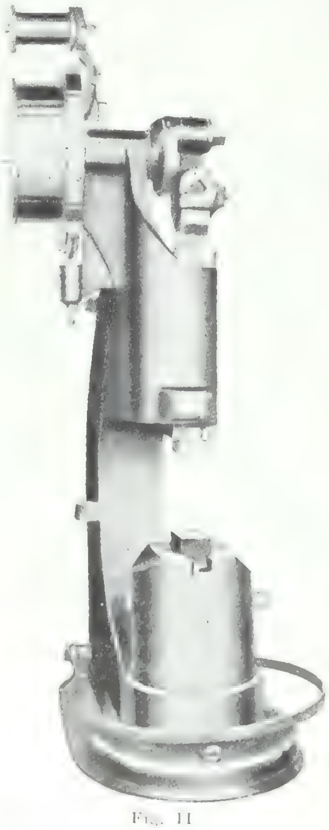


Fig. II

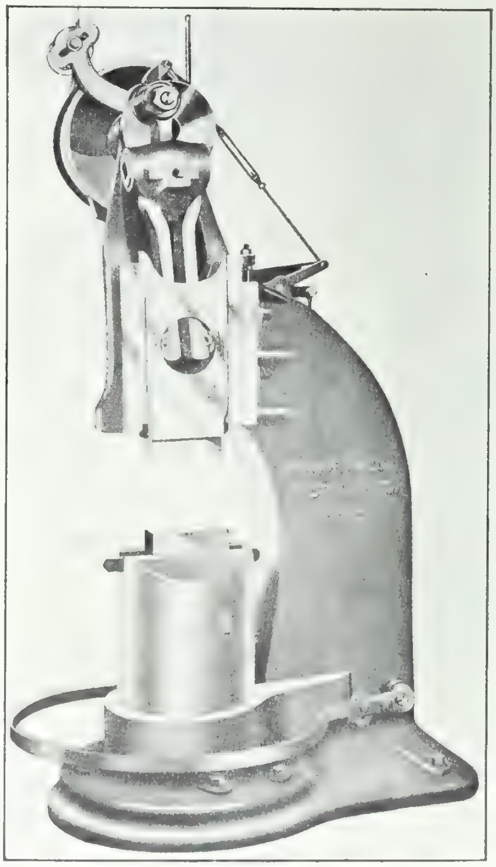


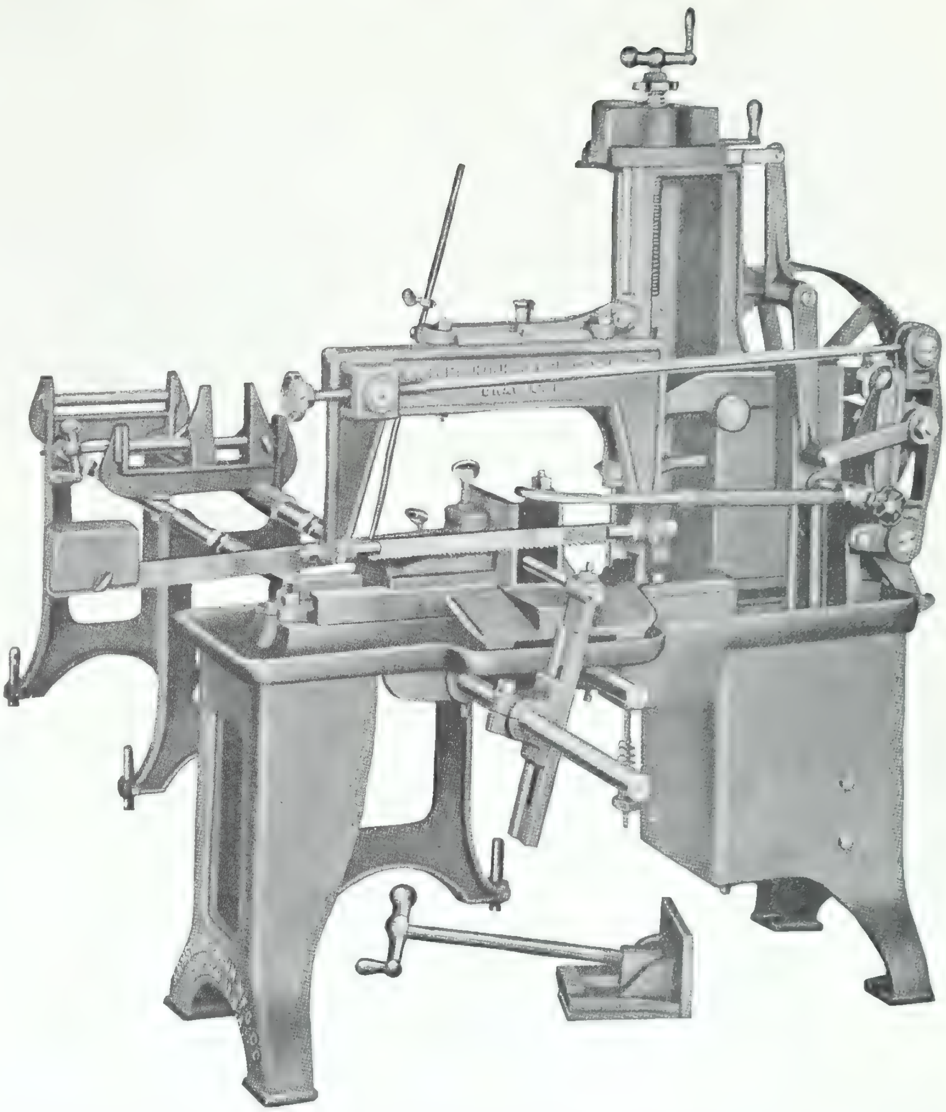
Fig. III

LARGE MACHINERY ORDER

THE Smith-Booth-Usher Company of Los Angeles have been given an order by Twohy Bros. Company, contractors, to furnish the entire equipment for the construction of $4,000,000 worth of cement roads in Maricopa county, Arizona, said to be the largest single highway contract ever let in the United States.

The equipment consists of gasoline locomotives, steel track and cars, gasoline pavers with modern batch box handlers, boom and bucket discharge, gasoline tamping and finishing machine, road graders and tunnel traps.

THE MARVEL HIGH SPEED SAW



THE Armstrong-Blum Manufacturing Company of Chicago, makers of a varied line of power saws, have developed as one of the units of their line an automatic high-speed hack saw.

This tool was designed for concerns having quantities of duplicate pieces to cut and offers a great saving in time and labor over other methods of cutting bar stock. Speeds up to 145 r. p. m. of the driving pulley may be had with this tool and it is capable of cutting six-inch round cold rolled steel in ten minutes with a maximum feed and speed.

The machine is provided with an automatic stock feed, which raises the frame after the cut is made, opens the chuck, feeds the bar forward, closes the chuck and then starts a new cut.

The saw frame always moves in a horizontal direction, and is carried on machined V guides, with adjustment for wear. Vertical movement is also made on V-guides and is controlled by a feed screw.

Power feed to the frame is accomplished by means of a friction device on the head of the screw. Tension on this friction is made with a hand nut under the ball crank on the screw head. The saw frame advances after each cut a varied amount, depending on the tension used on the friction head. It is positively lifted off the cut on the back stroke by a cam and lever which reduces saw wear.

The entire blade can be used up by adjusting the frame lengthwise with the hand screw at the head of same.

The machine is furnished with a coolant system for the saw blade which is self-contained and coolant is supplied by means of a plunger pump.

Bars up to twenty feet in length may be handled and the machine will cut off automatically pieces up to three feet in length. As an example of the accuracy which may be obtained with this machine, the writer has cut 2-inch by 2-inch cold drawn steel, using the automatic stock feed, thickness of piece cut off being .030 inch and variation of the thickness checked at the four corners being .002 inch. These results can only be accomplished with a machine having extreme rigidity and accurate alignment to the frame and this is obtained in the Marvel construction.

NILES-BEMENT-POND

THE combination of tool manufacturers organized under the above name is perhaps the largest of its kind in the world. It includes under its active management the famous Niles Tool Works of Hamilton, Ohio; the Pratt & Whitney Works of Hartford, Connecticut; the Pond Works of Plainfield, New Jersey; the works of John Bertram & Sons Company, Limited, of Dundas, Ontario; the large factory devoted exclusively to the manufacture of Niles cranes at Philadelphia; the Bement Works at Philadelphia, and the Ridgway Works at Ridgway, Pennsylvania. The combination of Niles-Bement-Pond gathers under one organization three of the strongest companies in the United States manufacturing heavy machine tools. By the addition of the Pratt-Whitney Works, this organization took to itself a peculiar place in the manufacturing of gauges and standards of super-accuracy and of tool makers' machines which are equal in design and finish to anything made in the United States.

The Niles-Bement-Pond Company have just issued a 600-page book catalog in which they describe the majority of the tools which they manufacture. This catalog covers some tools very important from the standpoint of the shipbuilder and the marine engineer. One of these, the largest vertical boring mill ever installed, is illustrated in the accompanying picture. We use the word "installed" advisedly, because we have heard it rumored that the Niles-Bement-Pond Company have now under course of construction a much larger mill which is almost ready for installation. The mill illustrated has a 36-foot table and was installed in the Norfolk Navy Yard for boring, planing, and turning the roller tracks for battleship turrets. The cross rail of this machine is of the box girder type, carrying two saddles for tool bars, these saddles being equipped with platforms for an operator. The mill is driven by individual electric drive motors which are located on the cross beam at the top of the standards, one motor taking care of all of the movements of the cross rail saddles and tool bars, the other working independently the rotation of the table.

Another gigantic tool described in the Niles-Bement-Pond book is the planer built for the Macintosh-Hemphill Company of Pittsburgh. This tool measures 14 feet 4 inches width between uprights, and the height from the top of the table to the underside of the cross rail in its highest position is 12 feet 2 inches, while the stroke of the table is 30 feet. This long stroke necessitated a bed of very massive construction. The total weight of the machine when finished was 845,000 pounds, or 422½ tons. Its operation required motors with a total of 207½ horsepower. One especially interesting feature of this machine is that the main drive by a 100 horsepower direct current motor was through a series of gearing and pneumatic clutches, of the well known Niles-Bement-Pond type. In this machine these clutches are operated by compressed air supplied from a compressor which is part of the machine itself, and this compressed air is used also for the operation of the mechanical feed, the feed cylinder being controlled by a valve which is operated automatically at each end of the stroke. To disengage this feed it is simply necessary to close a valve shutting off the air supply.

While the Niles-Bement-Pond Company have specialized in locomotive and car shop equipment, in machine tools for steel mills, and in ordnance tools, they also manufacture and carry in stock a very large number of special tools interesting to shipbuilders and marine engineers. Among these are a complete line of single and double frame steam hammers, hydraulic plate clamps, hydraulic flanging presses, hydraulic plate bending machines, hydraulic riveters, heavy engine lathes, various types of milling machines and milling cutters, a great variety of drilling and boring machines, a full line of electric traveling cranes, a very well designed and efficient type of gantry crane, and a full line of grinding machines and tool grinders.

That part of this catalog which deals with the Pratt & Whitney line of small tools and precision gauges will also be very interesting to shipyards and marine engineering shops in the tool room department. It is claimed that the Hoke precision gauges manufactured in the Pratt & Whitney shops are the most accurate gauge blocks ever produced. These gauge blocks are kept within five millionths of an inch of marked size up to one-half inch and within ten millionths per inch of length in sizes over one-half inch. This allowable size limit is almost exactly equal to the expansion in tool steel caused by a change in temperature of one degree centigrade. The use of these gauges in manufacturing processes permits of an allowable error that can only be discovered through optical methods, the ordinary mechanical measuring machines not being nearly so accurate as these gauges. Each of these blocks bears an etched serial number for identification, and certificates of the United States Bureau of Standards at Washington can be furnished for each block upon application.

Pratt & Whitney manufacture to sell at a moderate price mikechecks. These are small cylindrical blocks packed in a durable screw top steel case in sets containing either .1, .2, .3, .5 and 1 inch blocks or the nearest equivalent sizes in millimeters. They are guaranteed accurate within twenty-five millionths and are very convenient for checking up errors in micrometers. These checks are also supplied in 2-inch and 50-mm. sizes, and with three or four of these long mikechecks and one of the sets of small checks, a tool maker would be enabled to check all the measuring devices used in the ordinary tool room. The Niles-Bement-Pond Company, through their Pratt & Whitney branch, stand ready to design and manufacture gauges for all types of interchangeable manufacturing, and their extensive experience in supplying complete equipments of this kind to small arms arsenals has put them in a peculiarly advantageous position to render this service.

The last section of the catalog describes various installations of the Niles standard crane, varying in capacity from ten tons in an ordinary stockyard up to the 200-ton type for handling locomotives as installed in the shops of the Virginia Railway Company.

DRILLING EFFICIENCY

FOR the information of drillers in shops and shipyards, we are publishing herewith a table showing the speed at which drills should be run. It will be noted that this table is based upon a constant peripheral speed for all sizes of drills. For wrought iron and cast steel this speed should be in the neighborhood of 100 feet per minute, while for cast iron it is permissible to use speeds as high as 140 feet per minute. The table gives for each of the sizes of drills most commonly used the number of revolutions per minute which will give this peripheral speed.

The second table under "Feed per Revolution" shows the comparative allowable feeds with carbon steel drills and high-speed steel drills, as this feed is estimated for average conditions by the Arthur Colton Company, who have had such great success in the manufacture of drills of high-speed steel.

These tables should prove very useful to efficiency engineers in checking up the work of drills in shops and also should prove of great interest to the machinist himself, as he can by their intelligent use increase the output of his machine without danger of breakage to the tool and consequent loss to himself.

SPEED AND FEED OF DRILLS OF HIGH SPEED STEEL

Diam. Inches	Revolutions per Minute Wrought Iron and Steel	Cast Iron
1/8	1832	2440
3/16	1221	1627
1/4	916	1220
5/16	733	976
3/8	611	813
7/16	523	697
1/2	458	610
9/16	407	510
5/8	366	459
11/16	333	417
3/4	305	383
13/16	282	353
7/8	262	328
15/16	244	306
1	229	287
1 1/16	215	270
1 1/8	204	255
1 3/16	193	242
1 1/4	183	229
1 5/16	174	219
1 3/8	166	209
1 7/16	160	199
1 1/2	153	191
1 9/16	143	184
1 5/8	138	176
1 3/4	127	164
1 7/8	112	153
2	104	143
2 1/8	95	126
2 1/4	89	118
2 3/8	80	112
2 1/2	76	106

Periphery speed 100 to 140 feet a minute

FEED PER REVOLUTION

Carbon Steel Drills		High-Speed Steel Drills
.005-inch	¼-inch	.006-inch
.009-inch	⅝-inch	.010-inch
.012-inch	1-inch	.015-inch
.015-inch	2-inch	.020-inch

The above speeds and feeds are approximate for average condition. They can be greatly exceeded under some conditions, but under others both would have to be reduced.

AN APOLOGY

WE regret that in our May issue, on page 160, when referring to the ships of the Pacific Motorship Company, we appeared to be casting a reflection on the professional qualifications of the former engineers of these vessels when they were owned by the Australian Commonwealth government.

The present engineers of these vessels, to whom also every praise is due for their recent successful performances, after in many cases taking the ships over at very short notice, we feel sure will be the first to acknowledge the benefit they received from the improvements embodying the experience of their former confreres, also from the careful supervision of these officers and their superintendent during the final stage of completion of these vessels.

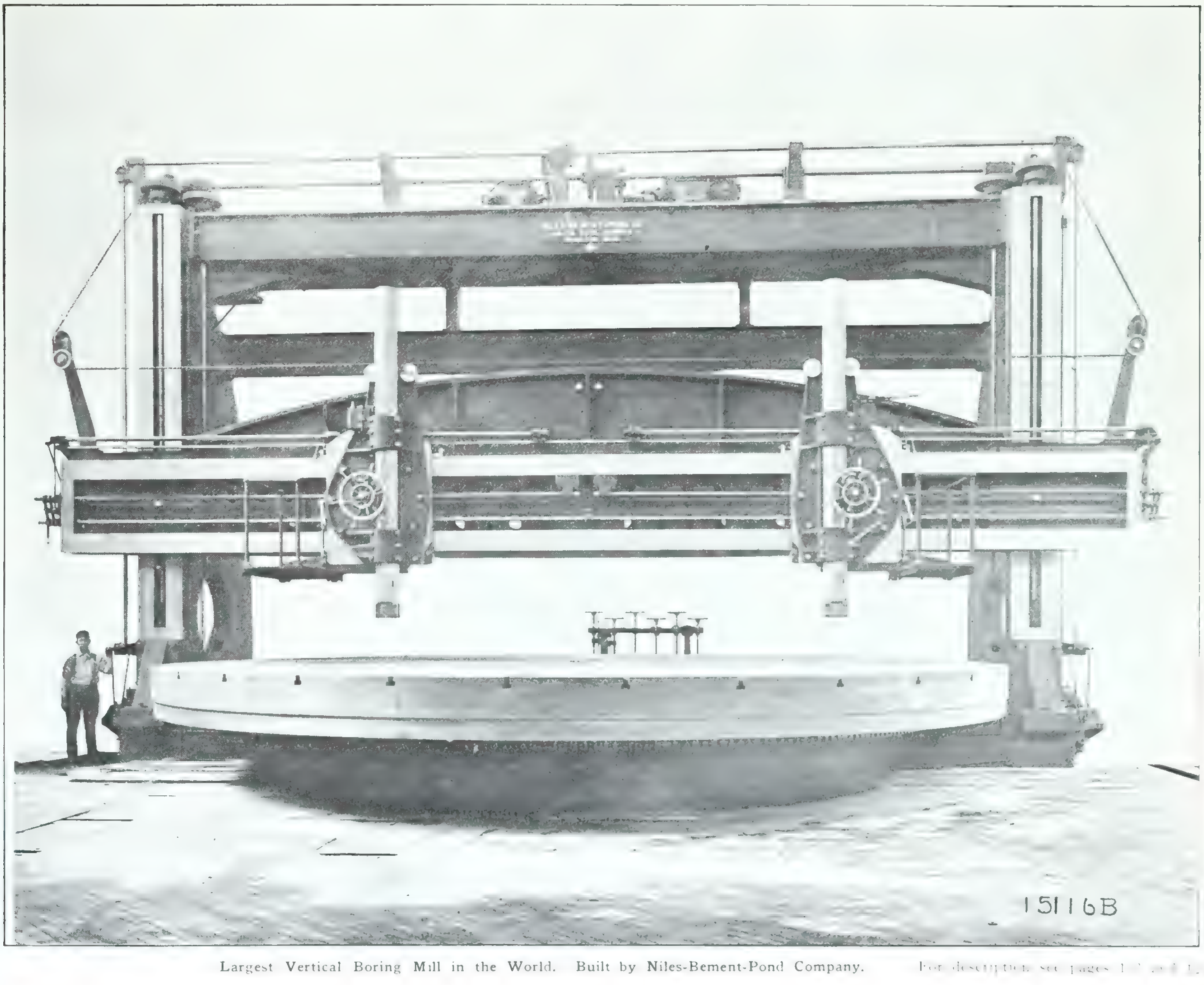
SALVAGING WORN CABLES

An interesting salvaging operation was recently carried out very successful by the Spanish-American Iron Company, a subsidiary of the Bethlehem Steel Corporation, in Cuba. The inner strand of a three-inch steel cable which had been condemned and discarded because of worn and frayed outer strands was salvaged and the worn strands cut into six-foot lengths for the charging box. Both the inner strand and the scrap were well worth saving, as the cable was a mile and a quarter in length and the reclaimed strand (1¼ inches in diameter) was practically as good as new.

The problem involved was to cut away the six worn strands without damaging the valuable inner strand. This was accomplished by means of a simple but ingenious device constructed on the ground out of convenient scrap metal. Suitable lengths of iron pipe, of a size convenient to grip with the hand, were oxwelded into the rim of a small iron pulley in such manner as to resemble spokes in the hub of a wheel with tire and felloes missing. A short section of sheet iron pipe, slightly smaller in diameter than the pulley but larger than the shaft bore, was then welded to it in line with the bore by the use of four strips of strap iron.

The strands of the cable were then pried apart for a few feet to admit of passing the inner strand through the hub and its extension and the feeding of the outer strands through the six spaces between the spokes. With the strands so adjusted, the device was revolved against the wind of the cable and advanced as the strands unwound, the inner strand being allowed to lie in a continuous length along the course of the work and the worn members being easily cut into charging-box size with the oxyacetylene torch. The length of the spokes gave the necessary leverage for hand operation of the device. The cable of course remained stationary, the inner strand being coiled and the scrap collected after the work was completed. The job was done in jig-time, the oxyacetylene flame snipping off the worn strands with almost chopping speed. The device was made with practically no cost for material, being composed entirely of scrap, and with little outlay for labor. It affords an interesting example of the resourcefulness of the American mechanic, John Cranford, who was in charge of the work.

The use of oxy-acetylene cutting, which was done with a portable oxweld outfit, made simple and inexpensive an operation that would have been prohibitive by any other mechanical means, as it was equally out of the question to carry shears of sufficient power to the work or to convey the work to the shears.



Largest Vertical Boring Mill in the World. Built by Niles-Bement-Pond Company. For description see pages [illegible] and [illegible]

W. T. Cleverdon

Average Adjuster

FOR SALE

Sch. **"PAWNEE"**—80′ x 16′ 9″ x 6′ 2″, composite construction, copper sheathed, fine lines. Suitable for installing power for trader, fisher or tender. Price **$5,000.**

Gas Tender **"WOTOC"**—65′ x 11′ x 5′. Heavy oak construction—cabin aft, large hatch; heavy mast and boom; 2 sails; 50 H. P. 4-cyl. gas engine. Price **$7,500.**

Triple Expansion

MARINE ENGINE

Ex S. S. "Bear"

31—50—84 x 54

About 4500 Horsepower

Large Donkey Boiler, Cargo Winches, Anchor Windlass, Welin Davits, Marine Pumps and Large Line of Marine Equipment

PORTER WRECKING CO.

805 FIFE BUILDING, SAN FRANCISCO

FOR SALE

The complete Shipbuilding and Engineering plant of

THE LONG BEACH SHIPBUILDING COMPANY

Located at Long Beach, California, consisting of 1600 feet of Main Water Front, and 600 feet of Slip Frontage in the Long Beach Harbor, comprising about twelve acres of area.

The above includes power houses, machine, blacksmith, pattern, bolt and nut and carpenter shops, iron and brass foundries, copper smith, electric, sheet metal, plumbing, steam-fitting, galvanizing, air tool, paint and other departments required in the modern and up-to-date construction and repair of steel ships and engines, together with current business and good will.

Bids are invited for the purchase of the property of the Company in its entirety.

Long Beach Shipbuilding Company

WATER & 2ND STS. LONG BEACH, CALIF.

Short Cuts to Better Insurance Service

As a result of many requests we repeat the advertisement below. Why not clip it out and bring it to the attention of your office force?

These Five Things

Instruct your office to do them and watch your insurance service improve.

1. Furnish your broker with all the definite and exact information obtainable concerning kind of merchandise; method of packing; amount of insurance desired; steamer name; marks and numbers on packages; nature of coverage you desire.
2. Notify your broker and insurance company promptly of any change in conditions governing the risk, such as a strike, delayed sailing, or change of steamer.
3. Close all risks promptly.
4. Advise your broker promptly of any loss.
5. Present all claims promptly to your broker or loss adjuster, supplying all documents relating to the risk.

We are ready to aid you in every way to obtain maximum insurance service.

The Washington Marine Insurance Co., of New York

MARINE AND AUTOMOBILE INSURANCE

HOME OFFICE: 51 BEAVER STREET, NEW YORK

C. H. WILLIAMSON,
Pacific Coast Agent,
322 California Street, San Francisco, Cal.

RE-MANUFACTURED MACHINE TOOLS

THAT there is no prospect for immediate relief from the shortage of high grade machine tools is the opinion held by Mr. Harvey Mead of Fred Ward & Son, San Francisco dealers of machine tools.

On a recent trip to all the machine tool manufacturing centers of the East, Mr. Mead made a personal investigation of the machine tool situation and found that, owing to the shortage of raw material coupled with enormous demands, the machine tool manufacturers are being hard pressed from all quarters to supply the demands for machine shop equipment. Many machine tool men were of the opinion that wholesale cancellations of shop equipment might be expected, but this has not been the case.

Fred Ward & Son have large standing orders with several machine tool manufacturers with very few definite promises for immediate delivery. To properly supply the local demand for high grade machine tools, Mr. Mead set about to acquire high grade equipment from plants making a specialty of remanufactured machine tools. Through Mr. Mead's efforts, Fred Ward & Son are able to offer immediate delivery of a very fine list of engine lathes which include standard makes of heavy duty lathes, rapid production lathes, tool room lathes, etc. In selecting this equipment Mr. Mead made a personal examination of each tool before ordering it shipped to his San Francisco stock. A number of 18-inch Le Blond engine lathes with 8-foot bed were ordered and also a number of Boye & Emmes engine lathes of the same size. Other engine lathes included 21-inch by 10-foot Le Blond heavy duty engine lathes and 20-inch by 8-foot American engine lathes. All of the engine lathes selected by Mr. Mead were found to be in perfect condition, having been put through a re-manufacturing process and tested for perfect running under the same conditions as had been imposed by the manufacturer before the machines originally left the factory. These machine tools are taken entirely apart and, though the machines were practically new, they were thoroughly cleaned, the flat surfaces tested out, with straight edges or surface plates, and if only slightly worn the surfaces were scraped to Brown & Sharpe surface plates. Cylindrical bearings are renewed and then aligned by the aid of precision instruments, and in fact every part of the machine is carefully inspected before re-assembling. Each machine is also refinished on the exterior. The old enamel scraped off and rubbed down, bright parts are polished and new enamel applied so that the machine looks just like new.

Shop executives in the territory served by Fred Ward & Son will find that in addition to the advantage of obtaining immediate delivery on these high grade machine tools, a very great saving can be made in the purchase price as compared with machine tools shipped from the factories. Fred Ward & Son have been able to purchase these re-manufactured machine tools in large quantities, and the prices, coupled with the excellent condition of the tools offered, will prove very interesting to local users of high grade machine tools.

The machine tools selected by Fred Ward & Son include the following:

21-inch by 10-foot Le Blond heavy duty engine lathes, 3 step cone for 5-inch belt, double friction back geared, 1⅞-inch hole in spindle, compound rest, full quick change gear box, takes between centers 5 feet 2 inches, with standard bridge carriage.

18-inch by 8-foot Le Blond engine lathes, actual swing 19 inches, 3-step cone for 3½-inch belt, double friction back geared, 1 9/16-inch hole in spindle, compound rest, full quick change gear box, takes 3 feet 11 inches between centers.

18-inch by 8-foot Boye & Emmes engine lathes, 3-step cone for 3½-inch belt, double back geared, compound rest, full quick change geared.

20 inch by 8-foot American engine lathes, actual swing 22 inches, double back geared, 4-tool turret tool post, hexagon power feed turret with independent stops on bed, no tailstock.

17-inch by 6-foot Le Blond manufacturers' automobile lathes, 3-step cone for 3½-inch belt, double back geared, 1⅜-inch hole in spindle, plain rest, auto quick change feeds, not screw cutting, oil pan.

19-inch by 8-foot Le Blond heavy duty engine lathes, 3-step cone for 4-inch belt, double friction back geared, 1½-inch hole in spindle, compound rest, full quick change gear box, takes 3 feet 8 inches between centers, with **standard** bridge carriage.

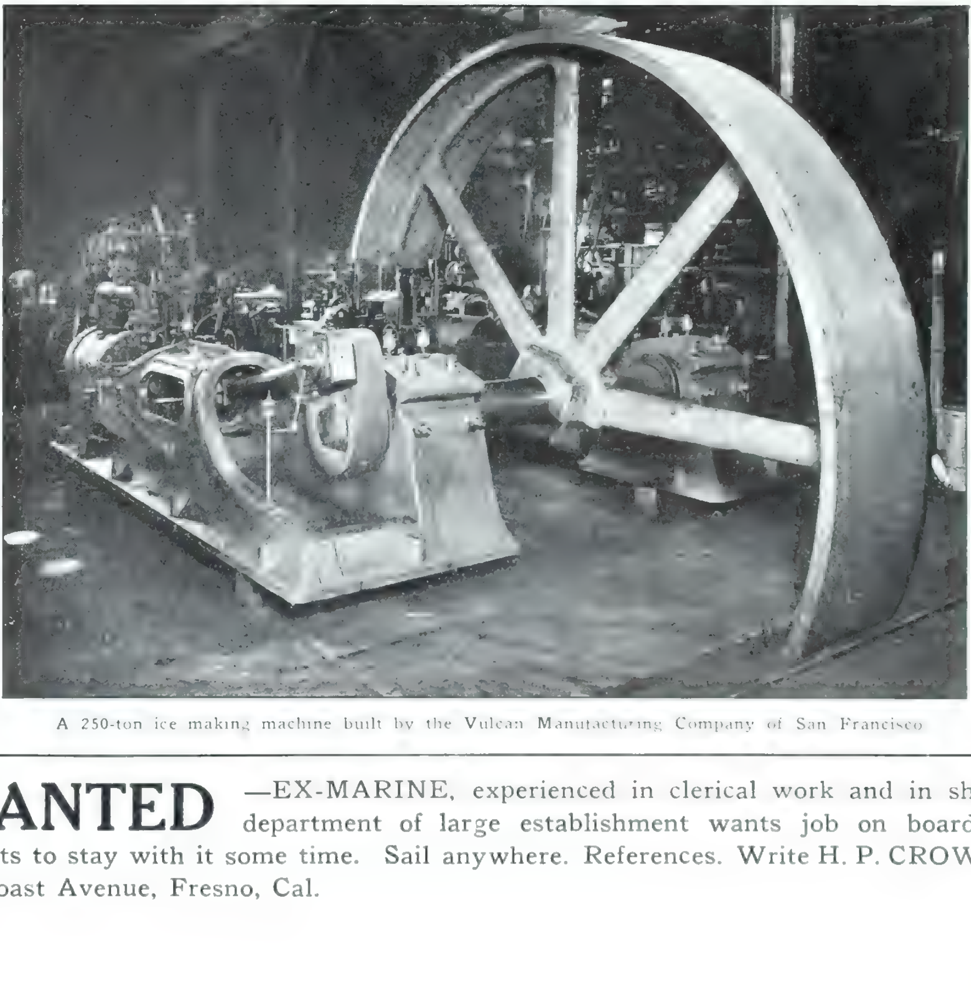
20-inch by 10 foot Lodge & Shipley engine lathes, actual swing 22 inches, arranged for variable speed motor drive, 1¾ inch hole in spindle, compound rest, oil rim carriage, full quick change gear box, oil pan, takes 60 inches between centers.

26-inch by 10-foot Bridgeford heavy duty engine lathes, actual swing 27 inches, 3-step cone for 5½-inch belt, double back geared, 2 1/16-inch hole in spindle, compound rest, full quick change gear box, takes 4 feet between centers.

26-inch by 18-foot Bridgeford heavy duty engine lathes, as above, takes 12 feet between centers.

26-inch by 10-foot Niles, Bement & Pond engine lathes, actual swing 28 inches, 3-step cone for 4¾ inch belt, solid spindle, compound rest, full quick change gear box, takes 4 feet 10 inches between the centers.

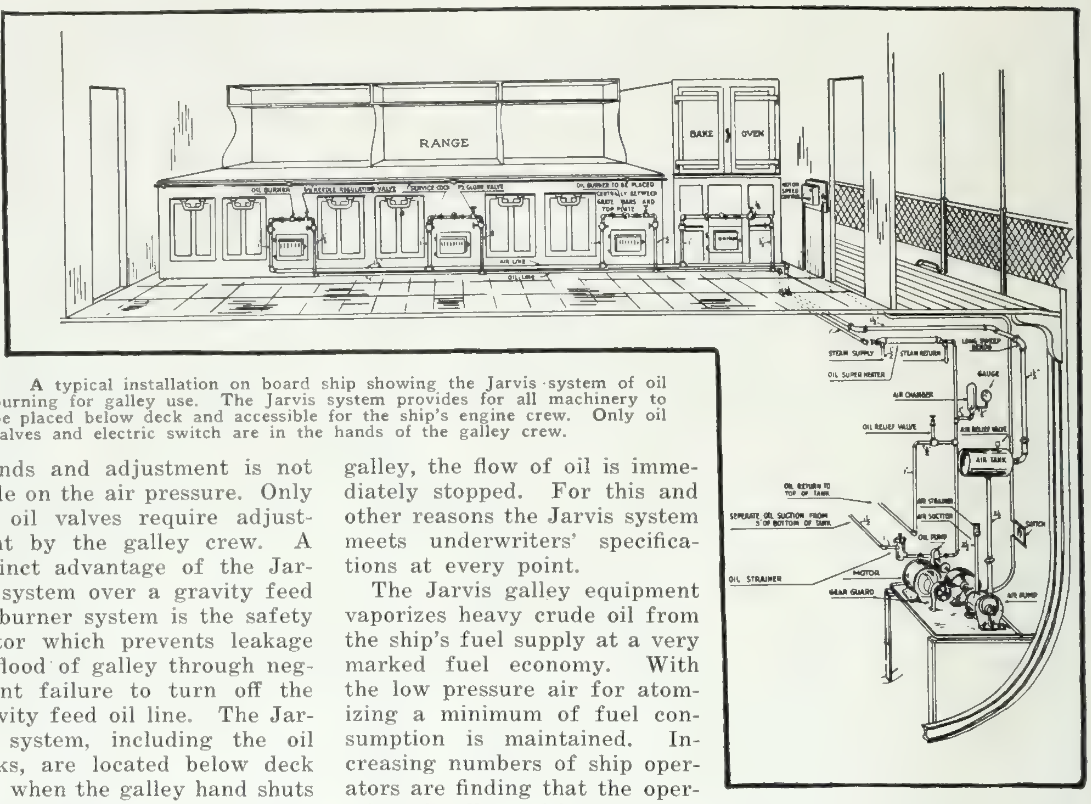
30-inch by 20-foot American geared head engine lathes, actual swing 34 inches, 12-speed change head, 2-9/16-inch hole in spindle, compound rest, full quick change gear box, furnished either belt driven or with gear and guard for motor drive.



A 250-ton ice making machine built by the Vulcan Manufacturing Company of San Francisco

WANTED —EX-MARINE, experienced in clerical work and in shipping department of large establishment wants job on board ship. Expects to stay with it some time. Sail anywhere. References. Write H. P. CROWDER, 140 Coast Avenue, Fresno, Cal.

JARVIS GALLEY EQUIPMENT

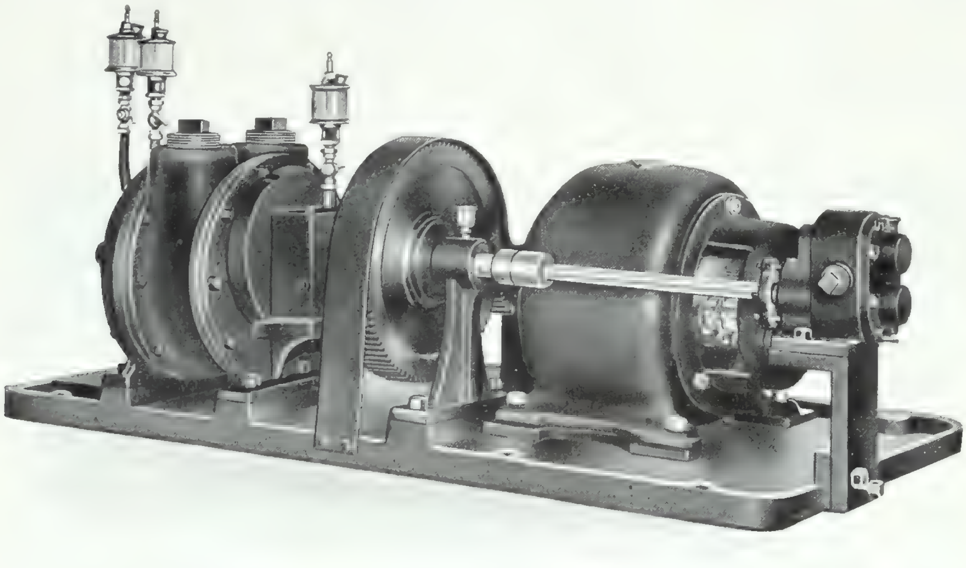


A typical installation on board ship showing the Jarvis system of oil burning for galley use. The Jarvis system provides for all machinery to be placed below deck and accessible for the ship's engine crew. Only oil valves and electric switch are in the hands of the galley crew.

THE Jarvis oil burner system for ships' galley equipment is the result of many years' experience in ship fitting. The Jarvis system, which is electrically operated, is entirely independent from the ships' main oil pumps. Separate suction is made from three inches of the bottom of the ships's tank by means of the special Jarvis rotary pump at a pressure from twenty to twenty-five pounds and after superheating through the Jarvis system the oil is pumped to the galley above deck. An important feature of Jarvis equipment is its compactness and is especially designed for ships' use. The oil and air pumps and motor—in fact, all machinery—is located in the engine room and this feature is not only important for compactness but it is located where the engine crew may have access thereto for inspection, lubrication, etc. The galley crew above deck have access only to the control valves and switches, the air line is maintained at a uniform pressure of about two pounds and adjustment is not made on the air pressure. Only the oil valves require adjustment by the galley crew. A distinct advantage of the Jarvis system over a gravity feed oil burner system is the safety factor which prevents leakage or flood of galley through negligent failure to turn off the gravity feed oil line. The Jarvis system, including the oil tanks, are located below deck and when the galley hand shuts off the electric switch in the galley, the flow of oil is immediately stopped. For this and other reasons the Jarvis system meets underwriters' specifications at every point.

The Jarvis galley equipment vaporizes heavy crude oil from the ship's fuel supply at a very marked fuel economy. With the low pressure air for atomizing a minimum of fuel consumption is maintained. Increasing numbers of ship operators are finding that the operation of galleys with coal ranges is not good economy. The small amount of space required for the oil burner system and minimum of dirt, etc., makes the oil burner system decidedly better for ships' equipment.

That the T. P. Jarvis Manufacturing Company have won confidence for their galley equipment may be seen in the many installations of ships on the Pacific Coast, which include Pacific Mail steamships Venezuela, Columbia, Ecuador, Newport, City of Para, San Jose, San Juan; Oceanic Steamship Company's steamship Sonoma; Admiral Line's steamships Governor, President, Admiral Sampson, Admiral Goodrich; Los Angeles Pacific Navigation Company's steamships Charles (formerly the steamship Harvard), Yale; S. F. & P. S. S. Company's steamships Beaver, Rose City; China Mail Steamship Company's steamship Nanking.



The Jarvis rotary pump electrically operated, designed for ship galley equipment. This positive acting pump is manufactured and tested at the Jarvis plant to meet the very exacting demands for reliable ship equipment.

GLOBE SHIPBUILDING AND DRY DOCK COMPANY OF MARYLAND

SHIP BUILDERS **SHIP REPAIRS**

New Floating Dry Dock, 9000 Tons Lifting Capacity, Ready for Operation About August 15th

OUR MOTTO: *"Service and Dispatch"*

New York Office ℅ Cox and Stevens, 15 William St. Cable Address "Globeship" **BALTIMORE, MD.**

FOR SALE

Just completed and now ready for immediate delivery at attractive prices two vertical compound Marine Engines, 18"—38 x 26" Stroke.

Inspected and passed by the American Bureau of Shipping.

DODGE MANUFACTURING COMPANY

MISHAWAKA, INDIANA

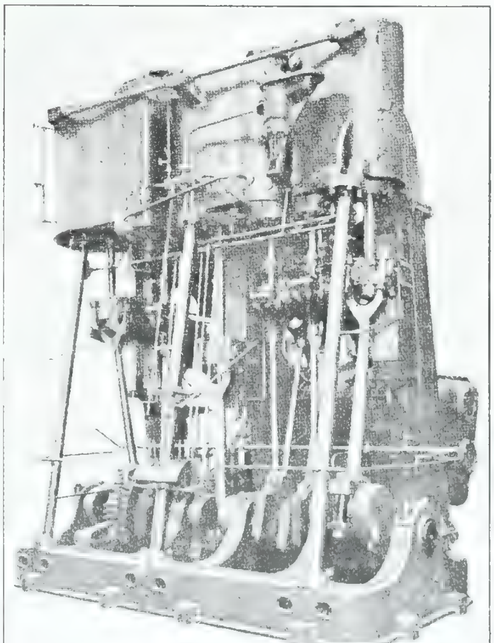
LARGEST SCRAP IRON DEALERS IN THE WEST

CALIFORNIA IRON YARDS COMPANY

YARDS
South San Francisco

OFFICE
554 Bryant St., San Francisco
Telephone Sutter 6605

Main Iron Works



(Formerly Main Street Iron Works)
KEYSTONE BOILER WORKS

BUILDERS OF

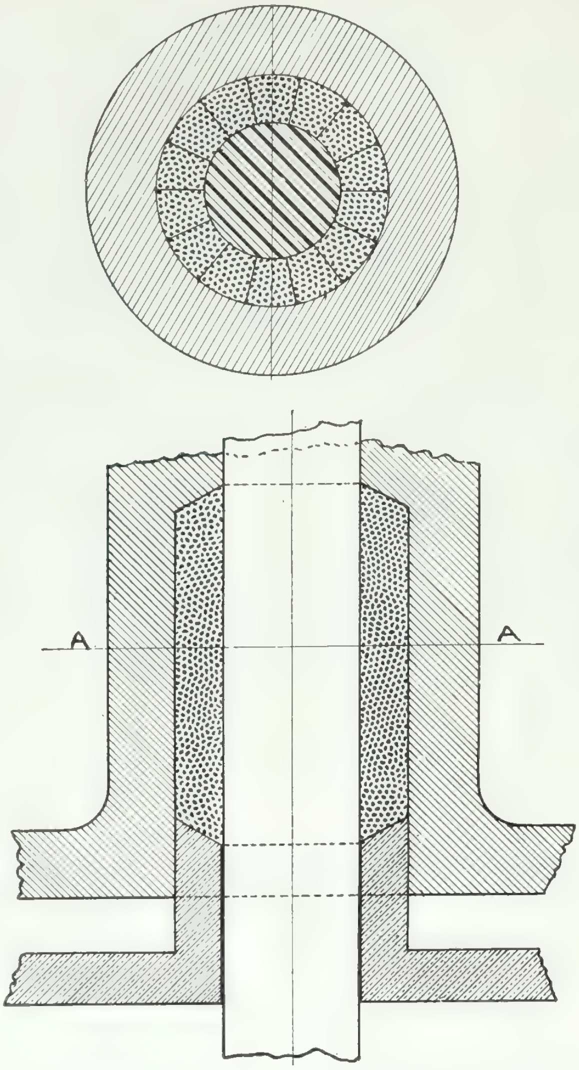
Wood and Steel Ships.
Marine Engines, Anchor Windlasses, Cargo Hoists, Capstans, Steering Engines, Oil and Feedwater Heaters and other Auxiliary Machinery.
Weir Condensers.
Marine, Tubular & Water Tube Boilers.
Tanks and Plate Work.
Special Facilities for Ship Repair Work.
Mining, Milling and Hoisting Machinery.
Hydro-Electric Power Plants.

AGENTS FOR
SCHUTTE & KOERTING CO.
Manufacturers of
Evaporators, Distillers, Feed Water Heaters,
Oil Burning Apparatus

MAIN OFFICE: 16th & DAGGETT STS. SAN FRANCISCO, CALIF.

STEPHENSON & NICHOLS SEMI-METALLIC PACKING

H. A. Fisher



The above diagrams illustrate the method of packing with Stephenson & Nichols semi-metallic packing. This packing is supplied in small segment bars which are placed in the stuffing box and after box warms up the packing amalgamates into a flexible metallic bushing. Stephenson & Nichols packing is leak proof and frictionless; will resist the highest temperatures and will not score the valve stem or pump rod.

B. J. Schneider

MR. H. A. FISHER and Mr. B. J. Schneider, whose portraits appear herewith, have recently opened sales offices at 63 Park Row, New York, to handle Stephenson & Nichols semi-metallic packing. The territory to be covered by the above sales office includes the coast line from New England to Newport News and the states of Illinois, Indiana, Wisconsin, Missouri, Iowa, Minnesota, Ohio and Pennsylvania.

Mr. Edmund Stephenson, of Stephenson & Nichols, Inc., has just completed an extended trip throughout the United States with the view of making arrangements to handle the Stephenson & Nichols semi-metallic packing at principal points of the country. The appointment of Mr. Fisher and Mr. Schneider at New York was made after a careful study as to the qualifications of these sales-engineers. Both Mr. Fisher and Mr. Schneider are thoroughly familiar with packing requirements, having been associated with selling another semi-metallic packing for a number of years. That these men have given up their old line in favor of Stephenson & Nichols is an indication of the high opinion they have of the California product. A complete line of packing is carried in stock for immediate delivery.

While in the Northwest recently, Mr. Stephenson made arrangements with the Marine Supply Company of Seattle for carrying a complete stock of Stephenson & Nichols semi-metallic packing.

For over eight years Pacific Coast engineers have recognized Stephenson & Nichols semi-metallic packing as an ideal material for packing piston rods, valve stems, expansion joints, pump rods, air compressors, turbines, etc.

Some of the largest oil companies, power plants and steamship companies have used S. & N. packing with excellent results and many piston rods packed several years ago are still in operation with the original Stephenson & Nichols packing and no signs of scored piston rods as might be expected from the use of soft packing.

Packing centrifugal pumps for cold operation is considered a severe test for any packing, yet S. & N. semi-metallic packing has been used successfully in eliminating friction and preventing leakage, without grooving the shaft.

ONE SOLUTION OF THE FUEL OIL PROBLEM

AMERICAN industry is face to face with a famine in fuel oil. It is not, however, very difficult to find the cause of the severe shortage in this widely used commodity. Production has long been insufficient, transportation is inadequate, and the demand from both governmental and private users has been steadily increasing. Unfortunately, in spite of extensive development work and lavish expenditures to produce, there is little or no hope of the situation becoming anything but worse.

The seriousness of this problem is being brought home to manufacturers by the reports of the directors of the United States Geological Survey. George Otis Smith told the United States Steel Institute that the overdemand would soon bring up the question of priority, with railroads and steam plants forced to yield to government need.

"High prices are here to stay for crude oil and for every one of its products," he said.

Obviously, it is necessary for industry to find a substitute fuel, but coke and gas are in even a worse plight themselves. It is evident that electricity offers the only adequate dependable source of fuel to meet the crisis.

The experience of the Electric Furnace Company is at the service of any plant executive whose production is being impaired by the present crisis in fuel. Most plants which began with a single unit today have many Baily furnaces. In the last three years there has not been a single case on record where a customer has installed any other type of electric furnace after he had purchased his first furnace of the Resistance type.

PUBLIC LIBRARY

Pacific Marine Review

THE GOLD STAR YACHT VENETIA
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1920

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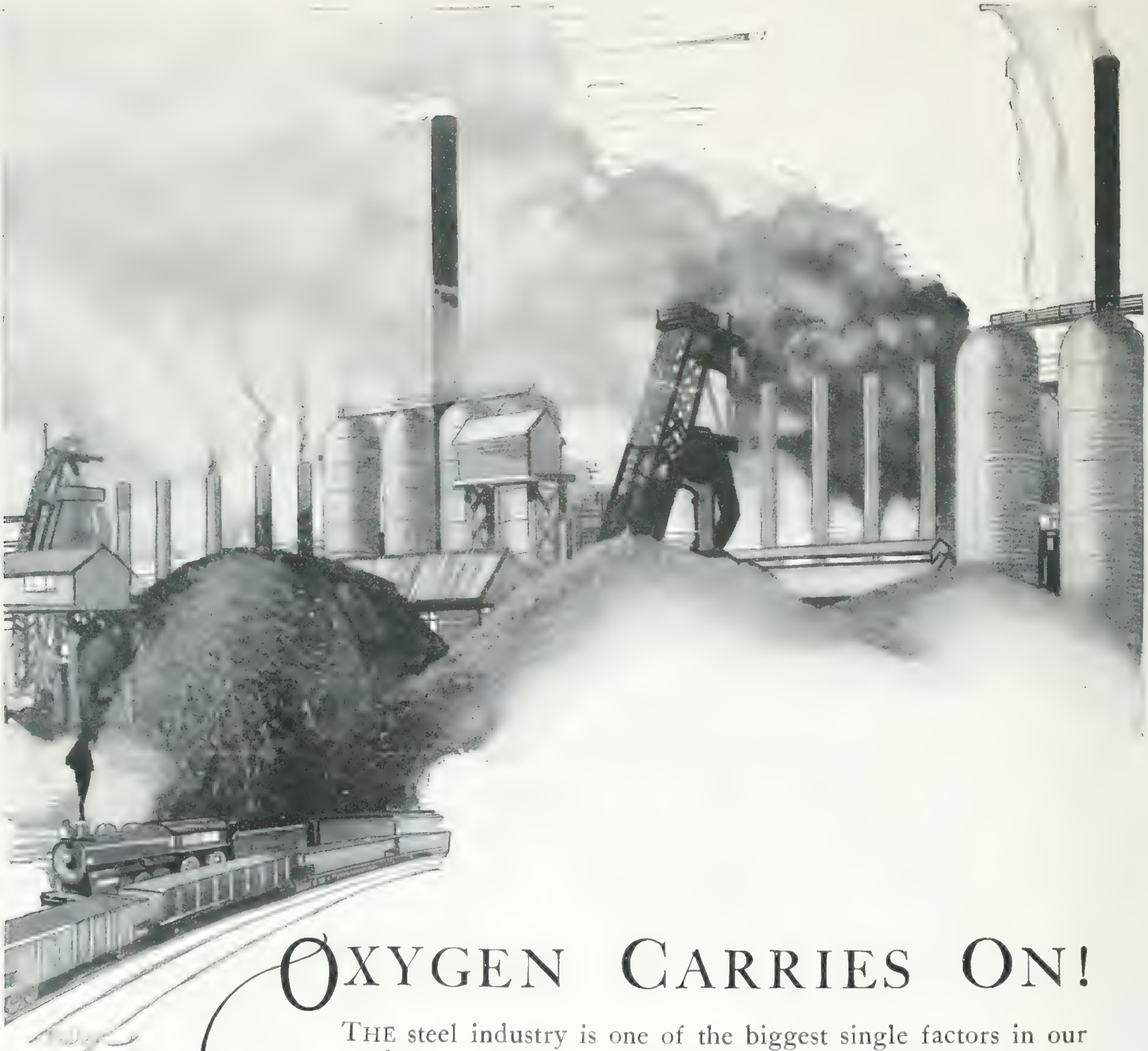

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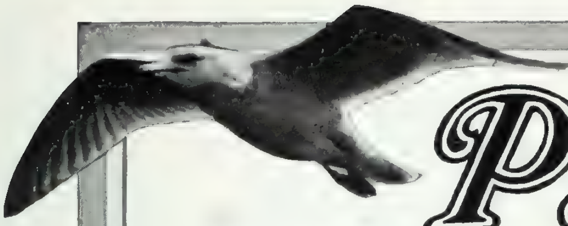

Pacific Marine Review

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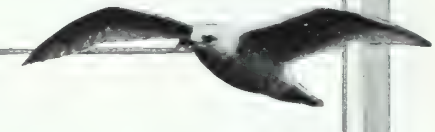

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Pacific Marine Review

The National Magazine of Shipping

September, 1920

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EIGHT MILES OF TANKERS

Contribution of Pacific Coast Shipbuilders to Oil Transport

By J. C. ROHLFS

MANY reasons have been given and much speculation has been indulged over the cause of recent fuel oil and gasoline shortage, and among others there stands out very prominently the disorganization in, and lack of proper facilities for, transportation of crude oil. Pacific Marine Review has, therefore, thought it wise to publish the achievements of its friends, the Pacific Coast shipbuilders, in the building and equipping of what is known as pipe line tanker tonnage. The table printed herewith show just what has been done in that type of construction since the beginning of the recent world war, and the aggregate forms a very great contribution to the solution of this knotty problem.

The mere figures as given in this tabular statement do not perhaps mean so very much to the casual reader, and in order that they may be impressed more firmly on the mind of that individual, we would call his attention to a few relevant facts and a few of the totals which help to make the meaning of the table more clear.

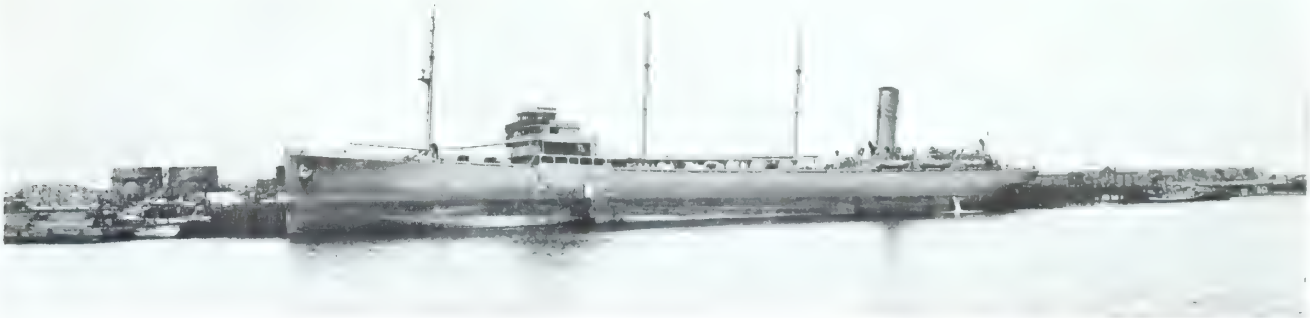
In the first place, these figures represent only new tanker tonnage and new tonnage of the type known as pipe line tankers, namely, vessels designed and constructed solely with the idea of the transportation of crude oil in bulk from the seaboard terminals of oil well pipe line connections. During the same period a vast amount of tonnage has been converted into the tanker type, either for the carriage of crude oil, Oriental vegetable oils, or petroleum distillates in bulk.

This new tanker tonnage, if placed end to end, would form a solid line of steam and motor ships approximately eight miles long. In the construction of these ships there have been fabricated and erected over 300,000 tons of ship steel. To the machinery and outfitting of these vessels items were contributed from practically every state in the Union. This is especially true of the ships not yet delivered and those which were built and delivered to the United States Shipping Board. The credit for this contribution to the solution of the fuel oil problem is, therefore, due not only to the shipbuilders but to hundreds of manufacturers in various parts of the United States who supplied auxiliary machinery and equipment which made possible the speedy delivery of these ships.

Take one item only, that of piping. We find that in these vessels this item covers engine room and boiler room water pipe systems; engine and boiler room steam and exhaust pipe systems; fire protection piping system; fresh and salt water piping to quarters; fuel oil lines; piping for loading and discharging the crude oil tanks; piping for bilge pumps and for water ballast; refrigerating piping; piping for steam smothering systems and for fire foam systems; lubrication piping for main and auxiliary machinery; piping for heating; piping for deck drains; anchor chain piping; and piping used for many structural purposes, such as deck railings, frames, guards, tubular masts, booms, tubular columns, and many other shapes, so that on an average each one of these ships would have a total of over five miles of the various sizes of pipe, much of which has to be carefully fitted, equipped with standard fittings specially adapted for marine use, laid out with proper expansion bends and suitable watertight passage through bulkheads and decks so that it presents a very much more complicated problem than a similar installation in a building on shore.

The aggregate deadweight carrying capacity of this fleet of new crude oil tankers amounts to 938,360 tons. Were the supplies available and were all of this tonnage concentrated on the transportation of Mexican crude oil, it would be possible to transport from Mexico to the oil bunkers of United States ports an annual aggregate tonnage of fuel oil amounting to between 15,000,000 and 20,000,000 tons, or approximately, let us say, 120,000,000 barrels. This 120,000,000 barrels of Mexican crude, had it been delivered to the United States in 1919, would have met the entire shortage of production as compared with consumption in that year and have added 40,000,000 barrels to our reserve stock.

Another interesting set of facts is developed when we compare this program of tanker construction with the world's tanker tonnage just before the war. Ac-



cording to Lloyd's Register, on June 30, 1914, Great Britain possessed 181 steam tankers with a gross tonnage of 819,993; the United States possessed 55 steam tankers with a gross tonnage of 201,160, and Germany had 45 tankers with an aggregate gross tonnage of 204,849. The entire maritime world outside of these three had just about 200,000 tons of steam tanker, the grand total being 1,431,950 tons. When we compare the total contribution of Pacific Coast ship yards in this class of tonnage, with the world's total, we begin to realize what the addition of these 92 modern steel tankers means to oil transportation.

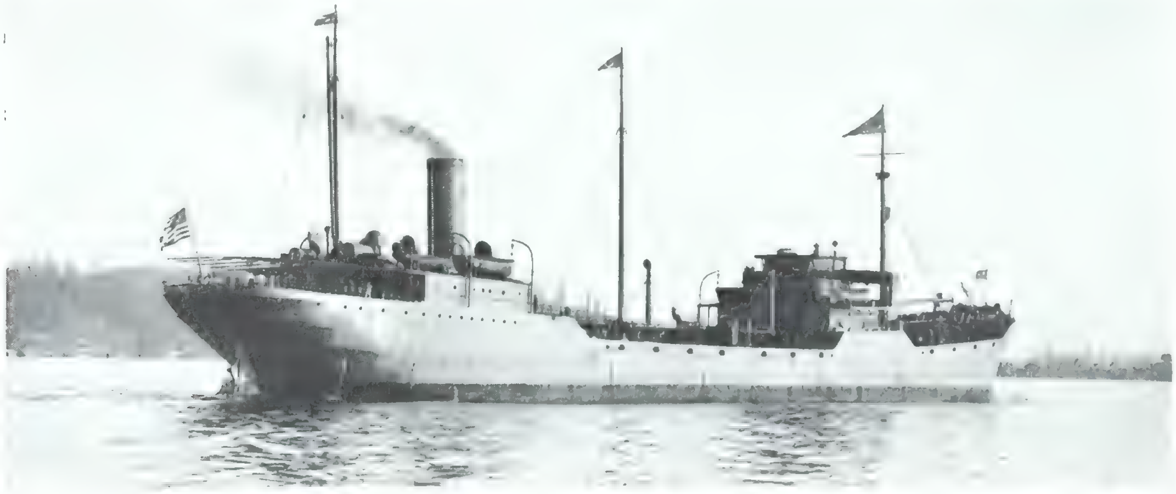
LIST OF TANKERS BUILT IN PACIFIC COAST YARDS SINCE THE BEGINNING OF THE WORLD WAR, TOGETHER WITH TANKERS NOW UNDER CONSTRUCTION

Owner	Builder	Vessel	Dimensions	D.W.Tons	Date Deliv.	Approx.Del.Date
S. O. Co. (Calif.)	Bethlehem S. B. Co.	J. A. Moffett	420'0" BP x 54'0"x 31'6"	9,000	Mar., 1916	
S. O. Co. (Calif.)	Bethlehem S. B. Co.	D. G. Scofield	440'0" x 58'0"x 41'0"	12,000	Aug., 1916	
S. O. Co. (Calif.)	Bethlehem S. B. Co.	W. S. Miller	435'0" x 56'0"x 33'6"	10,100		Oct., 1920
S. O. Co. (Calif.)	Bethlehem S. B. Co.	K. R. Kingsbury	440'0" x 58'0"x 41'0"	12,000		Jan., 1921
S. O. Co. (Calif.)	Union Constr. Co.	Charlie Watson	262'0" OA x 37'0"x 21'0"	2,800		Aug., 1920
S. O. Co. (Calif.)	Union Constr. Co.	R. J. Hanna	453'2" x 56'0"x 33'6"	10,200		Jan., 1921
S. O. Co. (Calif.)	Moore S. B. Co.	F. H. Hillman	330'0" BP x 46'0"x 27'0"	4,750		Feb., 1921
S. O. Co. of N. Y.	Bethlehem S. B. Co.	Acme	435'0" BP x 56'0"x 33'6"	10,500	June, 1916	
S. O. Co. of N. Y.	Bethlehem S. B. Co.	Astral	440'0" x 58'0"x 41'0"	12,000	Oct., 1916	
S. O. Co. of N. Y.	Bethlehem S. B. Co.	Algonquin	435'0" x 56'0"x 33'6"	10,500		
S. O. Co. of N. J.	Bethlehem S. B. Co.	Fred W. Weller	500'0" BP x 68'0"x 38'0"	14,900	Dec., 1917	
S. O. Co. of N. J.	Bethlehem S. B. Co.	A. C. Bedford	500'0" BP x 68'0"x 38'0"	14,900	Feb., 1918	
S. O. Co. of N. J.	Skinner & Eddy	Josiah Macy	420'0" x 57'0"x 31'6"	9,600	June, 1917	
S. O. Co. of N. J.	Skinner & Eddy	S. V. Harkness	420'0" x 57'0"x 31'6"	9,600	May, 1917	
S. O. Co. of N. J.	Skinner & Eddy	Trontolite	420'0" x 57'0"x 31'6"	9,600	Feb., 1918	
S. O. Co. of N. J.	Ames S. B. & D.D. Co.	Montrolite	420'0" x 57'0"x 31'6"	9,600	July, 1918	
S. O. Co. of N. J.	Ames S. B. & D.D. Co.	L. J. Drake	420'0" x 57'0"x 31'6"	9,600	Oct., 1918	
S. O. Co. of N. J.	Moore S. B. Co.	S. C. T. Dodd	425'0" BP x 57'0"x 33'0"	10,100		....
S. O. Co. of N. J.	Moore S. B. Co.	M. F. Elliott	425'0" BP x 57'0"x 33'0"	10,100		....
S. O. Co. of N. J.	Moore S. B. Co.	Thos. H. Wheeler	425'0" BP x 57'0"x 33'0"	10,100		....
S. O. Co. of N. J.	G. M. Standifer	Jno. Worthington	463'3" BP x 60'0"x 37'2"	11,740		Jan./Mar., 1921
S. O. Co. of N. J.	G. M. Standifer	W. H. Libby	463'3" BP x 60'0"x 37'2"	11,740		
S. O. Co. of N. J.	G. M. Standifer	Livingston Roe	463'3" BP x 60'0"x 37'2"	11,740		
Wilhelm Jebsen	Bethlehem S. B. Co.	Wilhelm Jebsen	435'0" BP x 56'0"x 33'6"	9,200	Oct., 1917	
Union Oil Co. of Cal.	Bethlehem S. B. Co.	Lyman Stewart	410'0" BP x 55' "x 31'8"	10,200	Dec., 1914	
Union Oil Co. of Cal.	Bethlehem S. B. Co.	La Brea	435'0" x 56'0"x 33'6"	11,000	Mar., 1916	
Union Oil Co. of Cal.	Bethlehem S. B. Co.	Los Angeles	435'0" x 56'0"x 33'6"	11,000	Apr., 1916	
Union Oil Co. of Cal.	Southwestern S. B. Co.	Montebello	440'0" x 58'0"x 41'0"	12,000		Dec., 1920
Union Oil Co. of Cal.	Southwestern S. B. Co.	La Placentia	440'0" x 58'0"x 41'0"	12,000		Jan., 1921
Atlantic Ref. Co.	Bethlehem S. B. Co.	H. C. Folger	435'0" BP x 56'0"x 33'6"	9,225	Dec., 1916	
Atlantic Ref. Co.	Bethlehem S. B. Co.	J. W. Van Dyke	435'0" BP x 56'0"x 33'6"	9,225	Feb., 1917	
Atlantic Ref. Co.	Bethlehem S. B. Co.	J. E. O'Neil	435'0" BP x 56'0"x 33'6"	9,225	Jan., 1918	
Atlantic Ref. Co.	Bethlehem S. B. Co.	Herbert Pratt	435'0" BP x 56'0"x 33'6"	9,225	Mar., 1918	
Atlantic Ref. Co.	Bethlehem S. B. Co.	W. M. Irish	435'0" BP x 56'0"x 33'6"	9,225	May, 1918	
Atlantic Ref. Co.	Bethlehem S. B. Co.	W. M. Burton	435'0" BP x 56'0"x 33'6"	9,225	June, 1918	
Vacuum Oil Co.	Bethlehem S. B. Co.	Paulsboro	435'0" BP x 56'0"x 33'6"	9,200	Sept., 1916	
Vacuum Oil Co.	Moore S. B. Co.	Vacuum	425'0" BP x 57'0"x 33'0"	10,100	May, 1920	
Vacuum Oil Co.	Moore S. B. Co.	Unnamed	425'0" BP x 57'0"x 33'0"	10,100		....
Pan Am.Pet.Trans.Co.	Moore S. B. Co.	Fred R. Kellog	425'0" BP x 57'0"x 33'6"	10,000	Aug., 1917	
Pan Am.Pet.Trans.Co.	Bethlehem S. B. Co.	Geo. Henry	435'0" BP x 56'0"x 33'6"	10,300	June, 1917	
Pan Am.Pet.Trans.Co.	Bethlehem S. B. Co.	S. M. Spalding	435'0" BP x 56'0"x 33'6"	10,300	Mar., 1918	
Pan Am.Pet.Trans.Co.	Bethlehem S. B. Co.	Paul H. Harwood	435'0" BP x 56'0"x 33'6"	10,300	Apr., 1918	
Pan Am.Pet.Trans.Co.	Bethlehem S. B. Co.	I. C. White	435'0" BP x 56'0"x 33'6"	10,300		....
Pan Am.Pet.Trans.Co.	Bethlehem S. B. Co.	Unnamed	435'0" BP x 56'0"x 33'6"	10,300		....
Pan Am.Pet.Trans.Co.	Bethlehem S. B. Co.	Unnamed	435'0" BP x 56'0"x 33'6"	10,300		....
Gen. Petro. Co.	Bethlehem S. B. Co.	Yorba Linda	435'0" BP x 56'0"x 33'6"	10,000		....
Gen. Petro. Co.	Union Constr. Co.	Unnamed	435'0" BP x 56'6"x 34'0"	10,200		Nov., 1920
Shell Co.	Union Constr. Co.	Unnamed	412'0" x 53'1"x 31'0"	8,400		Jan., 1921
S. P. Co.	Moore S. B. Co.	Unnamed	500'0" BP x 71'0"x 39'0"	16,340		....
Swiftsure Oil Trans.Co. (France&Can.S.S.Co.)	Northwest Bridge & Iron Co., Portland	?	465'7" BP x 60'0"x 36'3"	12,000		Feb. to Aug., 1921
Builder's Account	Southwestern S. B. Co.	Argonne		8,400		Oct., 1921

Owner	Builder	Vessel	Dimensions	D.W.Tons	Date Deliv.	Approx.Del.Date
U. S. Shipping Board	Bethlehem S. B. Co.	W. S. Rheem	435′0″ BP x 56′0″x 33′6″	10,100	Aug., 1918	
U. S. Shipping Board	Bethlehem S. B. Co.	Derbyline	435′0″ BP x 56′0″x 33′6″	10,100	Aug., 1919	
U. S. Shipping Board	Bethlehem S. B. Co.	Deroche	435′0″ BP x 56′0″x 33′6″	10,100	Sept., 1919	
U. S. Shipping Board	Bethlehem S. B. Co.	Devolente	435′0″ BP x 56′0″x 33′6″	10,100	Sept., 1919	
U. S. Shipping Board	Bethlehem S. B. Co.	Dillwyn	435′0″ BP x 56′0″x 33′6″	10,100	Sept., 1919	
U. S. Shipping Board	Bethlehem S. B. Co.	Dilworth	435′0″ BP x 56′0″x 33′6″	10,100	Jan., 1920	
U. S. Shipping Board	Bethlehem S. B. Co.	City of Alameda	435′0″ BP x 56′0″x 33′6″	10,100	Feb., 1920	
U. S. Shipping Board	Bethlehem S. B. Co.	Utacarbon	435′0″ BP x 56′0″x 33′6″	10,100	Mar., 1920	
U. S. Shipping Board	Bethlehem S. B. Co.	Portola Plumas	435′0″ BP x 56′0″x 33′6″	10,100	Apr., 1920	
U. S. Shipping Board	Bethlehem S. B. Co.	Cathwood	435′0″ BP x 56′0″x 33′6″	10,100	Apr., 1920	
U. S. Shipping Board	Bethlehem S. B. Co.	Richconcal	435′0″ BP x 56′0″x 33′6″	10,100	June, 1920	
U. S. Shipping Board	Bethlehem S. B. Co.	Dungannon	435′0″ BP x 56′0″x 33′6″	10,100		
U. S. Shipping Board	Bethlehem S. B. Co.	Durango	435′0″ BP x 56′0″x 33′6″	10,100		
U. S. Shipping Board	Bethlehem S. B. Co.	Halo	435′0″ BP x 56′0″x 33′6″	10,100		
U. S. Shipping Board	Bethlehem S. B. Co.	Halsey	435′0″ BP x 56′0″x 33′6″	10,100		
U. S. Shipping Board	Bethlehem S. B. Co.	Halway	435′0″ BP x 56′0″x 33′6″	10,100		
U. S. Shipping Board	Bethlehem S. B. Co.	Hambro	435′0″ BP x 56′0″x 33′6″	10,100		
U. S. Shipping Board	Bethlehem S. B. Co.	Hamer	435′0″ BP x 56′0″x 33′6″	10,100		
U. S. Shipping Board	Bethlehem S. B. Co.	Hammac	435′0″ BP x 56′0″x 33′6″	10,100		
U. S. Shipping Board	Moore S. B. Co.	Imlay	425′0″ BP x 57′0″x 33′0″	10,000	June, 1919	
U. S. Shipping Board	Moore S. B. Co.	Miskianza	425′0″ BP x 57′0″x 33′0″	10,000	Feb., 1920	
U. S. Shipping Board	Moore S. B. Co.	Quabbin	425′0″ BP x 57′0″x 33′0″	10,000	Mar., 1920	
U. S. Shipping Board	Moore S. B. Co.	City of Reno	425′0″ BP x 57′0″x 33′0″	10,000	May, 1920	
U. S. Shipping Board	Moore S. B. Co.	Salina	425′0″ BP x 57′0″x 33′0″	10,000	June, 1920	
U. S. Shipping Board	Moore S. B. Co.	Sapulpa	425′0″ BP x 57′0″x 33′0″	10,000		
U. S. Shipping Board	Moore S. B. Co.	Meton	425′0″ BP x 57′0″x 33′0″	10,000		
U. S. Shipping Board	Moore S. B. Co.	Mevania	425′0″ BP x 57′0″x 33′0″	10,000		
U. S. Shipping Board	Moore S. B. Co.	Stockton	425′0″ BP x 57′0″x 33′0″	10,000		
U. S. Shipping Board	Moore S. B. Co.	Minerva		10,000		
U. S. Shipping Board	Moore S. B. Co.	Minos		10,000		
U. S. Shipping Board	Moore S. B. Co.	Unnamed		10,000		

CONCRETE TANKERS

Owner	Builder	Vessel	Dimensions	D.W.Tons	Date Deliv.	Approx.Del.Date
U. S. Shipping Board	S. F. Shipbldg. Co.	Palo Alto	430′0″ x 54′0″x 36′0″	7,500		
U. S. Shipping Board	S. F. Shipbldg. Co.	Peralta	430′0″ x 54′0″x 36′0″	7,500		
U. S. Shipping Board	Pacific M. & C. Co.	Cuyamaca	430′0″ x 54′0″x 36′0″	7,500		
U. S. Shipping Board	Pacific M. & C. Co.	San Pasqual	430′0″ x 54′0″x 36′0″	7,500		



THE SHIP MORTGAGE ACT OF 1920

By HAROLD M. SAWYER

ONE of the most constructive provisions of the so-called "Jones Act" is Section 30, known as the Ship Mortgage Act of 1920. In this section Congress has given to American shipping interests an entirely new form of investment security called a preferred ship mortgage, which is intended to eliminate many of the risks and hazards inherent in the ordinary ship mortgage.

The difficulty with the customary ship mortgage is that it is not secured by a maritime lien, and hence under our maritime law has been considered inferior to any and every such lien, whether created before or after the execution of the mortgage, if enforced within a reasonable time. The theory of the maritime lien is that it creates a right against the ship and enables the lienor to seize the ship as security for any payments arising either from contracts or wrongs. The contracts must be maritime contracts—that is, those which assist the ship in the performance of her peculiar functions—and the wrongs must be those perpetrated by the ship herself. Consequently the operation of a ship may and frequently does result in almost constant creation of maritime liens. These liens are all secret in the sense that there is no requirement that they shall be recorded, and they are not dependent upon possession of the ship. Thus the ship mortgagee was continually subjected to the risk of having the priority of his lien displaced by both prior and subsequent maritime liens. The former he could not even discover until enforced, and the latter he could not prevent.

This peculiar situation arose because our maritime law did not regard the mere lending of money on the security of a ship as a maritime contract, nor the lien as a maritime lien. Such a transaction was undoubtedly a benefit to the owner, but it did not assist the ship to perform her functions. On the other hand, repairing and supplying the ship were of direct benefit to her, and transactions of this and similar character, if properly authorized, always gave rise to a maritime lien under our law.

In order to make the ship mortgage a more attractive and secure investment and so encourage the development of an American merchant marine, Congress has provided a method for creating a preferred ship mortgage to be secured by a maritime lien which is given a definite rank by the act. Maritime liens which are prior in point of time to the mortgage are still prior in right, but those which are subsequent in time are also subsequent in right with but few exceptions.

Preferred ship mortgages are limited to American vessels having a gross tonnage of 200 tons and upwards, and the mortgagee must be a citizen of the United States. The act leaves the status of the ordinary ship mortgage and the law applicable thereto unchanged. It merely provides a simple procedure for giving the mortgage a preferred status and endows the mortgage lien with maritime character.

The method for the accomplishment of these results is set forth in much detail which need not be considered here. Briefly stated, the process requires recording of the mortgage in the office of the collector of the port in which the ship is documented, endorsement of certain facts on the ship's documents, and an affidavit, likewise recorded in the office of the collector, to the effect that the mortgage is "made in good faith and without any design to hinder, delay or defraud any existing or future creditor of the mortgagor, or any lienor of the mortgaged vessel." The mortgage itself must be free from any provision which can be construed as a waiver of the preferred status.

While Congress has not attempted to make the preferred mortgage superior to any maritime lien which is prior in point of time, it has provided the mortgagee with at least a measure of indirect protection from such liens. The mortgagor is now required, upon request and prior to the execution of the mortgage, to make written disclosure of the "existence of any maritime lien, prior mortgage, or other obligation or liability upon the vessel to be mortgaged, that is known to the mortgagor." Furthermore, after the execution of the mortgage and until the mortgagee has had a reasonable time to record it, the mortgagor is forbidden to create, without the consent of the mortgagee, any maritime lien by contract except those particular liens which are prior to the preferred mortgage in any event. Violation of these provisions with intent to defraud is punishable by fine or imprisonment, or both, and any loss caused thereby can be recovered from the mortgagor by action in the state or federal courts.

In practical operation, therefore, these two provisions will make it possible for any prospective preferred mortgagee to discover the existence of all prior maritime liens known to the mortgagor. They will tend to eliminate fraud, give the mortgagee the benefit of all knowledge possessed by the mortgagor, and enable the latter to act with his eyes open.

After the mortgage has acquired a preferred status, the mortgagee is protected against all subsequent maritime liens except those which are described by the act as "preferred maritime liens." These are liens for wrongs committed by the ship, for stevedores' wages if the employment is authorized directly by certain persons named in the act, for wages of the crew, for general average and for salvage, including contract salvage. Even the preferred mortgagee must still run the risk of having the priority of his lien displaced by some of the maritime liens, but the number of such liens has been materially decreased by the act, and those which retain priority are abundantly justified by considerations of natural justice and maritime usage.

The mortgagee takes the ship as security with full knowledge of her capacity for inflicting damage, and, as she becomes in a qualified sense his ship, at least to the extent of the mortgage debt, there is no reason why he should be preferred over those who subsequently acquire maritime liens because of the wrongs which she may commit. All the other subsequent liens which are preferred to his mortgage are in the last analysis incurred for his benefit. In fact, the security of the mortgage may be directly impaired or wholly imperiled unless the acts which give rise to these liens are performed. Thus, the loading and unloading of the ship, the payment of the crew, the sacrifices and expenditures which give rise to general average, and salvage, are vitally necessary for the successful and efficient operation of the ship. To postpone such liens to any mortgage would be to substitute delay and investigation in place of the immediate action upon which the safety of the ship and the success of the adventure so often depend.

While the Ship Mortgage Act has materially improved the position of the mortgagee by enabling him to give his mortgage a preferred status, the result has been accomplished without injustice to subsequent lienors who are postponed to the mortgage. These lienors are of the class generically known as "Materialmen." They are those who, in the language of the act, have liens "for furnishing repairs, supplies, towage, use of drydock or marine railway, or other necessaries." Liens of this class arise only by virtue of contracts which can be made with deliberation and after ample investigation of solvency and responsibility. The time element, which is the justification for the preferred maritime lien, is rarely vital to the materialman, and therefore he should not be preferred to the prior mortgagee. His lien is not destroyed, but merely postponed, which is as it should be.

Furthermore, the materialman has been given additional protection by the requirement that a certified copy of the preferred mortgage shall be kept on board the ship. This copy and the ship's papers must be exhibited by the master "to any person having business, which may give rise to a maritime lien upon the vessel or to the sale, conveyance, or mortgage thereof." Wilful failure to exhibit these papers subjects the master to the penalty of having his license suspended or cancelled, and any loss caused thereby can be recovered from the mortgagor by action in the state or federal courts. The materialman, therefore, has no one but himself to blame if he extends credit unwisely: he can always take the necessary time for investigation, and, as he has a lien, his research need go no further than the ship's papers, for the sole question is one of priority.

From now on the position of the materialman as a lienor will be determined solely by the Ship Mortgage Act. Heretofore his rights have in large measure depended upon state statutes, but their operation has been specifically suspended by the act.

Although framed upon an entirely different theory, the Ship Mortgage Act is in complete harmony with English law and the priorities created by the act will doubtless be respected and enforced in English courts.

A preferred mortgage can be foreclosed like any other mortgage, and in a proper case a receiver may be appointed to take possession of the ship. Suit may also be brought against the mortgagor personally upon the mortgage debt. But the remedies for the enforcement of a preferred mortgage are administered exclusively by the federal admiralty courts. This is a distinct departure from existing law, for these courts have never had jurisdiction of such matters before. They have, however, always had jurisdiction of the enforcement of maritime liens. The enlargement of their power so as to include the enforcement of preferred mortgages will naturally promote uniformity of decision, for the same courts will now deal with both subjects. Inasmuch as the rights of both mortgagees and other maritime lienors are usually involved in a suit by either, the advantages of the procedural changes effected by the act are obvious.

The preferred mortgage is far in advance of the customary ship mortgage. It offers an equitable solution of the conflict between the rights of mortgagees and maritime lienors and should tend to make ship mortgages an attractive investment.

NOTES FROM THE EAST

By AMERICUS

WE are still waiting for that new Shipping Board, but in all probability by the time this is printed, we will know "who's who," as a definite statement has been issued officially that the nominations will be made in the not far distant future. Those receiving the nominations need not feel so sure of the tenure of their offices, as these "recess" appointments effective immediately when made must run the gamut of official confirmation by the Senate. If the Republicans win the November elections, it is not so sure that they will confirm the nominations made by the administration at this time. A shining precedent was established by Democratic Senators in holding up many of the then President Taft's appointments after it was definitely known that Mr. Wilson had been elected in the election of November, 1912. It is still anybody's guess who will receive the appointments. Having previously gone on record as to my guesses, I will refrain from further predictions. In addition to other California possibilities, the name of Captain Bulger, the well known Steamboat Inspection Service head at San Francisco, is quite frequently mentioned.

The Commissioner of Internal Revenue has invited a conference of steamship owners, and others interested in order to bring about an exchange of views as to the proper regulations soon to be issued by the Treasury Department for the enforcement of Section 23 of the Jones bill, which provides for the exemption from war-profit and excess-profit taxes of ship owners' earnings under condition that the amount of exemption be re-invested in new ships built in American shipyards. It is believed by many who have looked into the law carefully that some companies will be able to get the benefit of the limit prescribed by the law; that is, one-third of the cost of new construction. Already there are well defined rumors that the International Mercantile Marine and several of the large oil corporations are preparing to take advantage of this provision and place orders for new ships of large tonnage in American shipyards. There is also a portion of Section 25, which provides for the exemption from these special taxes of the proceeds from the sale of any American vessel built prior to January 1, 1914, provided the entire proceeds are invested in building new ships in American yards. As there is nothing in the law apparently which would prevent the immediate sale of such new vessels, it is quite probable that some owners may take advantage of "cashing in" on some of their tax exemptions. However, in that event, the government will have gained its object of increasing American built tonnage, of an approved type, which will help in securing a "balancing of its fleet" so much needed. As before remarked, the benefits of the Jones bill are far-reaching and it will take considerable time to work out all of its many advantages.

In these days of declining ocean freight rates, the matter of scarcity of fuel, both coal and oil, with the attendant rapid increase in price of both, is a most serious one for our maritime interests. Already there have been upwards of thirty Shipping Board vessels withdrawn from service on this account alone. Fortunately, however, the Shipping Board, after many vexatious delays, has made satisfactory arrangements for the delivery of about 26,000,000 barrels at various American ports. Its delivery price at the port of New York, for example, will be $2.30 to $2.40 per barrel, and at other ports in proportion to the cost of delivery. At Panama arrangements have been made to furnish vessels with oil at $3.50 per barrel and coal at from $15 to $17 per ton. The relative cost of fuel in the total cost of ship operation has therefore taken a decided increase. However, this will be no particular detriment to American vessels, as our competitors will suffer much more from the increased cost of fuel than ourselves. Illustrative of this, Mr. P. A. S. Franklin is quoted in one of the daily papers as stating that fuel oil in Great Britain is selling at the moment for an equivalent of $62.50 per ton. This can readily be believed when it is known that a tanker was recently chartered to transport oil from Mexico to a European port at a cost of $60 per ton. During the past week two of the largest passenger vessels in the world, the Aquitania and the Olympic, have arrived in New York on their maiden voyages after having been transformed from coal to oil burners. Their performances under the new conditions have attracted a great deal of favorable comment. It was particularly impressive to see a large sea-going tanker berthed alongside the Aquitania delivering over 5000 tons of oil to the Cunarder in a few hours. The saving in thus handling fuel over the old methods of bunkering in this port will go a long way towards reducing the expenses of operation. The shortage in tankers is rapidly being lessened by the completion of several large oilers, of the vast tonnage now building in this country, a tonnage far in excess of the number of cargo vessels now building for private account.

In view of the facts that competent authorities predict the exhaustion of all known supplies of petroleum in this country within the next fifteen or twenty years, and the combination recently entered into by England and France to control practically all of the oil supply in other parts of the world, is it not time that we, as a nation, begin to become alarmed as to the future supply of this most important element for sea power, both naval and mercantile? The question naturally arises as to why we should expend vast quantities of oil for marine propulsion, when we can perform the same work at an expenditure of one-third the fuel by the use of internal combustion engines to drive our ships. Surely this is a question vital to our interests on the sea, now made increasingly apparent by the scarcity of supply and ever-increasing prices. Shipowners should have vision at this time as never before, and prior to giving out any new contracts for ships take wise counsel from their technical advisers. If conditions are as they now exist, what will they be ten years from now, and their ships built today will be operated then under the motive power they now install, unless forsooth they may be willing to submit to enormous costs in order to make a transformation which then may be imperative. The start only has been made in motor-driven ships in this country, but if we are to continue on the seas very rapid development must soon ensue.

This all leads up to a very vital question which can easily be looked after if we are wise to our interests. The engineering personnel will be a greater factor in the successful operation of motor-driven ships than any other, but what has been done to provide competent men for this type of ships? The writer has discussed this subject with many ship owners, and is led to believe that not a few of them are deterred at this moment from ordering motor-driven ships by the fear that they will not be able to secure competent engine room personnel to operate them. The laws governing the licensing of such officers, such as there be, are singularly lacking and need to be drafted anew to suit the conditions. The presumption that any licensed engineer of steam vessels can be examined and, if found qualified as to his knowledge of the machinery of motor vessels, will make an efficient licensed engineer for motorships, is somewhat too optimistic to bring good results. No matter how long a man may have served as a steam engineer at sea, he ought to have not less than six months special training in a shop devoted to the manufacture of marine Diesel engines to make him as efficient as the necessities demand. The examination should also be made very thorough. Diesel engine builders in this country, although now very few in number, recognize the importance of good engineers and are sending men from their shops out with each new installation. The Shipping Board training system already has a class devoted to gaining practice in Diesel engine shops, and this method of training should be encouraged in every way by the board. This past week has witnessed the initial sailing of the steamship Cubore, propelled by the largest Diesel engine yet installed in an American merchant marine. The engine, of 3200 horsepower, is strictly of American design and built by the Bethlehem Company. Needless to say, her performance is being very carefully watched by many ship owners and other interested persons. It is hoped that there will soon be many motor ships of this size flying the American flag.

In Great Britain several of the leading men connected with the shipbuilding industry during the great war, have been knighted by the King in appreciation of their services to the country. Of course we have no such system in this great country of ours, but let it be understood that we have just as eminent shipbuilders as anybody, and that fact has been graciously recognized in one instance at least by the bestowal of the honorary degree of LL.D. on our well known hustling shipbuilder, Mr. William H. Todd, president of the Todd Shipyards Corporation of New York, Seattle, Tacoma and other places. Manhattan College of this city bestowed the coveted degree on Mr. Todd. When you meet the genial gentleman hereafter, you must refrain from addressing him "Hello, Bill," as it is now "Doctor" Todd, if you please.

The Merchant Marine League has arranged for a marine exposition to be held in Chicago, Illinois, during the week of October 18-25 next. This will be as nearly as possible similar to the exposition held in New York City last fall. The success of that show was so marked that it has encouraged its backers to embark in this new enterprise. Secretary Alexander, Admiral Benson, Captain Foley and other leading officials have consented to be present at the opening exercises, and there is little doubt of the benefits which will accrue to the maritime interests of this country from the educational advantages of an exhibit of this sort. The following year it is quite possible that some of the other great inland cities, such as St. Louis or Kansas City, may be the scenes of this meritorious propaganda in the interests of our merchant marine.

ITALY'S PURCHASES OF FOREIGN SHIPS

SINCE the signing of the armistice Italy has acquired foreign ships to the number of 94, amounting altogether to 565,267 tons deadweight. Eighteen of the vessels thus acquired are still retained in government service. The remaining ships have been turned over to the various Italian navigation companies. It is understood that negotiations are pending for the delivery of 21 additional foreign ships representing 186,230 deadweight tons. Practically all the foreign tonnage thus obtained by Italy is of British origin.

An order has been placed with an American firm by the government for what might be called four "knocked-down" ships—that is to say, the fabricated steel will be brought to Italy and the ships put together on Italian slips adjacent to the harbor of Palermo. The ship purchases already made and now in sight aggregate around 775,000 tons. Italy's tonnage losses through enemy action are estimated at 852,000 tons out of a merchant marine tonnage of 1,958,838 which existed before the war.

It has been officially declared that Italian navigation companies no longer hope to buy American tonnage under the prevailing adverse rates of exchange.

Seven Ships Launched on the Delaware in One Afternoon Completing Hog Island's Contribution to the War Emergency Shipbuilding Program and Setting a World's Record for Number of Ships Launched in One Day From Any One Yard

PORTLAND YARD BUILDS TANKERS

By A. J. ENGLAND

PORTLAND, after several months of comparative quiet, is again listening to the rattle of riveting hammers and the attendant music of a bustling steel shipyard. With the completion of the Shipping Board steel ship work in the Columbia district, the local yards have been closing and disposing of what material was left on hand. William Cornfoot's yard at Albina has been dark since the government program ended, except for the construction of a sectional drydock for the port of Portland. The Columbia River Shipbuilding Corporation, after the completion of thirty vessels for the Fleet Corporation, undertook the delivery of two vessels of 8800 tons each for the Green Star Line, and has since dismantled the larger part of its plant. The Northwest Steel Company launched and delivered thirty-six government hulls, and then the Northwest Bridge & Iron Company, which has since acquired the plant and equipment of the former company by purchase, successfully launched three 8800-ton freighters, one for the Union Sulphur Company and two for the Green Star Line. When the last of these vessels was delivered there was a complete cessation of construction activity in Portland until the Northwest Bridge Company secured and commenced work on a contract for seven 12,000-ton oil tankers for the Swiftsure Oil Company. Across the Columbia River, in the State of Washington, the G. M. Standifer Corporation has been steadily working on freighters of 9600 tons and tankers of the 12,000-ton size.

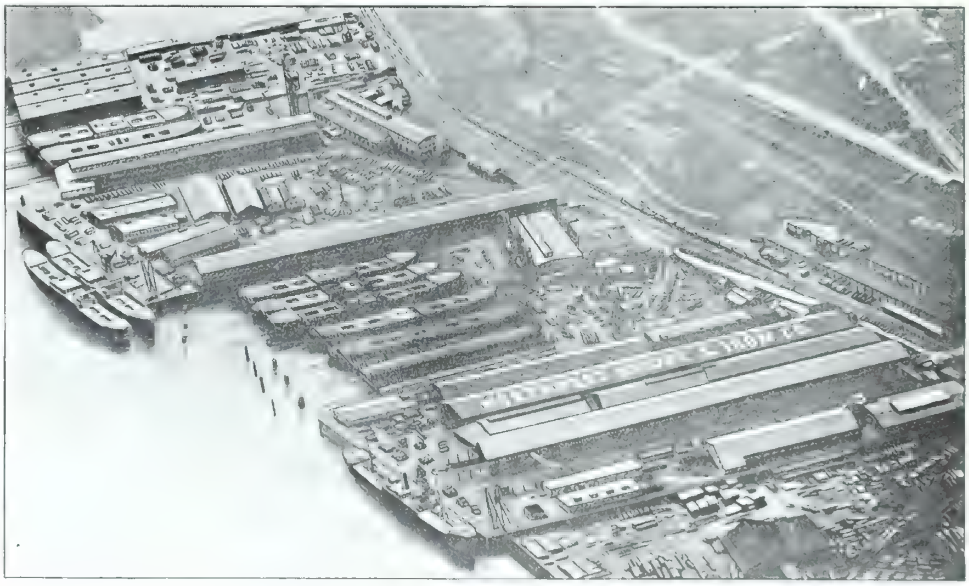
The directorate of the new shipbuilding company is made up of men who have been associated with the industry for a considerable time. Ward R. Bowles, a nephew of J. R. Bowles, of the Northwest Steel Company, was associated with his father, C. D. Bowles, both in the Duthie organization at Seattle and in the Columbia River Corporation at Portland before assuming control of the new organization. W. H. Cullers, another director, was a graduate of the University of Pittsburgh in 1901, and followed the steel business in the plants of the Pennsylvania Bridge Company and Cambria at Johnstown before coming to the coast to become chief engineer for the old Northwest Steel Company, which position he held for some eight years. Lewis R. Banks, the third member of the board, has been superintendent of the Northwest shops for about eight years, previous to which he has been associated with the steel industry in various capacities. These men have gathered a strong organization of practical shipbuilders together, and now that the transportation difficulties are showing a tendency to mend confidently expect to render a good account of themselves in the speedy launching and delivery of the seven vessels of the present contract.

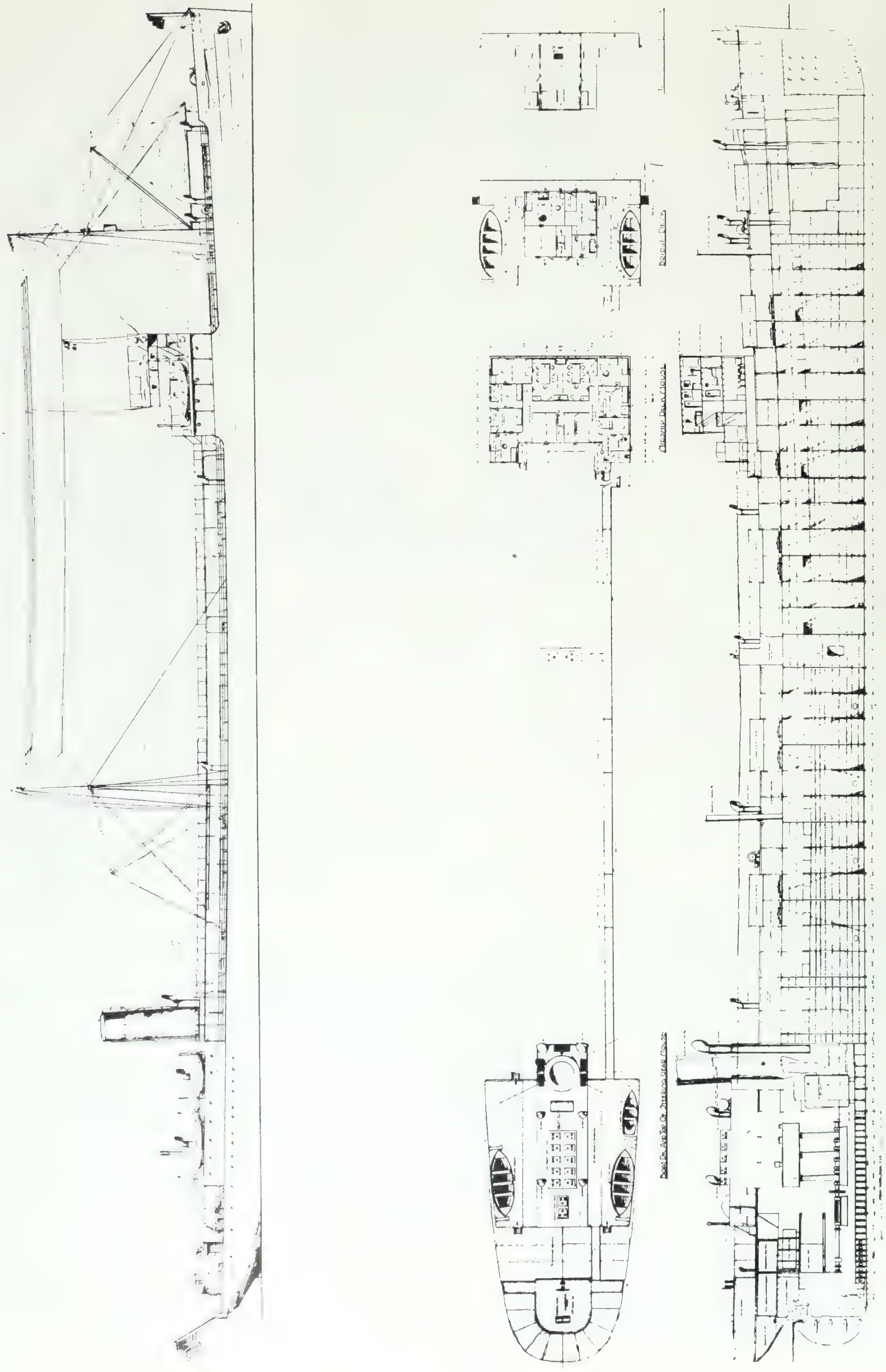
Ward R. Bowles, Director Northwest Bridge & Iron Co.

Lewis R. Banks, Director Northwest Bridge & Iron Co.

A considerable amount of preliminary work was necessary in order to adapt the original four ways operated by the Northwest Steel Company to the larger ships contracted for by the new company. The overhead system of aerial conveyance of material to the ways is in use here, and the huge masts, which carry these aerials, have been raised to give sufficient clear-

W. H. Cullers, Director Northwest Bridge & Iron Co.

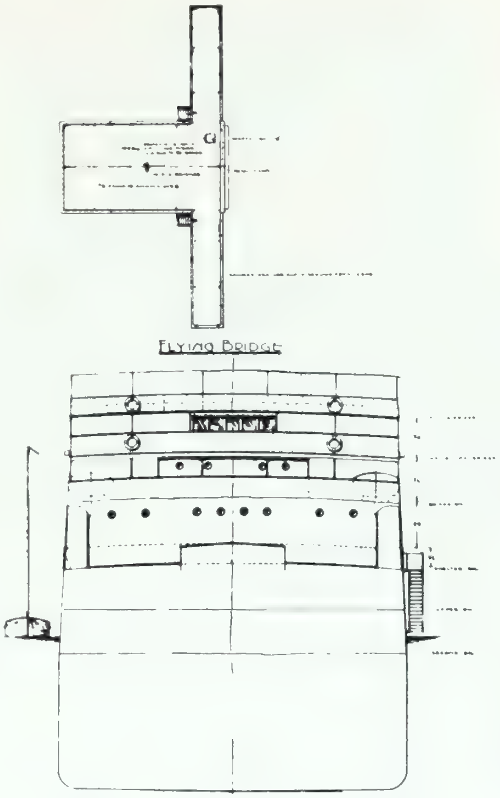

Birdseye View Northwest Bridge & Iron Company Plant at Portland



Outboard and Inboard Profiles and Superstructure Plans of Tankers for the Swiftsure Oil Company Now Building at the Plant of the Northwest Bridge & Iron Company, Portland ance. Three of the four ways are to be used as building berths, and the rotation of hulls on the various slips has been so planned that a single scaffolding system will be sufficient for the work on adjoining hulls. Three keels have been laid already, and the company expects to launch the first of these vessels in the middle of November and to deliver in February, 1921.

The new tankers will be single screw vessels of the three deck shelter deck type, constructed on the Isherwood system of longitudinal framing, with straight stem, semi-elliptical stern, bridge and house amidships and machinery aft. They will measure 465 feet 7 inches between perpendiculars (465 feet at load water line), with a molded beam of 60 feet and depth of 36 feet 3 inches to shelter deck and 29 feet 3 inches to upper deck; with 7 feet 6 inches between upper and main decks, and 7 feet from the upper to the shelter deck. Main deck is omitted in expansion trunks in way of oil tanks and machinery space.

There will be nine main cargo oil tanks on each side of the center line bulkhead, cross bunker being fitted for fuel oil, and a tank for fuel oil or water ballast forward; ten summer tanks, fitted in wing between main and upper decks, five on each side over main cargo tanks, and dry cargo space in forward hold and 'tween decks. Double bottoms will be fitted under the engine and boiler space for feed water, extending from the after peak bulkhead forward.



Flying Bridge Plan and End Elevation
New Tankers

The vessels will be rigged as fore and aft two-masted schooners, with steel pole masts and wooden topmasts. One heavy steam-driven winch is to be installed on the forecastle, two 9 by 12-inch winches on upper deck, and a 9 by 12-inch mooring winch. Plans call for a two-ton ammonia refrigerating plant and two generating sets of 15-kilowatt capacity. Pump room is located forward with two horizontal duplex pumps 18 by 14 by 24 inches installed.

The propelling machinery consists of a three-cylinder vertical inverted direct-acting triple-expansion engine driving a right-handed propeller. It will be 27½-46-78 by 51-inch stroke of the Stephenson link type, built for a piston speed of 660 feet a minute and 210 pounds boiler pressure, indicating approximately 3150 horsepower under normal conditions. The engine will be the well known Hamilton type of Hooven, Owens, Rentschler make. Steam will be furnished by three Scotch marine boilers, single ended, arranged for the Howden system of forced draught. These boilers will have a minimum inside diameter of 15 feet 5½ inches and will be 11 feet 9 inches long. Morrison corrugated furnaces of 47 inches diameter will be fitted.

These vessels will be the largest ships of any kind ever launched on the Willamette River.

COLUMBIA PACIFIC SHIPPING COMPANY

THE Columbia Pacific Shipping Company was organized in Portland, Oregon, in 1918 to operate vessels built in the Oregon district by the United States Shipping Board Emergency Fleet Corporation, and was reorganized in April, 1920, as a permanent operating company with branches and agents in every important Oriental port.

In the four months previous to the reorganization in April, the Columbia Pacific Company handled fifteen vessels, and its rapid and substantial growth will be recognized when it is noted that in the four months following April 1, thirty-five ships were dispatched, or an average of about one every three and a half days, and the company is now handling through Portland in the vicinity of 70,000 tons of cargo monthly.

The "North China Line" offers direct service without trans-shipment from Portland, Oregon, to Yokohama, Kobe, Dairen, Chinwangtao, Taku Bar, Tsingtao and Shanghai. Branches are maintained in Hongkong, Hankow, Chefoo, Kiachow and Tien Tsin, with agents in all other important ports of China and Japan. The vessels operated are American steel cargo steamers from 8800 to 9600 tons deadweight. They are: S. S. West Nomentum, S. S. West Keats, S. S. West Nivaria, S. S. West Angeles, S. S. Haymon, S. S. Bearport and S. S. Sinasta.

In addition to operating its own fleet of trans-Pacific freighters, the Columbia Pacific Shipping Company is general agent for the European Pacific Line, operated by Williams, Dimond & Company of San Francisco, offering "liner" service from Boston and New York to the Pacific Coast, including Portland, to the United Kingdom, the Continent and Scandinavia, with three sailings a month, regardless of cargo offerings. Among the ports of call are London, Liverpool, Glasgow, Havre, Rotterdam, Hamburg, Christiania, Copenhagen and Stockholm. Among the ships operated by the European Pacific Line are the Waterbury, West Katan, Orani, Eelback, Pomona, West Cayote, Dewey, Effingham, Bakersfield, Cockaponset and Fort Wayne. Many attempts have been made before to give Portland a regular and permanent line of Pacific and Atlantic freighters with more or less indifferent success until the Columbia Pacific Shipping Company was organized by far-sighted financial and business men of Portland, headed by Mr. Emery Olmstead, president of the Northwestern National Bank, who is also president of the Columbia Pacific Shipping Company. The personnel and financial backing of this company assured its success from the start and the confidence and foresight of the company's founders have been rewarded by a rapid and substantial business growth.

K. D. Dawson, general manager of the Columbia Shipping Company, gained his experience in the shipping business on both coasts. As head of the steamship department for Sudden & Christenson in that company's San Francisco office, Mr. Dawson has been in close contact with the possibilities and problems of west coast shipping. At the beginning of the war Mr. Dawson left this connection to take up his duties with the United States Shipping Board, following an appointment as operating manager in the division of operations, which position he filled under Assistant Directors C. W. Cook and J. R. Hanify, up to the signing of the armistice. Upon the conclusion of his Shipping Board work he re-entered the service of Sudden & Christenson Company, and was appointed manager of their New York office, where he remained until April of this year, leaving the New York post to accept the position of general manager for the Columbia Pacific Shipping Company.

At the outbreak of the great war, V. A. Cartwright chose the Royal engineers as the branch of service in the British army, for which he felt he was best fitted. After

K. D. DAWSON

General Manager Columbia Pacific Shipping Company, Portland passing the examination for this unit at the head of his class, he was awarded the commission of second lieutenant and immediately assigned to duty on the headquarters staff with work in connection with water transportation. Working in conjunction with Sir Francis Dent (head of the Southeastern Railway), who was in charge of a special transportation commission to Egypt and Salonika, Major Cartwright made an exhaustive survey of port facilities along the coast of Egypt, and as a result of subsequent recommendations laid before the war department in London, a number of radical changes were made. Recognizing his ability, the government later placed Cartwright on the staff of Lord Pirie, controller general of merchant shipbuilding, a commission organized and designed to meet the enormous ship losses arising from submarine depredations. Major Cartwright's service carried on to the termination of the war, and in recognition of this service he was decorated by the King. Cartwright joined the Columbia Pacific Shipping Company at its inception in April, 1919, and serves in the capacity of assistant general manager.

Considerable service with the great Panama project has given Mr. Sexton a very valuable training in general traffic work and freight handling. For eight years he was connected with the Panama Railway, at Cristobal, Canal Zone, five years of which time he was in charge of traffic at Atlantic and Pacific terminals of the Canal. During the last year of this time as general agent, 300,000 tons a month and over will give some idea of the volume of freight handled at this post. Upon leaving the canal zone, Sexton entered the service of the United Fruit Company as general freight agent, with headquarters in New York. In this capacity he handled the traffic for the New York division of this company for two years. Mr. Sexton was brought to the west coast through the offer of traffic manager for the Columbia Pacific Shipping Company, which place he is filling at the present time.

Mr. McMullen has been connected with transportation service since 1900. His start was made in the engineering department of the Pennsylvania Railroad, where he remained five years, leaving this post to enter the freight department of the Great Northern Railroad. In 1908 Mr. McMullen decided to come to the west coast and entered the service, in that year, of the American-Hawaiian Steamship Company. The experience gained on the coast has been extensive and very valuable to him, covering service with a number of shipping concerns, including Dodwell & Company, Ltd., and the Pacific Steamship Company, having been in charge of the latter's foreign department. After considerable pioneering on Oriental shipping work, Mr. McMullen entered the exporting and importing business for himself, remaining in this business until he joined the executive staff of the Columbia Pacific Shipping Company last June as general freight agent.

Major V. A. Cartwright, Assistant General Manager Columbia Pacific Shipping Company, Portland

Below is shown a Japanese-built steamer Eastern Ocean loading flour at a Portland municipal terminal. At the right of the steamer is shown the floating repair shop of the Pacific Marine Iron Works, an article on which will be found on page 108 of this issue of Pacific Marine Review.

W. T. Sexton, Traffic Manager Columbia Pacific Shipping Company, Portland

B. L. McMullen, General Freight Agent Columbia Pacific Shipping Company, Portland

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SALE OF SHIPPING BOARD SHIPS

THE United States Shipping Board has at last announced its fall sale prices for various classes of ships. The prices named are very conservative, ranging from $160 to $185 per deadweight ton for standard cargo ships. It is not to be anticipated that there will be any very rapid sale at these prices, as there is a considerable amount of private tonnage offering for a lower figure. We are reliably informed that tonnage now under construction in Great Britain is being offered for figures as low as $135 per deadweight ton, and it is of record that the United States Steel Corporation purchased two 10,400 deadweight ton cargo carriers very recently at $144.23 per deadweight ton on terms that were practically cash. The Shipping Board has, in round numbers, about 11,000 tons of steel ships to offer on this sale. Of this tonnage about two-thirds is of ships above 5000 tons of what might properly be considered ocean-going foreign trading vessels. If the Shipping Board had accepted the advice of shipping interests and offered their ships a year ago at about the same figure they are offering them now, undoubtedly there would have been a very much larger sale.

In view of the fact of this sale of ships and of the many other important propositions with which the Shipping Board is occupied, it is inexplicable that the board should remain without a quorum and that no appointments are made to fill up the vacancies. Here is a $4,000,000,000 corporation whose charter calls for a board of directors composed of seven men, and for over four months there have been only two members on that board. If the quality of the final selection is proportional to the lapsed time, all will be well and we can forgive the delay, but some immediate action is imperative in the matter of operating agreements and in the application of the Jones bill.

THE DISTRIBUTION OF SHIP SECURITIES

WHEN the final selection is made and we have our full Shipping Board, it is devoutly to be hoped that they will so manage the sale of Shipping Board vessels that investors in ship securities will have a full realization of the responsibilities and risks that are entailed in the operation of ships, and that with this realization the distribution of ship securities may be as wide as possible so that the small investor in our inland cities may be tied up financially witb the American merchant marine and realize fully the fact that his produce is being carried in his own ships to the ports of the seven seas. In other words, as we have so often pointed out in these columns, it is highly desirable that the American people should become "ship-minded," and this is one very potent means of bringing "ship-mindedness" about.

At the time of the Victory Loan much enthusiasm was raised by allowing those localities which were successful in raising their quota to name Shipping Board ships, and that suggests to us that possibly a great deal of enthusiasm might be engendered in the buying of ship securities by applying the same idea. For instance, if the people of Denver, Colorado, should buy enough ship securities to have a controlling ownership in several 10,000-ton ships, those 10,000-ton ships might be allotted by name to Denver in such a way that their fortunes could be followed by the Denver reading public, as they might be following the fortunes of their baseball team in its travels, and thereby an individual personal interest created in the minds of hundreds of thousands of individuals who perhaps might never see an ocean-going ship or come into any other sort of contact with marine affairs. The American people may have to stand some loss in the operation of ships in order to keep their merchant marine on the ocean, and the wider the distribution of ship securities among the American people, the more willing will they be to keep these ships running at small or even no profits.

SHIPPING SITUATION IN EUROPE

OUR British cousins on the other side of the water, to judge by the editorial matter in their marine magazines, are trying very hard to laugh at us in our shipping and shipbuilding efforts, but the laugh has a hysterical note as if they were laughing to hide their own fears, for that they fear the application of certain clauses of the Jones bill is very evident even to the most casual of readers. In this connection shipping men should read carefully the article in another part of this issue entitled "British Opinion on the Jones Bill." In this connection also it is well to note that Norwegian ship operators seem very anxious to curtail as much as possible their steam tonnage and are offering ships which they have under construction in British yards at figures per deadweight ton quite a little below the final cost of the ships to themselves.

In fact, all the ship owners of Europe are beginning to see that there are great freight rate wars ahead, and they are turning to the motorship in place of the steamship because they realize, as the Scandinavian motorship operators put it, "a motorship at present operation costs can cut present freight rates nearly 100 per cent and still make a profit, and she can cut freight rates 50 per cent below what any steamship can cut them and make profits."

MOTORSHIPS VERSUS STEAMSHIPS

AMERICA will do well to follow the lead of Europe in marine engineering and, if possible, improve upon it. We have been fed up in this country on a propaganda for oil-burning steamers in which it was shown that America would be the mistress of the seas in a merchandising sense because "when Coal Oil Johnny went to sea" no coal-burning Britisher would be able to compete with him, but when your coal-burning Tommy throws his boilers overboard and burns oil directly in his engines, no oil-burning boiler Johnny is going to be able to live on the same ocean in competition with the rates that Diesel Tommy can make.

The oil-burning engine has now reached a position of such reliability that one of the most conservative British ship and engine builders is taking orders for 10,400-ton deadweight carrying capacity single screw cargo motorships powered with one oil-burning engine of 3000 horsepower. This engine is capable of throttle control under load from 18 r. p. m. up to 135 r. p. m. Its normal speed is 77 revolutions. These figures show that for marine purposes the Diesel engine has achieved about the same reliability as the good old compound or triple expansion steam engine and can be depended upon for maneuvering or for extra power on sudden emergencies at sea. It goes without saying that in such a design we have all the elements of best propulsive efficiency, and we also are able to allot to cargo a very considerable portion of the space formerly given to machinery.

NEED OF MOTOR ENGINEERS

NOTWITHSTANDING the rapid development in the propulsion of ships by internal combustion engines during the last twelve years, America has made absolutely no provision for the training of engineers for motorships. In the general rules and regulations of the Board of Supervising Inspectors of the Steamship Inspection Service on page 161 there is a paragraph covering the licensing of engineers for motor vessels. This paragraph reads as follows:

> No person shall receive an original license as engineer of vessels of above 15 gross tons, propelled by gas, fluid, naphtha or electric motors, carrying freight or passengers for hire, who has not served at least one year on motor boats or in the engineers' department of steam vessels, or who has not had at least two years' experience in the construction of marine motor engines and their installation. All examinations for license as engineer of motor vessels shall be reduced to writing and filed with the application of the candidate.
>
> Any person holding a license as engineer of steam vessels desiring to act as engineer of motor vessels must appear before a board of local inspectors for examination as to his knowledge of the machinery of such motor vessels, and if found qualified shall be licensed as engineer of motor vessels. (Sec. 4426, R. S.)

We submit that this is rather careless treatment of a very important subject, and we have been told by numerous engineers that the obtaining of a license as a motor engineer by the holder of a steam engineer's license is considerable of a joke, the examination generally covering a very superficial knowledge of jump spark ignition, so that, for instance, any man holding a license as engineer of a steam vessel who had owned or driven a Ford car would very probably be able to satisfy his local inspector that he had a sufficient knowledge of internal combustion engines to get a license as an engineer of a first class motorship.

There can be no doubt in the mind of anyone who has seen the engine room practice on European, and particularly on Swedish and Danish, motorships, that the success of these vessels is very largely due to the fact that their engineer personnel has been trained in the shops of the manufacturer of the engines so that their engineers are able to make all necessary repairs and to keep the engines at all times in first-class running condition.

SHIP TURN-AROUND

NOTHING is more important in ship operation than quick dispatch, and there has been a very great deal of distress on that account among ship operators during the post-war period, both in the United States and abroad. Lack of proper handling facilities, labor troubles, lack of bunkering facilities, shortage of fuel, red tape, and many other causes have contributed to the delay in ports. Figures recently compiled by the division of operation of the Shipping Board show that the delay in American harbors is far more marked than that in harbors abroad. These figures cover the spring and summer of 1920. During the winter of 1919-1920 lack of bunkers and labor troubles were so marked in northern European ports that it seemed as if our ports were ahead of theirs with respect to turn-around.

The figures of the Shipping Board cover sixteen American ports and the clearances of eighty-six vessels, while those for the European ports covered six ports and sixty-six vessels; the average tonnage of the eighty-six vessels taken in the American ports was 6388 and that of the sixty-six vessels in the European ports 5491. The average time of turn-around in the American ports was thirty-five days. The average in the European ports was fourteen and one-half days. The details of the turn-arounds at the European ports are not available, but those for the American ports prove very interesting reading.

At Baltimore the average turn-around was forty-two days. At New York, where thirty-nine vessels were taken, the average turn-around was thirty-eight days. At Norfolk it was thirty-five days; at Philadelphia, twenty-one days; at Boston, only fifteen days; and at New Orleans, thirty days. The total number of days the eighty-six ships were in port totaled 3033. Of this time 1226 days were consumed in making repairs; 813 days in loading and discharging; 264 days awaiting fuel; 163 days awaiting berth; 101 days awaiting orders; 24 days were due to strikes; there were 166 Sundays, and 276 days of delays due to miscellaneous causes. Over one-third of the time, therefore, was spent in making repairs, which goes to show how important proper repair facilities are in the management of ships and of harbors. This is only one of the many angles of ship operation on which it will be necessary for America to concentrate all of that superior engineering skill for which she has always been noted.

COASTWISE LAWS TO PHILIPPINES

QUITE a protest has come from the Philippines, and from islanders resident in the United States, against the provisions of the Merchant Marine act that extend the coastwise laws to the Philippines. One ground of protest is that the people of the Philippines were not consulted prior to passage of the law; another, and probably the more potent, is that the islands will not enjoy such low ocean freight rates as they would if there were unrestricted foreign competition, and that consequently the hope of making Manila the distributing center for American goods in the Far East will not be realized.

Manila evidently has a short memory. During the war the transportation of Philippine products to the United States was handicapped grievously by the shortage of ocean tonnage, and after the withdrawal of the Pacific Mail the islands virtually were at the mercy of foreign lines, which for the most part profited hugely by war-time rates. But that condition has passed; the Philippines see ample tonnage on the Pacific; they hear rumors of rate-wars, in which foreign lines, led by the Blue Funnel, shall cut rates to unheard-of figures; and the islands desire that foreign lines shall be at liberty to cut rates as they will; they believe that their interests would be served best by open competition. Is that belief well founded? Do low rates of today necessarily forecast low rates tomorrow and next year? If the foreign lines were able, by rate wars, fighting ships and deferred rebates, to exclude American vessels from the Philippines-America trade, does it necessarily follow that rates always would remain at a low level? What would Manila say if American steel were worth $20 a ton today and $150 tomorrow; would such fluctuations conduce to making Manila a center of American trade? Will violent rate-cutting be of any permanent value?

And it is not true, as Manila assumes, that American monopoly of the island trade would advance only the private interests of American steamship companies; nor does it necessarily follow that American ships always will be more expensive to operate than foreign. But these considerations well may give way to a recital of facts, to an analogy that appears to be conclusive.

Hawaii's situation does not differ materially from that of the Philippines. Both are archipelagoes under the American flag; both are dependent upon overseas communication. When the Philippines were unable to get their products to market in the States, what of Hawaii? Through the protection of the coastwise laws two great steamship companies had been built up: the Matson Navigation Company and the American-Hawaiian Steamship Company, the latter of which possessed the largest fleet under the American flag; these companies served Hawaii well; Hawaiian sugar moved promptly to the States, and at rates that were amazingly low compared with the exorbitant charges ruling elsewhere; mainland merchandise was transported promptly to the islands; in fact, Hawaii, of all territories of the world dependent upon overseas communication, probably suffered least from the shortage of tonnage.

Let the Philippines take a leaf from Hawaii's book; let Manila organize, in conjunction with capitalists of American seaports, an American-Filipino steamship line; and the objectors shall find their interests, instead of being adversely affected by the Merchant Marine act, benefited enormously, in that merchandise will be moved regularly, at fair and stable rates—precisely the conditions under which Manila may be that to which it aspires.

Timeo Danaos et dona ferentes; which, translated, means: I fear that foreigner who offers me something for nothing.

SHIPPING BOARD RECRUITING SERVICE

What It Has Done, Is Doing and Proposes To Do

THE Recruiting Service as at present conducted consists of navigation and engineering schools for training officers, the sea training bureau for training men below the grade of officers, and the sea service bureau for placing on ships officers and men trained by the service, as well as those from other sources.

NAVIGATION AND ENGINEERING SCHOOLS

There are twelve navigation and six engineering schools for training officers, and only men with satisfactory sea experience on deck are accepted for the navigation schools, and those with satisfactory engineering experience for the engineering schools.

The average attendance in these schools at the present time (excluding turbine training) is about 400 men; 13,412 men have been graduated since the establishment of the first school in June, 1917, to June 30, 1920; 72 per cent of the graduates have already been licensed.

A course of instruction on the upkeep and operation of geared turbines is maintained by the Recruiting Service at the plants of the manufacturers, and 30 men are kept continuously in these classes. Up to June 30, 1920, 372 licensed experienced chief and first assistant engineers had been graduated from this course.

A course is also being given on electric drive.

SEA TRAINING BUREAU

This bureau has a training base at Camp Stuart, Va., with four wooden vessels operating on the Atlantic Coast as combination training ships and cargo carriers. These ships each have a capacity of 200 apprentices, but carry from 125 to 150 each because more efficient results can be obtained. They also have capacity for about 1200 tons of cargo each.

The bureau has stations at San Francisco and Seattle. There are two training ships on the West Coast, one a wooden ship carrying about 1800 tons of cargo and 115 apprentices, operating on the triangular run between Seattle, the Hawaiian Islands and San Francisco. A new 8800-ton steel ship, fitted to carry about 146 apprentices in the bridge deck space has recently been allocated to the recruiting service by the board, to be used as a combination training ship and cargo carrier on the Pacific. This vessel will also be put on the triangular run mentioned above.

Thirty-two thousand three hundred and thirty-five men of the various grades below licensed officers have been turned out by the service from its establishment, January 1, 1918, to June 30, 1920.

SEA SERVICE BUREAU

The Sea Service Bureau maintains agencies at twenty-one American ports. During the fiscal year July 1, 1919, to June 30, 1920, the bureau placed on American vessels 160,863 officers and men; 65.7 per cent of this number were Americans; about 15 per cent of the total were graduates from the Shipping Board Recruiting Service.

Proposed System of Training, Submitted for the Purpose of Stimulating Suggestions and Recommendations:

The primary object of any sound sea training policy should be to secure men with, or give them a fair general education concurrently with the technical training and instruction for marine service.

It is felt that any national training system to be successful must have the cooperation of the government, the ship owners, the officers and men. It would also be highly beneficial to have the cooperation of all educational associations and institutions.

It is suggested that shore stations be maintained where men from all sections of the country can be assembled and given instructions in seamanship, boat drill, compass and other preliminary work. They would then be sent to sea on one of a number of modern steel freight ships which would be utilized as combination cargo carriers and training vessels, carrying about 125 apprentices each; that the apprentices be housed under the bridge deck or in other space which will cause the least interference with the cargo carrying capacity of such vessels; that these ships be placed in a trade which will insure a voyage out and return of about sixty days; that about four of such vessels be used on the Atlantic and two on the Pacific, the number to be increased or reduced as the demands require.

It is further suggested that there be operated in conjunction with such vessels at least two sailing ships, one for the Atlantic and the other for the Pacific, such sailing ships to be fitted with Diesel engines, to be used only when necessary and to insure regularity of voyage; that there be selected each trip from the steam training vessels a limited number of the most promising and apt young men for training as deck officer material; that the men so selected be sent on one of the sailing ships for one or two voyages; that training on such vessels be confined to officer material; that when a man has completed one or two voyages on such ships, which would also be engaged in the cargo carrying trade, he would be placed as quartermaster or cadet on a regular cargo and passenger steamship.

Men selected for training as marine engineers should also be sent for a trip on one of the sailing ships, and, in addition to looking after the motive power equipments during the voyage be given intensive instruction on engineering. Upon completion of such voyage these men should be placed in marine machine shops where they could obtain instructions and experience on the construction and repair of marine engines for at least one year. Thereafter these men should be sent to sea either as cadet engineers or in the regular berths as oilers or water tenders.

Concurrently with such sea training, there should be established at some of the colleges and universities at or near the principal American ports, a maritime commerce course which should include accounting, business correspondence, business principles, economics, elements of statistics, markets, elementary transportation, principles of foreign trade, one or more foreign languages, exports and imports, railroad and marine rates, business administration, business law, admiralty law, advertising, ship operation, and other basic subjects.

The year should be divided into four three-month periods, the first one or two quarters to be spent in college work, and subsequent quarters to alternate between practice work under competent supervision in the offices of steamship companies, and on board ships. All this training, including college and practice work, should be done under the supervision of a joint committee, consisting of representatives of the colleges, vessel managers, and the government.

The course should be so graduated and arranged as to extend over a period of four years, with a degree given upon completion.

This would build up a competent operating personnel and leave many other well trained men in all branches of maritime commerce. Some would not complete the course, but would remain at sea as officers.

This co-operative maritime commerce course has been tried out for about a year at the University of Washington at Seattle, Washington, and is now showing satisfactory results. Between forty and fifty men are enrolled under this plan. A considerable number are now at sea; seven as third mates; others are in the offices of steamship companies, the port commission, and others at Seattle.

AMERICAN BOYS FOR AMERICAN SHIPS

By REAR-ADMIRAL W. S. BENSON

This article is made up of excerpts from speeches delivered by Rear-Admiral W. S. Benson since his appointment as Chairman of the United States Shipping Board. The Rear-Admiral has shown himself to be a very sturdy American and undoubtedly he will put the weight of his influence behind every effort to properly retain American boys for American ships.

THE United States Shipping Board is using every endeavor to build up its vast fleet into a profitable enterprise. It is succeeding with the aid of a growing body of splendid private ship operators who are acting as managing agents of the ships. It is no easy task which we have before us. The solution of many questions now before us require time, study, thought and considerable energy before our Merchant Marine shall be an accomplished fact and a permanent thing. We need the co-operation of every American. We need particularly the honest wholesome advice and helpful aid of every commercial American organization.

We have competition. Perhaps it is well to bear this in mind as you consider the task before us. Healthy competition in any effort only serves to stimulate and bring out the best. We welcome all such competition. But it should be borne in mind that so far as the race for commercial advancement would make it so **the war is over.** Big opportunities developing for commercial advancement and enterprise are bringing this fact before us from time to time. America must wake up to a realization of this. Old commercial relations broken off by the World War, which lasted more than four years, are being renewed. The commercial advantages enjoyed by the enemy are no longer theirs. It is the trade which they developed to a high degree that now offers itself as nations cry for goods, more goods and ships to carry them.

We have the goods to supply their needs. We have the ships. We are working with a single motive in mind to make those ships a permanent part of an all-American Merchant Marine. This brings me to the point which I wish to emphasize most fully.

A Merchant Marine to be successful must have the support of all Americans. The only way it will have the support is to make the opportunities for advancement in our Merchant Marine so great that American boys in large numbers will be attracted to again enter seafaring life as they did in the early history of our country. We must strive for the day when we can honestly say we have an all-American manned and owned Merchant Marine.

We know how long it takes to build the average freight ship. We know how much that ship should earn to be profitable. What we are facing is the need of more of the right kind of youths trained for the sea who enter our service on a merchant ship at the bottom rung with the hope, ambition and power to ultimately own the ship.

The records of our Sea Placement Bureau during the last six months show that an average of six are American citizens out of every ten men who enter the service of vessels in our control. It is encouraging to learn that this percentage is growing higher from week to week. The records of our New York office disclose that while in 1917 only 10 per cent of the men below the grade of officers placed on our ships were Americans during the last six months the average has been 55.7 per cent.

Every hamlet has been reached in an effort to get the boys from interior towns to see life from a shipping point of view. Boys of vision should see the life as it is on board ship to know what fine training for future material happiness lies in store for them in the service of our merchant ships. It is easy work to secure men to man the ships, but it is another matter to get men who are ship-minded and who enter the ranks with the hope and ambition to succeed as a ship operator. Many of those who are now serving are arousing our hope that they are in this class. The future will tell.

The American boy at sea is no new thing to me. When one has put in forty-seven years of the hardest kind of service he may be expected to speak with some authority about the men who sail our ships. They are a splendid class, big in heart, strong of body and keen witted at all times, especially in face of danger. No better type of American manhood can be shown than that developed in the right sea service.

It was in May, 1915, that I became chief of naval operations, after more than forty years of service in the navy. In those two score years I personally saw our navy develop thousands of American boys who came to us as raw recruits. As chief of naval operations during the war under my direction there were hundreds of merchant ships engaged in overseas' service, manned by American boys, many of them trained by the recruiting service of the Shipping Board. Thousands of men from the naval reserve also came under my direction and charge.

I recall an instance which well-illustrates the grit and pluck of these boys. It was in the early days of the war, when we had to send a dozen submarine chasers from New York to southern waters. We turned to our men of the naval reserve to man those ships. They made the trip through heavy seas, but not a moment was lost, and when the boys were needed most they were on hand with their ships.

Hundreds of our ships manned and sailed through the submarine zone with remarkably small loss of life and property. These were manned by Americans who, with few exceptions, had never before served at sea. If this performance of transporting American soldiers and their supplies and equipment could be accomplished in times of national stress, establishing a record never before equalled, there is no reason whatever why our merchant ships cannot be manned by Americans in peace times.

Since the signing of the armistice our experience with the merchant ships has shown that the American boy will go to sea and stick if he is given right treatment on shipboard.

Two Giants of the Sea. The Imperator and the Leviathan at a New York Dock

In closing let me present some vital matters which should have careful consideration.

It is believed that there is a general failure to appreciate the importance—if not absolute necessity—of manning our ships with American citizens. Steps should be taken at the earliest moment to insure that at least all the officers on our vessels should be loyal citizens of this country. The rapid expansion of our merchant marine during the war forced us to accept the services of citizens of our allies. As fast as possible all foreigners now serving as officers due to the shortage of officer personnel should be replaced by Americans.

Shore Station of the Seattle Branch of the United States Shipping Board Sea Training Bureau

TRAINING DECK OFFICERS AND OTHER EMPLOYES IN MARITIME COMMERCE

By PROF. J. E. GOULD
Instructor in Charge, U. S. Shipping Board Free Navigation School, Seattle, Washington

AMONG the great efforts of the United States in prosecuting the war, perhaps the one that will influence most profoundly the peaceful activities of this nation is the construction of the American merchant fleet. A completion of the building program will bring under our flag approximately 1800 ships, a fleet larger than that gathered under one ownership at any previous date. The successful operation of this fleet will vitally affect and enormously expand three branches of business: foreign trade, marine insurance and banking. No national effort of modern times has brought equal possibilities of development. Its size alone is proving the most serious obstacle to its transfer to private organization and seems to insure a protracted period of government control. As a means of promoting foreign trade as well as providing an auxiliary to the navy, there is convincing evidence that the fleet must be maintained.

MERCHANT MARINE BRINGS PROBLEMS

In view of the fact that this nation was steadily relinquishing its share of deep-sea transportation preceding the war, the sudden expansion of its maritime facilities has brought forward new problems of educational training, vocational interest and national support. Secretary Payne, formerly of the Shipping Board, has shown that the merchant marine must become a part of our national life.

Early in the development of the construction program, the United States Shipping Board Navigation School of Seattle perceived the educational problem involved, both in preparing officers for the fleet and employes needed in the inevitable expansion of our foreign trade. It was obvious that the work and responsibility connected with the operation of ships costing $500,000 or more each, and carrying a cargo of equal value, would require highly trained men of excellent ability and character. No less could be said for the men needed in the local and foreign agencies.

BUSINESS MEN FORM ADVISORY BOARD

Beginning in a sincerely co-operative spirit, the navigation school approached a group of business men interested in the merchant marine and work allied thereto and asked for the formation of an advisory board that would help in the drafting of a curriculum designed primarily to train men in maritime commerce and the operation of ships. This board, representing organizations of extended experience in these activities, has given enthusiastic support to a co-operative plan of training which is now being developed.

The chief intent of this plan is to coordinate three principal training agencies:

First, the United States Shipping Board, bringing the most extensive opportunities for acquiring first-hand knowledge of foreign resources, ports, trade routes and the operation of ships. This portion of the training is under the direction of Captain J. Howard Payne, head of the Sea Training Service for the Pacific Coast.

Second, the College of Business Administration, University of Washington, furnishing the academic courses and body of facts which could function in a fundamental way in later business experience.

Third, Northwestern business organizations in all branches of maritime commerce who alone are able to contribute a business atmosphere and the real problems of successful management.

QUARTER SYSTEM OF OPERATION

The quarter system of operation in force at the university accommodates itself readily to a plan by means of which training under these three agencies may be carried on during alternate quarters. It is desired that a student shall be given one college year of academic training, during

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which time he will enroll in those subjects that are fundamental and most ready to serve his purpose in meeting the demands of his immediate future experience. Such subjects would be elementary accounting, business correspondence, economic resources, language, elements of statistics, ship-operation, and electives chosen under advice.

ELIGIBLE FOR THIRD MATE

This year will be a testing period to indicate the student's general ability, character and fitness for this field of work. During the following summer quarter he may elect a practice cruise of two months on the combined cargo and training ship of the Shipping Board, followed by a similar period of service on vessels of the fleet, which give a choice of visiting several ports. Arrangements have been effected to make these trips yield the largest measure of experience and acquaintance with foreign ports and resources.

Trading Schooners Loading Copra at Tahiti

South Pacific Trading Schooners at a San Francisco Dock

TRADING SCHOONERS

The illustrations on this page show a very romantic and interesting phase of marine life on the Pacific. These trading schooners were built by W. F. Stone & Son for Burns Philp & Company of Sydney, and their regular job is trading for copra and other tropical products in the islands of the South Pacific. The cargoes which they pick up are ordinarily delivered at central points, there to be loaded on larger vessels. Once every three years the schooners themselves load a cargo of copra and run up to San Francisco for general overhauling. They are engined with 110 H. P. 3-cylinder open crosshead Union gas engines. Two of these vessels, the Matau and the Mauno, were recently in San Francisco harbor on their first overhauling when it was found that both engines and hulls were in excellent condition, the engines requiring minor adjustments only and the hulls recaulking and painting.

Alternating quarters of this sea service may be taken, a student serving for two months in the capacity of apprentice, for eleven months as a seaman, and for two months as a cadet officer, the compensation ranging from $30 to $90 a month in addition to board and quarters. At the end of this service he is eligible for third mate, the lowest position as an officer. The various ratings in officers' positions carry compensations ranging from $160 to $400 a month, with board and quarters. Incidentally, the compensation received during the quarters of sea service could be made to meet the expenses of the students' academic training. The sea training secured by this means is considered invaluable by the shipping organizations.

ELECTIVE SUBJECTS OFFERED

The quarters of academic work after the first year will include electives in mod-

View on San Francisco Dock Showing Bulk Copra Being Unloaded and Sacked

A Giant of the Air. Arrival of R-34 at Mineola Field

ern language, science, mathematics and engineering, and a considerable body of courses in the business college, covering transportation, ports and terminals, railway and marine rates, insurance, markets, cost accounting, advertising, money and banking, foreign exchange and corporation finance.

In lieu of a part of the sea service, or in addition thereto, the student may elect to devote alternate quarters to work with business firms in the Northwest, the third agency joining in the training. Provision is being made with the firms to fill the lowest office or dock position through the assignment of students for alternate quarter periods, the assignments being so arranged that these positions will be filled continuously, and thus will be eliminated the difficulties arising from irregular service with the firms.

FIRMS CO-OPERATING IN WORK

The alternation in the business positions will be effected in the same manner as has been provided in the sea service work. The compensation accompanying these positions will be determined by the business firms and will, of course, vary with the services rendered. It appears that nearly two years of service can come under the plan before positions too greatly complex will be reached.

The firms co-operating in the business practice work are: The Port of Seattle Commission, W. R. Grace & Company, Frank Waterhouse & Company, the Pacific Steamship Company, the Puget Sound Navigation Company, W. C. Dawson & Company, Struthers & Dixon, Alexander & Baldwin, Balfour, Guthrie & Company.

During the first year the navigation school has enrolled seventy-one students in the maritime commerce course. During the summer quarter, 1920, there will be twenty-six students serving as apprentices in business practice or at sea.

The reaction on each other of the work in these three agencies has proved to be very beneficial, and there is convincing evidence that the ultimate effect will be the furnishing of a high-grade employe to all those firms interested in maritime commerce, as well as contributing valuable support to the ultimate success of the merchant marine and foreign trade of this nation.

A PAIR OF INTERESTING WINDJAMMERS

WHEN the United States Shipping Board cancelled the contracts held by the Peninsula Shipbuilding Company of Portland for the wooden steamers of 4150 deadweight ton capacity, known as the Peninsula type, which that company was building for the government, there were left on the ways several of these hulls. Grant Smith of Portland and of the Grant Smith-Porter Corporation (who had built many wooden steamers and who recognized the possibilities in these large hulls), formed a company, known as Grant Smith & Company, to take over a number of wooden hulls from the division of supply and sales of the Emergency Fleet Corporation, with the idea of running these ships as sailing vessels. Mr. Smith very wisely arranged this company so that almost one-half of its shares were sold in small blocks to the people of Portland, thereby helping to make personal the common interest in the upbuilding of Columbia River commerce, which had grown to such proportions during the shipbuilding boom on that river.

Six-masted Schooner Oregon Pine at Sea on Her Trial Trip

The first two hulls to be taken over were rigged as six-masted schooners and named the Oregon Pine and the Oregon Fir. Before the [illegible] were completed on the first boat, both ships were chartered for lumber to Melbourne at $40 a thousand feet. Both vessels were completed and left the Columbia River during July, the Oregon Pine with 2,146,466 feet and the Oregon Fir with approximately 2,200,000 feet. About 600 tons of ballast was loaded in the lower hold of each ship to insure stability.

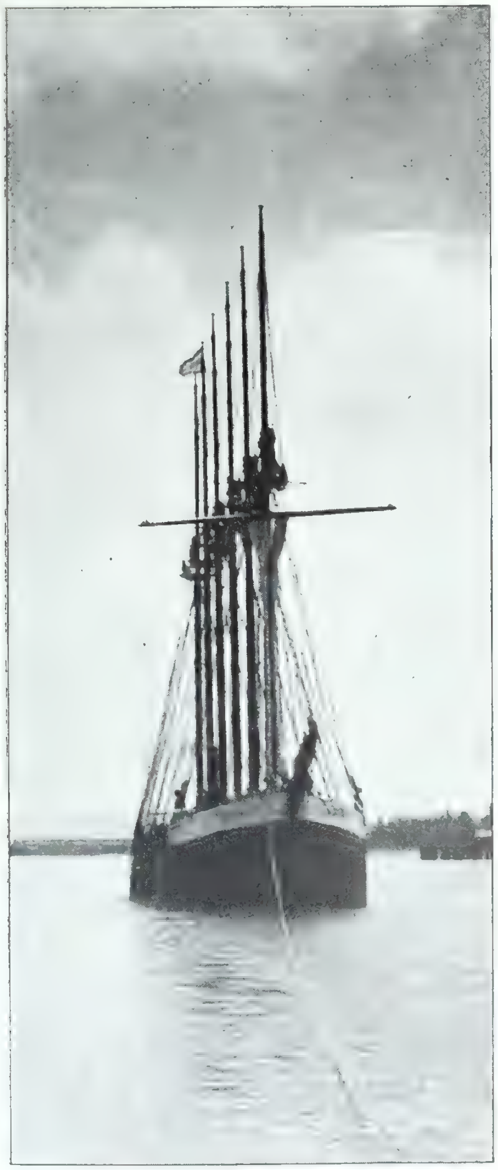
These vessels are 282 feet long over-all and 269 feet between perpendiculars, with a molded beam of 48.8 feet and 27.11 feet depth of hold. Their displacement light is 2171 tons, and fully loaded 6350 tons. The loaded draft is 25.8 feet. The six masts are 125 feet long, 28 inches in diameter at the butt and weigh nine tons each. There has been quite a difference of opinion among sailormen along the Columbia River as to the naming of these six sticks. Representatives of the owners give the names as foremast, mainmast, mizzenmast, spanker mast, jigger mast, and driver. The top masts are each 65 feet long, 14 inches in diameter, and weigh two tons. The six gaffs and six booms together weigh 7½ tons. The weight of the rigging and rope is 18 tons. There are 30,000 square feet of canvas in the sails of each ship, the cloth weighing 2½ tons.

The schooners have been classed by the American Bureau of Shipping and approved for carrying cargo of any character and given a fifteen-year rating.

The present shortage of fuel oil and the high and continually rising prices of fuel for power are giving considerable impetus to the return to sail power on the Pacific Coast, and shipping men are watching the experiments in that direction with great interest. These Peninsula type hulls are the largest wooden vessels built on the

Pacific Coast during the Emergency Fleet program, being considerably larger than either the Ferris or the Hough types, and at the present freight rates they should return their owners a good profit. Certainly there can be no more healthy condition for a shipping company than to be operating ships which are owned, built and manned by citizens of their home port and whose hulls are themselves the best standing advertisement of the durability and usefulness of the freight which they carry. Even the names of the two ships carry this message of the confidence of the citizens of Portland in the product which they are marketing.

Another interesting feature of the ships to the readers of Pacific Marine Review lies in the fact that the master of the Oregon Fir is no less than our old friend and correspondent, Captain W. I. Eyres, the author of the American shipmaster's letters defending wooden sailing ships, which appeared in the issue of January, 1919.



Six-masted Schooner Oregon Fir Being Towed Down the Columbia

Another View of the Oregon Pine

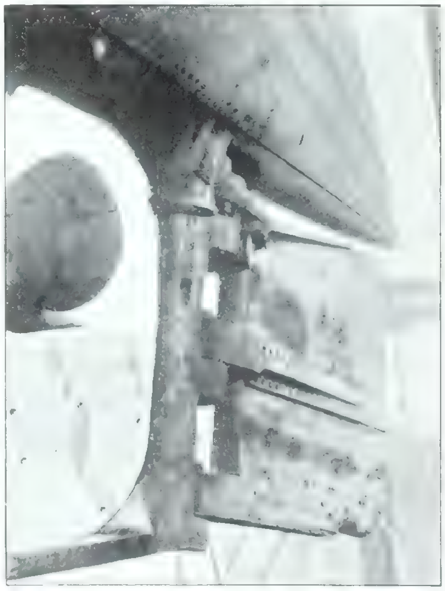
THE LARGEST MARINE WELD STILL STRONG AS EVER

THOSE who recall the published account in Pacific Marine Review of July, 1919, of the largest marine weld ever made—namely, the thermit weld on the stern post of the United States transport Northern Pacific, which had been broken as a result of the grounding of this ship off Long Island on January 2, 1919—will be interested in hearing of the service test extending so far over a year to which this weld has been subjected.

When the Northern Pacific was returned to service in May, 1919, for the first time after the grounding accident, the strength of the welded stern post was tested very thoroughly. The transport steamed out to sea a number of miles and, while under full speed, made a series of circles.

Since that time the Northern Pacific has rendered a highly valuable transportation service and has made several round trips at high speed across the Atlantic. In May, 1920, while transporting General Pershing to the Panama Canal, this vessel was unfortunate enough to get temporarily grounded a second time, off Porto Rico. The ship was soon refloated, however, and a short while afterwards steamed up the Atlantic Coast and was placed in drydock at the New York navy yard, Brooklyn, New York, for repairs.

An inspection of the ship at this time showed that, although the forward part of her keel required some repairs as a result of her second grounding, the thermit weld on her stern post, as shown in the accompanying photograph which was taken on this occasion, appeared in just as good condition as ever.



The Thermit-welded Stern Post of the Northern Pacific After One Year's Strenuous Service

ISLAND WRECKS V

By ANDREW FARRELL

ONCE upon a time the Pacific Mail Steamship Company, attracted by the proximity of Midway Island to the Honolulu-Yokohama great circle route and the fact that it was an American possession, believing that a good harbor and coaling station might be established in the lagoon, prevailed upon the United States government to appropriate $50,000 for blasting a channel through the reefs. With equipment for this work the U. S. S. Saginaw departed from San Francisco February 22, 1870. After six months a channel had been dug fifteen feet wide and 450 feet long. At this rate of progress, completion of the work would have cost $2,000,000, which goes to prove that, even in 1870, Congress was human and steamship operators likely to be over-optimistic.

In October, 1870, the Saginaw sailed from Midway for the States by way of Ocean Island, which lies fifty miles from Midway, at the extreme end of the leeward chain. Two duties, to search for castaways and to survey the imperfectly known island, impelled Captain Montgomery Sicard to visit the atoll; but within a day the fates from which he would have saved others had enveloped him: his men were huddled ashore, in a situation not of the best, and their ship was fast on a reef, a hopeless wreck. She struck at 3 o'clock in the morning of October 29. Within an hour the rock on which she was impaled, breaking through the hull into the engine and fire-rooms, drove the crew ashore, with scant provisions and a few turkeys, sheep and chickens; a meager fare on which, supplemented with the flesh of albatross, seals and turtles, the men lived for several months.

WRECKED ON OCEAN ISLAND

Soon after the Saginaw was wrecked Lieutenant John G. Talbot volunteered to command a vessel on a voyage to Honolulu in quest of relief. Each of his fellows did what he could; an officer prepared a duplicate chart; a second copied the necessary nautical almanac tables; others made a sextant of the face of a steam gauge, bits of a stateroom mirror and scraps of zinc, on which the scale was drawn with a cambric needle; all of these were of incalculable value. The gig was decked over and its sides raised a few inches; and in this vessel, with half-rations for thirty-five days, Lieutenant Talbot and a picked crew sailed for Honolulu November 15. So keen was the competition for seats in the boat that two men wrestled for the honor of going, the loser to withdraw all claim, so that the crew was the flower of the Saginaw: William Halford, coxwain; Peter Francis, quartermaster, and John Andrews and James Muir, seamen.

SKETCH OF
CHRISTMAS ISLAND
North end of Cook I. Lat.1 57 17 N. Long. 157 27 46 W
HWF & C. IVh. 23m. Springs rise 3½ feet
VARIATION 7°10 E (1915)
INC. 2½ ANNUALLY
strong westerly current
Northwest Pt
Cairn
See plan
Cook I.
Shallow Lagoon
Southwest Pt
Beacon
East Pt
(very low)
This light is very dangerous. A vessel getting on it at night will have a small chance of getting off after discovering the breakers
Sand hills
Beacon
Southeast Pt
Caution
Nautical Miles
0
5
10
15

FIVE MEN ASLEEP

Much of the food was spoiled by salt water, when gales nearly swamped the craft, the only provisions remaining at the end of the voyage being sixteen gallons of fresh water and a pulp made of potatoes. Thirty days out, on December 18, the island of Kauai was sighted; but landing was prevented by the wind shifting to the northwest and by heavy squalls that beat the boat out to sea. With great effort it crawled up again the night of December 19 ,too late for a landing; and while they lay outside the reef, awaiting the dawn, the five men fell asleep.

Drifting into the breakers, the boat overturned. Talbot, Andrews and Francis, sleeping soundly, at last, after their weary voyage, were cast from sleep into death. Of five men in the boat, only two escaped. Halford was swept overboard, but catlike he recovered himself; caught the gig; moved it into shallow water; lashed the unconscious Muir to the deck; and took ashore the tin boxes containing papers and dispatches. Then he carried Muir to land and made for him a bed on the beach; all in vain, for Muir died.

Halford walked to Hanalei to report the wreck of the Saginaw; and, his story reaching Honolulu, two vessels were sent to Ocean Island to take off the crew.

THE BRIG SHELEHOFF

Among island disasters that of the American brig Shelehoff is unique; not because of the number of men lost, because they were only eleven; but because of the peculiarly dreadful manner of their death and the endless drifting of the sole survivor. Each sunrise marked a new eternity in his unearthly wandering; with each sunset he died another death; the stars were cold to his agony; wind and sea mocked him; he sailed solitary but not solitary, because famine and despair and death clung with him in his precarious perch; the ghosts of his companions lay with him in the empty forecastle. This is a tale more dreadful than any fancy because the tale is true; that gaunt and ghastly thing was a living man; the brig, a real vessel and no nightmare; a wreck afloat long after her time, waterlogged, bulwarks gone, stern torn away, flying rags of sails.

H. M. Whitney, who was a passenger on the steamship Moses Taylor, told the story of the Shelehoff in the Pacific Commercial Advertiser, Honolulu, issue of October 28, 1871:

"On Thursday, October 19, at 8 a. m., a sail was discovered by the wheelman of the steamer Moses Taylor. The vessel lay directly in the steamer's track, and appeared to be disabled, having but one mast standing, and only her lower topsail set, running before a fresh southeast wind. On approaching her it proved to be a brig, water-logged, with her mainmast carried away, apparently deserted, no persons appearing in sight on board. A sail spread, over the forecastle, and a tent rigged in the foretop cross-trees, showed that the crew had occupied these places for some time. At every lurch, the sea made a clean breach over her from stem to stern. To all appearance it was a wreck that had long been water-logged, and her crew taken off by some passing vessel. Her stern was broken away, the bulwarks on both sides gone, and her sails flying from the foremast in rags.

ONE MAN IN FORECASTLE

"On reaching the wreck the steamer stopped, and Captain Bennett sent off a boat to ascertain whether any persons were on board, and if none, whether any record could be found respecting her. The sea being quite rough, the brig lurched heavily, and the boat approached her with some difficulty. She was boarded, however, by the third officer and one seaman, who immediately went aloft into the foretop, and finding no one, went into the forecastle, where they discovered a weak, emaciated man, who exclaimed as he saw them: 'Great God Almighty, am I saved?' He was lifted to the boat and taken to the steamer, the only articles brought with him being a small canvas bag containing a nautical almanac, and a vial inclosing a sheet of paper, with the date of the wreck and names of the crew and passengers.

"It proved to be the American brig Shelehoff, 213 tons register, of San Francisco, bound for Callao with a cargo of lumber. The survivor was Captain Luder Hopken, the last of twelve persons on board at the time of the disaster. The brig was caught in a cyclone the night of July 3, the same date as the solar eclipse. Soon after midnight, when the cyclone was at its height, she was thrown on her beam-ends, and found to be rapidly filling, and in order to prevent total loss of the vessel and her company, her mainmast was cut away, and she righted up. No time was allowed to save any provisions or clothing from the cabin, and and the crew were obliged to retreat to the foretop to prevent being washed overboard, as every wave made a clean breach over her. The mate, Mr. Johnson, died first, six days after the disaster. Two half-barrels of salmon, a half-barrel of tongues, and a box of China starch were fished up out of the hold, but the drinking water was all found to be brackish. The salmon, tongues, starch and a few fish caught with a hook from time to time, and occasionally a little rain-water caught in a sail, and always more or less brackish from the salt spray, were all that the ship's company had to subsist on.

"Captain Hopken's account of the sufferings of his men and passengers is a most heart-rending one. After the death of the mate, on the 9th of July, none occurred until September 6, when they began to become delirious and weak from hunger and thirst, and several died, or jumped overboard in their delirium.

A SAIL SIGHTED

"Nine or ten days before the steamer rescued him, Captain Hopken states that a bark ran down to the wreck, hove to for a few minutes, and then squared away without sending off a boat or making any effort to rescue the lives of those on board, of whom there were then eight living. The bark came so near that persons could be seen moving about on her deck. Those on the brig were so weak as to be unable to stand, but got on their knees and waved pieces of sailcloth, hoping to attract attention. Their feelings as they saw the bark square away, when so near them, may better be imagined than described. Their last hope gone, they lay down, and one after another died or leaped overboard. The bark displayed no flag, and all that Captain H. can recollect of her appearance was that she had a bright new spanker set.

2000 MILES IN 109 DAYS

"Soon after the disaster occurred, Captain H. set the foresail and jib (the only sails used), and rigged the rudder so as to steer the wreck from the foretop. This was accomplished by running the rudder-ropes through a block aft, and then carrying them forward to the foretop. In this way the brig's course was shaped towards these islands tolerably correct, without compass or chart. The accident occurred in north latitude 16 and west longitude 117, about 520 miles southwest of Cape St. Lucas. The wreck was fallen in with in north latitude 26:40, west longitude 148:52, about 400 miles northeast of Hawaii, showing that they had run nearly 2000 miles in 109 days.

"The brig sailed from San Francisco June 22, with 210,000 feet of lumber on board. The deck-load was swept off by a heavy sea soon after she became water-logged, and a portion of the lumber in the hold worked out the stern, which was carried away. What remains is probably rendered worthless by the worms. So that the vessel and cargo may be set down as a total loss."

AFLOAT UNTIL—

The following paper was prepared by Captain Hopken September 10, so that there would be a record in case no one survived:

"American brig Shelehoff, of San Francisco, was water-logged on the 3d of July, 1871, in a hurricane, latitude 16 north, longitude 117 west. Was affoat until September—. This was written on the 10th September, 1871, 70 days at sea.

"Captain, Luder Hopken, master, San Francisco; mate, T. Johnson of Schleswig Holstein; second mate, James MacCarley, Port Petrice, Migdonshire; steward, Philip Dunn, San Francisco. Seamen—Levedore Police, Rebosto Silicia, Mitchell Velago, Bajerro Calabria, Italy; Andrew Larssen, Sweden; Lona Lewis Nessen, Flensburg, Germany. Cabin passengers—Ashley Crane, Charles Davis, San Francisco; Charles Kurtz, Tubingen, Germany (New York papers copy); Bartholomew Clawell, native of Charleville, Department de Sardensu (France?).

"Written on board the brig Shelehoff, Monday, September 10, 1871. We have suffered hard from hunger and thirst.

ONE MAN LEFT ALIVE

"Crew, passengers and officers beg to send this to San Francisco, California, and publish in the papers."

In the nautical almanac were these entries:

"July 3, cyclone; vessel water-logged.

"September 21—On the wreck 80 days; 92 days from San Francisco; no rain. Nothing to eat.

"Saturday, September 30—We are on the wreck 89 days. Four dead. Please advertise this in papers.

"Monday, October 15—105 days on wreck. All hands dead, except the captain and one passenger—Crane."

And by October 19 Crane was dead.

(To Be Continued)

Seals and Turtles on Laysan Island

THE PHILIPPINES

By PAUL PAGE WHITHAM

Consulting Engineer, Trade Commissioner, Department of Commerce

IT is surprising to discover the limited conception the average American has of the Philippines—their resources, present and potential. Even yet some supposedly well-informed people do not know where the Philippine archipelago is located. Not long ago a commercial representative at Manila received a letter from his American house asking if he would run over to Porto Rico, it being nearby, and tend to a little business for the firm. Since returning to the United States, men have told me they thought the Philippines were a lemon from the commercial standpoint. As a matter of fact, the Philippine Islands are a part of the great Malay archipelago situated off the coast of tropcal Asia, in longitude nearly opposite New York. The island group is about six hundred miles in width and one thousand miles in length, extreme dimensions. The population is about ten million. The area is nearly that of the British Isles.

In regard to commercial value, the foreign trade is approxmately $235,000,000 per year, of which over 60 per cent is with the United States. Not so bad for the present. The potentialities have been little more than touched.

The chief commodities exported (1918) were:

	(Approximate Value)
Hemp (U. S.)	$58,000,000
Cocoanut oil	31,000,000
Copra	5,000,000
Sugar	16,000,000
Tobacco products	14,000,000

The total exports amounted to $135,000,000.

HEMP FOR THE WORLD

The world's supply of Abaca fiber, Manila hemp, is derived almost exclusively from the Philippines. The output may be enlarged as the demand increases. Tobacco production may be expanded to meet the growing market. Little attention was paid to the sugar possibilities until within the past few years when Hawaiian interests undertook the development of the business and several modern sugar centrals have been put into operation. A number of new ones are building or projected. The present annual sugar production is only about 300,000 tons per annum, but within the next few years it should jump to the neighborhood of 600,000, about the same as the Hawaiian output. If the labor supply can be made adequate, the ultimate production might be made to crowd Cuba, which has reached the 4,000,000 ton mark.

Cocoanuts thrive in the islands. Already the output of cocoanut oil and copra is an important factor. It would seem practical to so increase the production that the requirements of the United States might be met from the Philippines alone. The United States is particularly vulnerable in regard to its sources of rubber supply. The small plantations undertaken in the Philippines have demonstrated that Para rubber may be grown successfully. The best informed judgment is to the effect that rubber culture in the archipelago may be developed to an extent that would make the United States sufficiently independent of outside sources to materially strengthen its position in that respect. In addition to these major products, there is a long list, minor in quantity, but important commodities that may be secured or produced in the Philippines—among them being cinnamon, cacao (cocoa), tapioca, sago, gums, tannan barks, gutta percha, camphor and fruits. The timber resources, particularly in hardwoods, are large and of increasing importance.

Coffee thrives in the islands and at one time was of considerable commercial importance. If some way can be found to successfully combat the insect blight, a large production of the best Arabian coffee could be developed.

VITAL TROPICAL PRODUCTS

The three tropical products vital to the United States in times of peace, and particularly so in case of war, are hemp, cocoanut oil and rubber—consequently, it is of national import that the production of the last trio of commodities be developed to as near the country's demand as may be practicable. In 1918 the United States imported rubber to the value of $205,000,000, and copra and cocoanut oil to the value of $60,000,000. Coffee was imported to the value of $103,000,000. Cacao (cocoa) to the value of $41,000,000.

American capital has done little for the economic and resource development of the Philippines. The people naturally look to the mother country to back the school-house with opportunity developing investments. Besides, it is to our business advantage to do this. America requires the tropical products the Philippines produce, and they in turn need and will purchase American products and goods more or less directly in proportion to the extent of our assistance in resource development.

In the days when the American ships on the Pacific could be counted on the fingers of the two hands, little consideration was given the possibilities of Manila as an American shipping and distributing center for tropical Asia. But since the American flag has become a common sight in the principal ports of the Far East, and many of the ships carrying the flag turn around at Manila, the question has come to the fore. In fact, the shipping business at Manila has so expanded during the past two or three years that the capacity of the existing wharf and terminal facilities has proven entirely inadequate to meet the demands.

A COMMERCIAL AND SHIPPING BASE

The Philippine legislature recently authorized a bond issue of $6,000,000 for port improvement purposes. This sum, with funds already appropriated for the completion of a large new pier now under construction, together with additional current funds, which will no doubt be made available within the next two or three years, should make a total of about $10,000,000 devoted to enlarging the shipping accommodations at the Port of Manila. With this amount two or three huge piers, about 20 feet wide by 1300 feet in length, will be constructed, bulkhead sheds will be completed, storage warehouses erected and the harbor area behind the breakwater deepened to forty feet. The completion of this program should take care of the immediate needs. Some additional accommodations may be provided within the existing harbor inclosure, but if the development of the Philippine resources progresses rapidly and America becomes active in the development and trade of tropical Asia, a new and large port area must be created. It should be borne in mind that even in the present undeveloped state, the foreign trade of the islands and countries in tropical Asia within the trade sphere of Manila, in round numbers, is $2,000,000,000 per year. While in the Philippines, I made preliminary studies to this end, and suggested the development of the Tondo site on the north side of the Pasig river. There a splendid marine and industrial port-terminal, a sort of Bush terminal, may be developed to serve the shipping and commercial needs of the Philippines and the United States in tropical Asia.

FILIPINO CO-OPERATION

If I interpret the Filipinos rightly, they desire to carry on the development of the existing port area, but are inclined to put it up to the federal government and American shipping and commercial interests to improve their own base at the Tondo site. It seems fair enough, as such a large terminal would not be required for purely Philippine business. It would cost a good many million dollars to do this, but when completed America would possess an over-seas commercial base as good or better than that possessed by any of the European countries with large trade interests in the Far East. Furthermore, it would advance American prestige from Port Said to Vladivostok.

DEVELOP TROPICAL PRODUCTS

The people of the United States did not realize the extent to wihch they had become more or less dependent upon tropical products until the ship shortage during the war brought it home to them in part. Even now this is not fully realized by those who should know the extent to which tropical products, especially raw materials, are a factor in the industrial life of the nation. Our manufacturers to a large extent have been content to buy through third party nationals rather than go direct to the producers, or at least purchase through American importing concerns. As American industry comes into keener competition in the world markets, and this it will do soon, it will find itself handicapped because it pays more for raw materials and in some instances may be shut off in part, or altogether from sources of supply. It is, therefore, quite vital that American business organize so as to deal directly with the producers of raw products. If such materials may be secured or their production developed in the Philippines, politically associated with the United States, they should be obtained from that source. A good share of our tropical products needs may be supplied from Central and South American countries. Others can be secured to a better advantage in the Philippines and tropical Asia, and in some instances from there alone. The problem of vital tropical products is a big one, which American industrial business interests should take up and solve in a big way without further delay. We are weak in experts experienced in tropical production and the uses of the various materials and commodities. A tropical research and production expert bureau of some kind should be organized and maintained by a group of most interested parties, perhaps assisted in part by the government. This is presented in connection with the Philippines, because the archipelago affords a remarkably rich field for a wide range of tropical production.

While on the subject of raw materials, it should be emphasized that there is a most important market advantage that may be gained by purchasing direct from producers in foreign countries. This is particularly true in the Orient, where the native is inclined to spend his money with the people to whom he sells. If American purchases are made through a third national, he gets the benefit of the market created by our own money, the native producer not knowing the Americans to be a party to the transaction. Thus American money spent in purchasing foreign products and goods, frequently is used effectively against us on the export side. It seems foolish on our part, but that is just what we are doing today on a large scale. In addition, if Americans buy from third nationals, they generally manage to fill their ships, instead of ours, and to take the miscellaneous profits all along the line. Americans must play the game all the way through, if they are to win in the long run. All this is applicable to the development of the Philippines and the creation at Manila of a large shipping and commercial base. If American financial, industrial, commercial and shipping interests pull together and play an all-around game from source of production to the home industry and from manufacturer back to final consumption, then there will be ample justification for undertaking large developments at Manila—otherwise, no. The foreign shipping and commercial game is like fighting on a circular front, the success of the entire operation being dependent upon holding and developing each and all of the numerous and complicated sectors. The Philippines, Manila and tropical products development are three particularly vital sectors that should be given important place in the forward-looking plans of the American general staff of foreign investment and trade.

Two Interesting Views of Manila Harbor

EUROPEAN MARINE NOTES

Exclusive Correspondence of Pacific Marine Review

THE British shipping controller is making further announcements with regard to the withdrawal of control. Relaxation has been going on for time time quietly, so that while each movement is not extensive the total amount now is considerable. Furthermore, the relief does not come a minute before it is jolly well wanted, as a "chappie" would say. At the same time it must be borne in mind that the Ministry of Shipping still persists and it is a body that can put into operation at any moment active measures of control or re-control. The official view is that so long as the world is not at peace, and the need may arise for suddenly directing shipping into certain specific channels, the Ministry and its powers must persist. Owners have been informed that while it will still be necessary, under the defense of the realm acts, to apply for licenses for voyages, all applications now made to proceed on any voyage whatsoever will be granted unless unforeseen circumstances arise, in which event due notice will be given. A further announcement that, as from July 15, the shipping controller intends to withdraw all limitation rates of freight, is taken as affecting the terms on which vessels may be directed by the Ministry of Shipping to particular voyages. The present directed rates are, as a rule, now well above the ordinary market rates. Thus, in January, the directed rate for wheat from the lower ports of the River Plate to the United Kingdom was increased from $12.50 a ton to $21.50 a ton (these rates are worked out on the basis of four dollars to the pound sterling), with an additional $1 for up-river loading, the increases being made in view of the great rise in the cost of bunker coal, the delays to which vessels were subject in port, and the higher cost of loading and discharging. Such has been the recent heavy drop in the market freights that a rate of about $14.10 a ton is now quoted for grain from the lower ports of the Plate to Europe and $15.50 a ton from the up-river ports. This particular fall has been hastened by circumstances which may not continue, and it is possible that even a small increase in the demand for tonnage immediately available in the Plate would bring about a sharp recovery. But, especially while so much tonnage remains unemployed in the United States ports awaiting coal, the outlook for freights in the early future cannot be regarded as brilliant. The inquiry for tonnage on time charter is still extremely quiet, although business for the liner companies could probably now be done at about $3 a ton deadweight per month, as compared with the rate of $3.50 a ton recently ruling.

THE POSITION OF SHIPBUILDING

In view of the fact that a ruling of the Industrial Court is to the effect that the value of the product must not be ignored as a factor in the consideration of wages questions, some figures which have been given to me are interesting. A year ago the value of a cargo steamer of about 7500 tons deadweight was $104 per ton deadweight. Six months ago it was $124 per ton. Now it is less than $104 per ton deadweight, and is still falling. These figures relate to comparatively new vessels. For older vessels—vessels built, say, ten or twelve years ago—the best offers made are, in fact, in the region of $72 or $76 per ton deadweight.

IS A CRISIS APPROACHING?

Generally speaking, a pretty gloomy view is being taken of the shipbuilding position in the country in many quarters. It is declared that unless there can be brought about some change for the better in the relation of producing costs to the earning capacity of tonnage, drastic steps must be taken by shipowners to obtain release from a situation which is rapidly becoming economically impossible. An engineering writer in the Times points out that the situation is ruled by two wholly irreconcilable conditions. There is, in the first place, the falling off in the freight market. This has become still more pronounced within the past month, and is now such that there is no immediate prospect of profitable employment for ordinary cargo steamers built at the high costs now prevailing. The freight market calls emphatically for cheaper and more economically operated vessels. In normal, pre-war times this call would have been responded to automatically by a reduction in costs, or at the very least by a cessation of all demands for changes which would involve advances in costs, and thus the situation would have been in due time corrected. But at the present, so far from there being any indication of a movement towards decreased costs in sympathy with the decreased earning capacity of ships, the tendency is all the other way.

Labor is determined at the moment to obtain the highest possible rates, and to consolidate these as permanent, post-war wages. It is also significant that while advances on the rates paid for a forty-seven hours' week have been demanded, there is also a demand for a forty-four hours' week — without reduction of the weekly wage. When the working week was reduced from fifty-four hours to forty-seven, the fifty-four hours' wage was continued, so that employers see in the near distance the prospect of a forty-four hours' week for the money which they paid not long ago for one of fifty-four hours, with all that the shorter week means in overtime and other increased expenditure. Prices of materials of all kinds—including shipbuilding steel and coal for industrial purposes—also continue to soar, so that the shipbuilder is in the very awkward position of having to increase the price of the article which he produces, while at the same time he is called upon by the shipowner to reduce his prices if he wishes to obtain any new contracts.

AN IMPOSSIBLE POSITION

This is the impossible position in which the industry is placed, and out of which there seems to be no way except that of cutting down the ordering of new vessels to the minimum, and cancelling as many as possible of the orders already placed. The former policy is now being acted upon by practically all cargo-ship owners, and, apart from passenger vessels and oil tankers, hardly any new contracts are being placed. The bulk of the work on hand in some of the shipbuilding districts—on the Clyde especially—consists of passenger vessels, most of which were ordered before, or very soon after, the close of hostilities, and the ships are nearly all being built on the time and lime system, which brings all the increased costs home to the owners. During the past few weeks there has been, on the part of owners, a very decided revolt against the system, and a demand for a return to the system of contracting for a lump sum, so that the shipbuilder, and not the shipowner, may take the risk of the rising cost of materials and labor. As things are at present, shipbuilders cannot take this risk, because they have no means of estimating what their liabilities might be.

BRITISH SHIPBUILDER ON CANADA'S FUTURE

Sir James McKechnie, of Barrow-in-Furness, who has just returned to London by way of Southampton after a business tour in Canada and the United States, has been much impressed by the industrial possibilities of the Dominion. The purpose of his visit to the other side of the Atlantic was to investigate industrial conditions in the interest of his firm, Vickers, Ltd., but he also, I understand, went through some of the plants associated with the British Empire Steel Corporation. He regards the merger as a good thing, not merely for Canada, but for the Empire as a whole. It was, however, of the Dominion's general industrial possibilities that he spoke most enthusiastically on his arrival here. The natural advantages of the average industrial site were much greater, he said, than was the case here, especially in respect of electric power. Completely to offset them was, perhaps, impossible. There was, however, no reason why the employers and workers of the old country should not by co-operating with other equal, if not actually excel, the efficiency of Canadian and American organizations. Wages were high on both sides of the Atlantic, but while trans-Atlantic workers strove to maintain output at the highest possible volume, there was a strong all-round tendency here to restrict output. If output were unrestricted here he had not the least doubt that the United Kingdom would be able to hold ts own against all comers.

LORD INCHCAPE'S SHIPPING DEAL

Lord Inchcape has finished the sale of the great mercantile fleet he bought from the government soon after the war ended. The 198 steamers of which he has disposed were the vessels built on account of the government to repair the ravages of the German submarine campaign. When hostilities ceased the government found themselves in possession of a great number of ships which they were hardly prepared to work as state-owned vessels. Their problem was solved for them by Lord Inchcape, who undertook to dispose of the vessels and to accept any financial risk there might be in the transaction. The sales have been going on for about eighteen months, but at last all the vessels have been absorbed into the fleets of the different shipping firms in the country. In a letter addressed to the various buyers of the ships, Lord Inchcape made the following simplet yet splendid statement:

The charges incurred for clerical help, printing, postage, telegrams, etc., in connection with the purchase and sale of 198 steamers, involving $175,000,000, have amounted to $4250, equivalent to a 412th part of one per cent. No gain has been made by my firm, my companies or myself through any of the transactions, no commission of any description has been taken or paid, and the sales have, in every instance, been made to the highest bidder. Where more offers than one at the same price were received, the offer of the would-be purchaser who had the better claim to replenish his fleet, owing to war casualty, was accepted.

The Good Ship Seaforth, a Fine British East India Clipper

GARDENS FOR LINERS

I see that something of a song is being made about the Imperator's gardener, whose principal duty during the round voyage completed on June 26 was to attend to the palms and other decorative plants which are a feature of the modern liner's gilded halls. Next voyage he is, it seems, to grow flowers and sell the blossoms. The idea is not, if my memory serves, absolutely new. In both the Cap Finisterre and the Cap Trafalgar there were not only conservatories but also market gardens—from which part of the vessels' vegetable supplies was drawn. I have, in fact, been in the market garden of the Cap Finisterre, but, not being a gardener, took away only a poor impression of its lay-out. Still the Teuton who was in charge was very proud of it, and prophesied quite in the German way all sorts of developments of it. The Cap Trafalgar we shall, of course, never see again, for the Carmania put paid to her account. But the Cap Finisterre has been reconditioned at Birkenhead, and it will be interesting to see how her gardens and other Teuton features have fared at the hands of our experts.

BRITISH OPINION OF THE JONES BILL

THERE have been many protests from individual British and Japanese steamship operators on the Pacific Coast against some of the clauses of the Merchant Marine Act, and there has been considerable comment by the British press concerning the effect which this act is liable to have on British shipping. In the issue of Fairplay, July 8, appears a ringing call to the Imperial government insisting that it take action to provide itself with a "similar weapon" which, if necessary, could be used "as a club" to prevent unfair competition against the British merchant marine. It is highly important that American shipping men should know exactly how their cousins on the other side of the water feel, and we quote from Fairplay in full on the subject.

In a sense, of course, the bill is a direct challenge to the supremacy of our mercantile marine. The fact that it was provided that certain taxation exemptions should be granted for ten years to American owners operating in foreign trade, conditionally upon their agreeing to construct new ships in the United States; the limitation placed on sales to foreigners; the clauses creating still further monopolistic rights in respect of the coastwise trade and extending those rights to America's insular dependencies; the reservation to American ships of the carrying of export and import merchandise on which preferential railroad rates are granted—all this points to a determination on the part of the United States to make her latest commercial weapon as effective as possible. But to argue from that, as the Republican party men are doing, that the British government is opposing the bill in any way, or the last-named provision in particular, indicates a spirit singularly at variance with our own or with that which actuated the American public in insisting on the passing of some such a measure into law.

The Jones bill, so I gather from the best-informed sources, far from being intended to mark any jealousy or ill-feeling towards this country, is an attempt on the part of the general public in America to re-establish private enterprise, ownership and initiative as quickly as the special circumstances of the case will permit. The main object of the bill is to enable American citizens to relieve themselves of the incubus of state management and control. They recognize that it was entirely due to the war that the American government was compelled to intervene in shipping matters; that at that time it was essential that the private owners should be supplanted by the state. But, the crisis having passed, the American belief in individualism as opposed to state interference is reasserting itself. State ownership and mismanagement have been found not only to be costly, but, on the whole, unsatisfactory; and the Jones bill is the outcome of the intention to get away from them as speedily as possible. And in that respect, anyhow, shipowners in this country may rightly claim to be envious, having regard to the rate at which we are marching in the opposite direction.

If, however, in order to rouse partisan passions the political leaders in the States are saying some rather foolish things, and if Admiral Benson, the chairman of the Shipping Board, is taking advantage of the occasion to give some further examples of his lack of statesmanlike reticence, it is by no means necessary for us to minimize the possible effects of the Jones bill on our shipping future, or to take no steps to be ready to counter what may be its ill effects. And, in particular, it is well to note that, in the opinion of Mr. Winthrop L. Marvin, the vice-president of the American Steamship Owners' Association, as given in last week's American Number of the Times, what America is doing today should be regarded only as a beginning. He writes:

It is not to be anticipated that a complete national merchant marine policy for the the United States is contained within the limits of the pending shipping bill. Rather is this regarded in the maritime circles of this country as only a beginning. The navigation laws and rules of the Federal government, long neglected because of the long-continued depression in the maritime industry, are now in a fair way to be revised and modernized on the basis of the recommendations of an expert commission of representatives of the people most vitally concerned. A commission of bankers is studying the question of how best to interest the American investing public in maritime securities. Private-owned American shipping, measurably free from government regulation and control, returns a handsome income at the present time, though the usual gains of government owned and controlled ships are disappointing. The hope of a permanently prosperous American merchant marine in the best judgment of the country rests, first, on the prompt enactment of forward-looking maritime laws, and, second, on the complete transfer of the government-owned fleets to private capital and enterprise.

Mr. Hoover, in an interview to which I referred last week, has already indicated some of the lines along which state aid might have to be afforded, particularly in regard to the new trade routes which the American fleet intends to endeavor to exploit, but the capture of which might at the outset be too heavy a task for private enterprise. But, even though the Jones bill may not be a preliminary to still more far-reaching measures, and though it is by no means unsatisfactory, **pace** the Republican leaders, to British shipowners to feel that American sentiment seems to have set so strongly against any state control, that we may expect to have a fair field and fight ahead of us, it would be suicidal to suppose that it would be safe for us to run the risk of facing an American competition, backed by such a club as the Jones bill, without putting ourselves into the position of being able to wield as hefty a weapon should occasion arise. Prior to the war Great Britain's mercantile fleet was paramount, but the Germans were steadily forging ahead, their government **mutandis,** had much in common with the Jones bill, and by 1914 we were becoming vividly alive to the fact that, thanks to our complacency, the policy of our chief mercantile rivals was bearing bitter fruit for us—indeed, if the war had not supervened our position would probably have been critical in the extreme. And, with that history lesson before us, we should be fools to ignore its teaching and to refuse to take obvious measures to meet honest American aggressiveness.

America has brought in, almost by acclamation, a bill which, without any further auxiliaries, if insisted upon to the letter, would have a very serious effect upon certain sections of our shipping and trade. We are told on the one hand that it is merely a precautionary measure and will remain in the cane-cupboard just as long as it is not wanted; but, on the other hand, Mr. Marvin opines that it is only a beginning, and he outlines a policy which, with public sentiment properly aroused, might compel the government of the United States to wage as bitter a **tacens bellum** against us as ever Germany did in the past. And, if that occurred, they would necessarily use every weapon in their armory. And where should we be then? Clubless; and, indeed, worse, for popular clamor might induce panic legislation at America's expense, and no one here can say where that would end or what international passions might be engendered. In the face of the Jones bill our obvious duty is likewise to put ourselves into the position of the strong man armed. America may never need to use her weapon in such a way as to injure us; it is a certainty that there would be still less chance of her doing so if we were able to retaliate in kind. Today she proposes to extend her coastwise trading restrictions to her insular dominions, and, in effect, to subsidize her railways for the benefit of her mercantile marine. Whether Sir Eric Geddes has any similar plan in his head regarding our overseas and coasting trades, I do not know; but, so far as our coastwise traffic is concerned—I use coastwise in the fullest Imperial sense, and as embracing all the British dominions—it is essential that we should take such steps that, should the operation of the Jones bill be such as to cause unfair injury to our shipowners and merchants, we should be in a position immediately to put up a polite but effective counter-offensive.

We possess all the materials for the manufacture of a big club, for not only could we make ourselves self-supporting within the Empire, but many of our old-time customers could not do without us, and, in addition, our Dominions have mercantile marines of their own capable of carrying the fight into those markets which might be lost to us were distance a factor in the situation. The question is: What steps do our government propose to take in the way of anticipating, let us say, the remote possibility of the Jones bill being strictly interpreted and enforced? If our traders find themselves met by notices warning them to beware of spring guns and man traps in districts where hitherto they have been free to carry on business, they will naturally expect that, for their protection and for that of the nation generally, similar action will be taken along our own coastlines. But, if that ever has to be done, we must have the means of doing it, and the United Kingdom must not do it off her own bat. An Imperial conference should be called, the Dominions' views should be taken, and a joint policy should be drawn up and published, so that no competitor would have any cause to feel aggrieved if it were suddenly found that Great Britain, for once, was prepared to do unto others as they sometimes have been a little over-ready to do unto her. But it is not talk or diplimatic representations, or royal commissions, or committees of inquiry that are wanted, but action by those men whom we put into power for the express purpose of doing this sort of thing for us.

U. S. Shipping Board Steamer Eastern Light, 10,705 Tons Deadweight, Built and Engined by the Osaka Iron Works

THE OSAKA IRON WORKS

IN 1881, an Englishman, E. H. Hunter, founded the Osaka Iron Works, eleven years after another Englishman had established the Yokohama Engine and Iron Works. Neither of these was the pioneer yard of modern Japan, because the Japanese themselves, in the '50's, soon after their country had been opened to the world by Commodore Perry, had established plants at Nagasaki, Yokosuka and Ishikawajima. In spite of this relatively late start, the Osaka Iron Works grew steadily until it has become one of the most important shipbuilding plants of the Far East.

YEN 12,000,000 CAPITAL

The shipbuilding yard was continued as a private, unincorporated business by Mr. Hunter and his successors until March 18, 1914, when a limited company was organized with a capital of yen 12,000,000. Three years prior to the incorporation, the Innoshima yard near Onomichi was purchased, and its capacity, added to that of the original Sakurajima yard. Osaka now is sufficient for about 200,000 deadweight tons, of which Sakurajima can contribute 120,000. Up to and including 1918, the company had built, since 1881, 295 steel steamers; 136 wood steamers, construction of which was abandoned six or seven years ago; sixty trawlers; five torpedo craft for the Japanese navy; sixty-three dredges; twenty-five shallow-draft steamers, besides engines, locomotives, boilers and other miscellaneous machinery.

Office of the Osaka Iron Works, Dojima, Osaka, Japan

FOUR FOR U. S. S. B.

The Osaka Iron Works built four vessels for the United States Shipping Board's second series, which is near its end now. These vessels were the Eastern Knight, Eastern Mariner, Eastern Admiral and Eastern Sailor, all of 10,500 tons deadweight, the aggregate of Osaka being only a few hundred tons less than that of Kawasaki of Kobe, which built five 9100-tonners, and approximately the same as the Kiangnan yard, Shanghai, which had a contract for four 10,000-ton vessels. Only one yard, Asano, built larger vessels than did Osaka, and the single other plant that built steamers as large was Harima, owned by the Suzuki interests, which built one 10,500-tonner. Osaka thus was one of the leading yards in constructing the large American fleet, and its position was enhanced by the fact that the four vessels were of the Isherwood type, the Japanese and Korean license of which is held by the Osaka Iron Works.

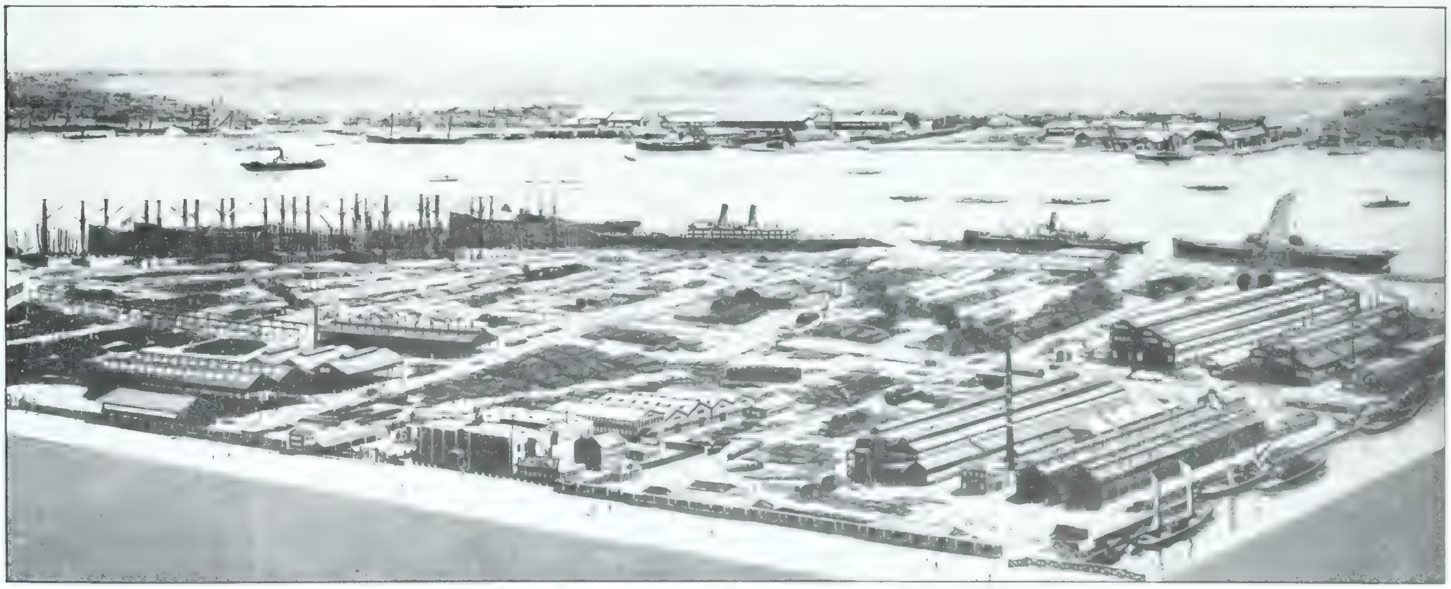
These four vessels are 415 feet long between perpendiculars; 55 feet 6 inches molded beam; 34 feet 8 inches, molded depth to the shelter deck; about 7200 tons gross; single-screw, with triple-expansion reciprocating engines and three Scotch boilers. The speed attained is about 10½ knots an hour when the vessels are loaded to Lloyds' summer draft. In addition to these vessels of the second series, the Osaka Iron Works, through the Nippon Kisen Kaisha, delivered two 10,500-tonners and one 7000-tonner to the Shipping Board in 1918.

RECENT CONSTRUCTION

In 1916, the Sakurajima and Innoshima yards built twenty vessels of an aggregate of 50,000 tons gross. The output in 1917 was of an aggregate of 60,000 tons gross; and in 1918, twenty-two of 103,471 tons gross. The first Isherwood-type vessels were built in 1916 and most of these that followed have been of the same design, although there were some transverse-construction ships. For 1919 the program was for sixteen major vessels, besides ten trawlers. Of the sixteen, nine were built at Sakurajima and seven at Innoshima. Heading the list were two 12,000 deadweight ton ships for the Osaka Shosen Kaisha, both Sakurajima yard vessels; six 10,500-tonners, two for the United States and four for the Nippon Kisen Kaisha, four of the six being built at Sakurajima and two at Innoshima; five 7000-tonners for the Nippon Kisen Kaisha, three built at Sakurajima and two at Innoshima; and (all built at Innoshima) one 9000-tonner for the N. K. K.; one 6000-tonner for the N. K. K., and one 2000-ton stock vessel.

WITH KUHARA INTERESTS

This frequent recurrence of the name of the Nippon Kisen Kaisha (not the Nippon Yusen Kaisha) points to another



Birdseye View of the Sakurajima Yard of the Osaka Iron Works

Birdseye View of the Innoshima Yard of the Osaka Iron Works

of the seemingly inevitable alliances between Japanese yards and shipping companies. The N. K. K., a company controlled by the powerful Kuhara interests, owns a large majority of the Osaka Iron Works stock, and the Osaka Shosen Kaisha, one of the dominating corporations of Japan, also has holdings. Such alliances generally are highly advantageous to both sides.

CHINESE RIVER STEAMERS

Locomotives, usually for prefectural railroads, range up to about fifteen tons. The O. I. W. makes stationary engines, bridges, cast-iron pipe and all sorts of forgings. Some floating dredges have been built for China, which has taken many shallow-draft steamships, principally for the Yangtse River, the largest being of 4500 tons deadweight. Two 2000-tonners also have been built. Although the rivers of Japan cannot compare with the Yangtse and other great streams of Continental Asia, many smaller shallow-draft steamers have been built for home use. The number of trawlers has been large.

Sakurajima has seven building ways, all of concrete on concrete piling,, as follows: No. 1—425 feet by 60 feet; capacity, 6000 tons deadweight. No. 2—560 feet by 75 feet; capacity, 15,000 tons deadweight. No. 3—560 feet by 75 feet; capacity, 15,000 tons deadweight. No. 4—525 feet by 70 feet; capacity, 15,000 tons deadweight. No. 5—425 feet by 60 feet; capacity, 6000 tons deadweight. No. 6—440 feet by 60 feet; capacity, 8000 tons deadweight. No. 7—373 feet by 50 feet; capacity, 4000 tons deadweight. The last way was finished in 1916.

INNOSHIMA EQUIPMENT

The Innoshima ways are: No. 1—560 feet by 75 feet; capacity, 15,000 tons deadweight. No. 2—560 feet by 70 feet; capacity, 15,000 tons deadweight. No. 3—560 feet by 70 feet; capacity, 15,000 tons deadweight. No. 4—425 feet by 60 feet; capacity, 8000 tons deadweight. No. 5—425 feet by 60 feet; capacity, 8000 tons deadweight. No. 6—425 feet by 60 feet; capacity, 8000 tons deadweight.

There are six docks, all graving, three of which are at Sakurajima and three at Innoshima. No. 1 dock at Sakurajima, the largest, can take a steamship up to 10,000 tons. The dimensions of the Sakurajima docks are: No. 1—Length on bottom, 453 feet; width, entrance, 65 feet; depth on blocks, 21 feet. No. 2—Length on bottom, 190 feet; width, entrance, 27 feet; depth on blocks, 11 feet. No. 3—Length on bottom, 281 feet; width, entrance, 40 feet; depth on blocks, 13 feet.

The three Innoshima docks are: No. 4—Length on bottom, 347 feet; width, entrance, 42 feet; depth on blocks, 24 feet. No. 5—Length on bottom, 460 feet; width, entrance, 42 feet; depth on blocks, 24 feet. No. 6—Length on bottom, 145 feet; width, entrance, 29 feet; depth on blocks, 19 feet.

WATERTUBE BOILERS BUILT

Sakurajima has both the boiler and engine shops, being large enough for both building yards, so that it has not been necessary for the Osaka Iron Works to buy outside. Watertube boilers of the Yarrow type are built for Japanese destroyers, but most of the output is Scotch, no watertube having been built for merchant vessels. The monthly maximum capacity is about fifteen boilers fifteen feet in diameter. The engine shop began in 1919 to build a merchant turbine of the Stal design, but most of the parts came from Sweden.

In the Sakurajima forge shop there are thirty hammers, the largest of which is a ten-ton steam, the others being five-, three- and two-ton. At the ways there are thirteen derrick posts, served by five- and six-ton electric winches, and four twenty-ton stationary hammerhead cranes. The wharf crane is an eighty-ton hammerhead. Innoshima has three twenty-ton hammerheads, six locomotive cranes and five derrick posts, the electric winches of the latter being of five- and six-ton capacity. The wharf crane is a fifty-ton hammerhead. Sakurajima has twelve locomotive cranes; three fifteen-ton revolving cranes, and four two- and three-ton hand cranes are used for work on the wharves. Although the Sakurajima yard has a network of railroad tracks, they are not connected with the Imperial railways, and all materials come in by water. Innoshima has six locomotive cranes.

BINGO YARD ABSORBED

The principal buildings at Sakurajima are: boiler shop, forge, pattern, foundry, coppersmiths', machine, punching, anglesmiths', mold loft, office, warehouse, and dining hall.

The Innoshima shops include: machine, boiler, club, hospital, warehouse, coppersmiths', electric powerhouse, carpenter shop, anglesmiths', boarding houses, sleeping quarters for the men, offices.

Besides these two yards, the Bingo Dock Company, near Innoshima, was taken over in 1919. It has four berths, building vessels up to 5000 tons deadweight, and two graving docks. During the height of shipbuilding in Japan, Bingo employed about 2500 men; Sakurajima about 9000, and Innoshima about 7000.

HOW HOG ISLAND VESSELS BEHAVE

HOW the vessels of the Hog Island yard of the American International Shipbuilding Corporation are behaving at sea is evidenced by a letter received by M. C. Brush, president, from Captain O. F. Schroder, master of the steamship Quistconck. She was delivered to the Emergency Fleet Corporation December 3, 1918; had steamed, to June 10, 58,634 miles; was drydocked once, at Newport News, after 38,000 miles at sea, when her bottom was cleaned and twelve rivets tightened.

To paraphrase the captain's letter in one sentence: She runs like a Pierce-Arrow, and perishable cargo is as safe in her holds as it would be in a warehouse—.

NAVY TO ESTABLISH RADIO COMPASS STATIONS ON THE GREAT LAKES

By JOHN W. KEAN

RADIO compass stations erected by the United States Navy on our Atlantic, Pacific and Gulf coasts have been such a big help to navigators that a number of stations are to be erected on the Great Lakes.

The following sites for stations have been selected and plans for the stations are now being prepared:

White Fish Point, Mich.	Lake Superior
Grand Marais, Mich.	“ “
Eagle Harbor, Mich.	“ “
Devils Island, Wis.	“ “
Manistique, Mich.	“ Michigan
Detour Point, Mich.	“ Huron
Thunder Bay Island (Alpena), Mich.	“ “

An article entitled "Piloting by Radio" in the April number of Pacific Marine Review described the radio compass and told about the establishment of stations on the Pacific Coast.

One radio compass station can give a ship its bearing—that is, its direction from that particular radio compass station. Two or more radio compass stations can, through one of them, tell a ship its exact position five minutes after the information has been requested.

This article should be read in connection with the two articles under the Material Handling section on page 91 of this issue of Pacific Marine Review. It is a very encouraging sign for the future that the Great Lakes region is waking up to the importance of an ocean-going merchant marine.—Editor's Note.

This is accomplished by means of a coil of wire wound around a rectangular frame work and mounted on top of a revolving shaft.

When a ship wishes to obtain its bearing or its position, it sends a pre-arranged signal by radio for a specified period. As this signal is received, the operator slowly revolves the radio compass and listens to the signal, which is carried to his ear by ordinary radio apparatus. As he turns the compass, the loudness of the signal varies and this enables the operator to determine the direction of the ship. By plotting on the chart the ship's direction from two or more compass stations, her exact position can be determined.

The Fifth Naval district, headquarters Norfolk, Virginia, furnished 576 ships with bearings during the month of May. The average time required to furnish the bearing was 5.5 minutes.

The following is a sample of hundreds of letters received by the Naval Commission Service:

> Sir: I am glad to let you know that I have received the most valuable information from the radio compass stations of Price's Neck and Surfside on the 15th of June. All day I had very thick fog and rain and the bearings given to me by the two above radio stations were very good and in accordance with the soundings. It is the first time that I have had such a good help and I am very thankful.
>
> Respectfully,
>
> L. S. Cavy, Master.

The Navy hopes to have two or three stations in operation on the Great Lakes by fall. They will be a big help to the Great Lakes' skippers.

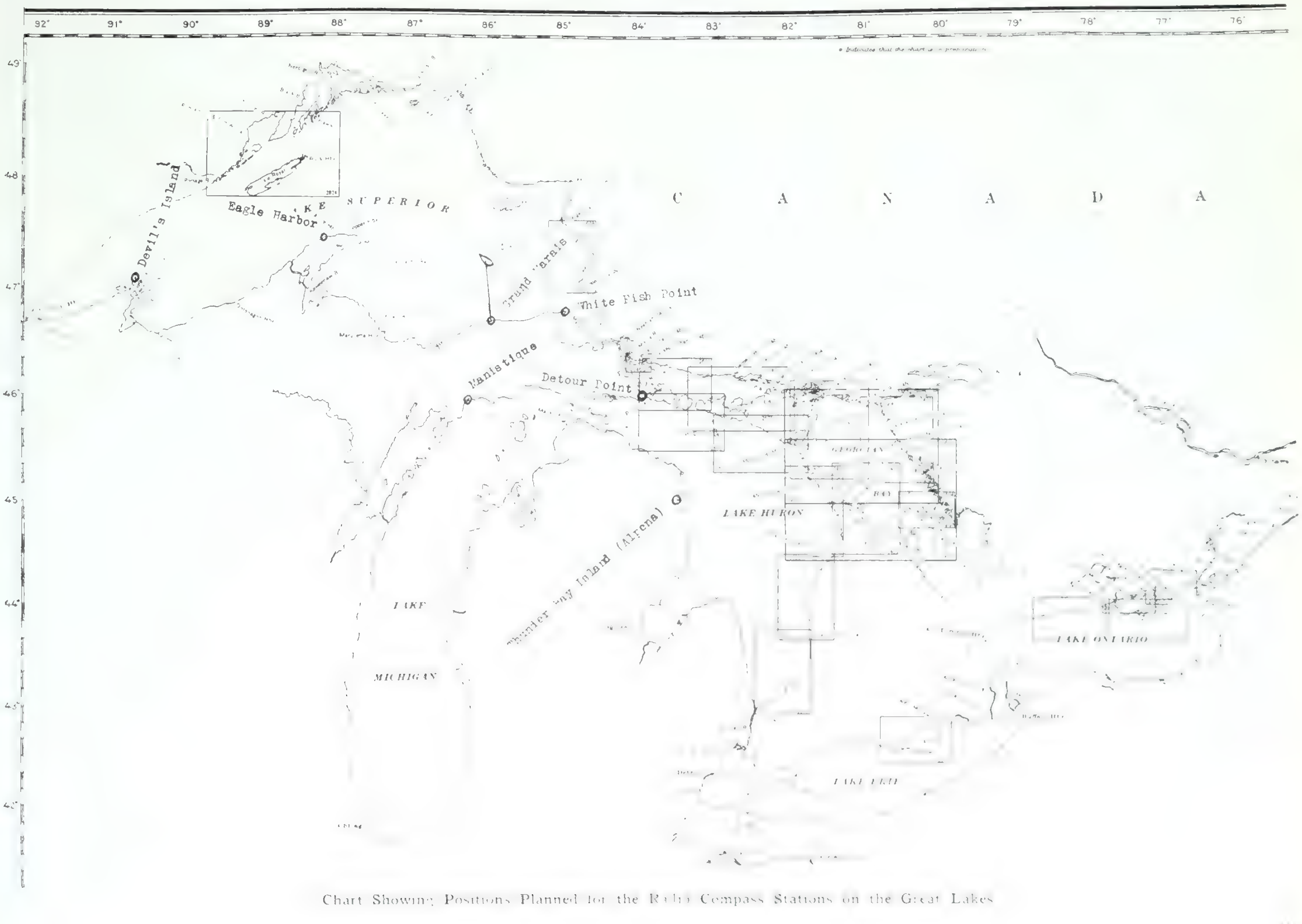


Chart Showing Positions Planned for the Radio Compass Stations on the Great Lakes

THE CRISIS IN FUEL OIL

By LETSON BALLIET, M. E.

AMERICAN industry is face to face with a famine in fuel oil. It is not, however, very difficult to find the cause of the severe shortage in this widely used commodity. Production has long been insufficient, transportation is inadequate, and the demand from both governmental and private users has been steadily increasing. Unfortunately, in spite of extensive development work and lavish expenditures to produce, there is little or no hope of the situation becoming anything but worse.

The seriousness of this problem is being brought hame to manufacturers by the reports of the directors of the United States Geological Survey. George Otis Smith told the United States Steel Institute that the over-demand would soon bring up the question of priority, with railroads and steam plants forced to yield to government need.

'High prices are here to stay for crude oil and for every one of its products," he said.

It is time to begin to weigh the essential uses of petroleum in the United States. During the last decade there has been a transition from an over-supply of oil to an over-demand, and the increasing demand for gasoline and fuel oil must so bring forward the question of priority. The United States Navy and merchant marine in 1920 will require one-third of the fuel oil output, or 40,000,000 barrels, and in 1921 60,000,000 barrels, while the use of gasoline and of fuel oil in industrial plants must yield to government needs.

A few years ago crude oil was selling from 40 to 60 cents a barrel at the well. Today fuel oil, which is practically a residue left from crude oil after the benzine, gasoline, distillate, kerosene and other so-called "tops" have been distilled off, is selling for $2 a barrel at the refineries on the Pacific Coast. When the price increases to $3 a barrel, the burden of expense will fall heavily upon the railroads, and many industrial enterprises, but when it reaches $4 a barrel it will be absolutely prohibitive for transportation purposes.

HYDRO-ELECTRIC POWER

In the next few years we will witness a rapid change of the railroads from steam to electric power, and within fifteen years every foot of railroad in California will be electrified, and in twenty-five years there will hardly be a steam locomotive west of the Missouri River. Simultaneous with the railroad change will be rapid and extensive development of hydro-electric power, resulting in a large portion of the industrial power being changed to electric, while cooking, baking and much domestic heating is even now being done with electricity. The crying demand is, already, for more hydro-electric development, that the fuel may be released for uses upon the sea. From the very nature of its origin, it is obvious that there is but one crop of fuel oil and coal in the earth, and when that is exhausted some other method of obtaining heat must be at hand. A stampede to bring new oil wells and coal mines into a stage of production may increase the production for a time, and perhaps make a peak in the production chart, but this will only bring the final exhaustion of the supply nearer. I cannot see much opportunity for any permanent relief from the high prices of fuel. In fact, it appears likely that the prices will continue to increase until they are prohibitive for industrial purposes.

A temporary drop in prices may be even more disastrous to industry than a steady increase, because it might encourage a development along lines that could not exist when the prices again start upward. The solution of the problem is not yet clear, but indications point strongly in two directions for heat generation, viz., to gas for heat by combustion, and hydro-electric energy for heat by resistance. At the present time, much electricity is generated with fuel, which will have to be superseded by gravity, water, wind, tide, wave or other power, and much gas is made from coal and oil, which will have to be superseded by hydrogen, perhaps, obtained by electrolysis from water. In the meantime operators will be able to continue only by economy and efficiency in the use of the fuels they require.

The B. T. U. value of fuels has long been used as the standard for comparison but this is misleading. It is not the B. T. U. value of the fuel, but the B. T. U. value of the combustible mixture that counts. In other words, it is not the B. T. U. value that is **in** the fuel, but it is the B. T. U.'s that can be utilized **out** of it.

Too often we are prone to select some fuel because of its low initial cost, such as oil, because its initial cost is lower than city gas. Neither low initial cost, nor local supply, sums up the situation. There is always a RIGHT fuel for the particular work at hand, and all others are wrong.

There is probably no one fuel that has been more abused and misused than fuel oil. Its high concentrated heat value, and the ability to use it with mechanical feed apparatus, have permitted the application of fuel oil in a haphazard manner by people who seem satisfied so long as it was burned, and made some sort of heat. There is altogether too much importance attached to the so-called oil-burners. The very term is a misnomer, as there is no such thing as an oil burner. There are valves and nozzles for atomizing oil, but their efficiency is mechanical and not thermal.

Most furnaces using oil fuel are so ignorantly or inefficiently designed and constructed that they waste more heat units of the oil than would be necessary to obtain a required heat from city gas made from the oil. There is an utter disregard of the mixtures and gases of combustion by most users of fuel oil. The interiors of furnaces are heated to temperatures away above that which is required. Excess of air is used to intensify the flame and thus to produce a "quick heat" and a highly destructive heat upon iron and steel as well as upon furnace linings.

Speed, safety, economy and the perfection of the finished product at the lowest cost can be obtained only by the use of the RIGHT fuel delivered into the combustion chamber in RIGHT proportions and RIGHT mixtures.

Perfect mixtures require some stirring or agitation. A jet of air meeting a stream of oil, or of city gas, may inject it into the combustion chamber of the furnace, but the mixture is far from homogeneous and the heat is not regular.

FUEL OIL WASTAGE

Any combustible gas or vapor spreads its flame wide out to find the necessary oxygen in the air for combustion, but if you mix the gas or vapor artificially with air, the flame is shortened, more concentrated and the effective heat within a given space is greater. Whenever fuel oil is sprayed, blown, atomized or otherwise injected into a furnace, or hot combustion chamber, whether by steam or air, hot or cold, the physical properties of the oil are unchanged and although divided into the finest mist, **it is still oil** and as such each tiniest globule must be surrounded by or float in a bath of air in order to burn. As each particle burns, the diameter of the globule diminishes, but the surrounding air is diluted by the products of combustion, and the oxygen content of the air is reduced, and the globule must float further for more oxygen till it is completely burned.

Since oil cannot be burned without an excess of air, the oxidation of steel in oil fires is severe. An efficient "neutral" or "reducing" fire with fuel oil is yet unknown in industrial heat practice. In furnaces where oxidation makes no difference, where nothing but an intense heat is required, there is no fuel better adapted for the purpose than fuel oil. Frequently in such operations, excess fuel is not noticed. It is perfectly true that you might light a cigar or cigarette with two matches struck at a time and the "smoke" might be perfectly satisfactory to the smoker, but there is no denying that one match was wasted and I think I wouldn't be far off if I said that 50 per cent of the fuel oil is wasted in many industrial furnaces.

GAS VERSUS OIL

Is city gas made from oil an economy of oil? No it is not, except that users of city gas watch leaks and wastes more carefully, because the initial cost of the gas is higher.

Can more heat be obtained from the gas than from the oil? Absolutely no. But it can be more accurately controlled, burned, and directed in mixtures at any desired pressure, with less waste of heat, and less damage to material being heated, which reduces the cost of production.

Properly mixed gases are the secret of efficiency. In the products of combustion there must be no free oxygen, nor any excess of unburned gases. It is only of recent years that the thermo chemists have been able to make apparatus that will accurately control the temperature and condition of the flame with completely combustible gas mixtures, and eliminate the destructive action upon the finished products.

In the manufacture of marine boilers of large horsepower the quality of the stay tubes and stay rods is of extreme importance for safety. The procedure for many years has been to "upset" the end of the rod or tube, increasing its diameter or thickness, to such an extent than a thread can be cut upon it, to leave the bottom of the cut the same diameter as the original rod.

It is most important that the quality of the metal in these threads be fully up to their highest strength, as—the oxidation of the exterior, or the decarbonization of the metal at the end of the rod, or any unequal deteriorated portion of the threads would be a cause for condemning the rod or tube.

The proper procedure is to thoroughly heat the end of the rod or tube in a furnace designed for the purpose, to a temperature of not to exceed 1725° Fahr. (as the danger of decarbonization of the steel begins after 1800 degrees is past), in a flame that is neutral or non-oxidizing. When the desired heat is obtained the rod or tube is lifted quickly from the fire and the heated end is laid in a split die, and by pressure from a hydraulic ram the end is upset, to a diameter that has been previously decided in the preparation of the upsetting die.

STAY BOLT FURNACE

The writer designed a special furnace for this purpose now in use in the largest boiler shop in the Pacific Coast, at the Moore Shipbuilding Plant, which produces the highest quality of stay tubes and rods that it is possible to produce, there being not the slightest injury of the metal heated. The furnace is eight feet long, supplied with gas burners front and rear. The front is opened in long slot just wide enough to admit the ends of the largest stay rods. The slot is inclined, that the rods may be easily rolled toward the exit end. All of the burners are below the slot. The combustion chamber is in reality the space underneath the rods, which has no exit for the heated gases of combustion except that they rise between and around the rods.

The fuel is city gas, pre-mixed with air, capable of accurate control in any part of the furnace. A slow heat with a partially open gas valve is the beginning of the heat and it intensifies as the rod rolls toward the finish of the heating. It thus gets a "soaking heat" during the time that twenty similar rods are being upset, and until its turn comes to be taken from the furnace. The gas admitted through the burners is supplied with just enough air that all the oxygen will be consumed, and a trace of unburned gas rises with the burnt gases, to be burned in what air comes in through the slot, above the rods. Any excess air coming into the furnace comes in above the rods and is carried upward and out through the top without coming in contact with the heated rods, and no excess air is supplied below, hence in the furnace heat the rods are practically scale free, and of the highest quality.

The fuel cost is somewhat greater than oil fuel, but the cost of compressed air to spray the oil, the cost of steam to pump the fuel oil and to preheat it, and the bad effects of the clouds of noxious fumes in the shop, the irregularity of the oil fire due to variations in viscosity and pressure of oil and air, the better quality of the finished product, the increase in the life and wearing qualities of the upsetting dies, due to less scale from the gas fire, and the increase in the number of rods or tubes upset in a day per man, make the gas fire much the cheaper. Rods furnaces and angle furnaces give similar results when using gas fuel.

NAVAL ENGINEERING DEVELOPMENTS

The present naval program of the United States is the most extensive ever undertaken by any nation. We are now rapidly completing six battleships of the Tennessee-New Mexico class and while these vessels are today unequaled in cilitary power, they will become secondary as soon as representatives of two new classes are put into commission.

These new classes consist of battleships and battle cruisers which will compare with the Tennessee as follows:

	Tennessee	New Battleships	New Battle Cruisers
Length over-all, feet	624	684	874
Beam, feet	97	105	90
Draught, feet	31	33	31
Displacement, tons	33,000	43,200	43,500
Speed, knots	21	23	35
Main battery	12 14-in. guns	12 16 in. guns	8 16 in. guns
Shaft horsepower	30,000	60,000	180,000

The new battleships are to be electrically driven, and the main propelling equipment of four of them—the Indiana, Montana, South Dakota, and North Carolina—will consist of two Westinghouse 28,000 KVA turbine generators and four 15,000 horsepower Westinghouse propeller motors. The turbines are to be of the complete expansion, impulse-reaction type, and will develop their full rated load at 265 pounds' steam pressure, 50 degrees superheat, and 28½ inches' vacuum. Electric power will be generated in the form of three-phase, sixty-cycle, 5000-volt alternating current.

The statistics of the new battle cruisers given in the table indicate that these vessels are to be very unusual in many respects, but their most remarkable feature is the enormous power of their turbines—180,000 horsepower, or 160,000 KVA.

These figures do not, however, give an adequate conception of the magnitude of this power. Not only is it greater than that of any ship ever built—for the power of the British cruiser Hood is 134,000 horsepower and that of the Leviathan 90,000 horsepower—but it is greater than that used by most cities of over a half a million inhabitants. For example, the combined capacity of all of the central station and electric railway power houses of Pittsburgh is less than 150,000 horsepower; of Baltimore, less than 160,000 horsepower; and of Philadelphia, about 200,000 horsepower. There are, in fact, but two or three steam-power plants in the world that have greater capacity than the engine rooms of these battle cruisers will have, so that, from the standpoint of power engineering alone, the construction of these vessels will constitute an achievement of the highest order.

Two of these vessels, the Ranger and the Constellation, will have the following equipment:

Four Westinghouse main turbines to develop 49,750 B. H. P. each, with steam at 265 pounds, 50 degrees superheat, and 28½-inch vacuum.

Four 40,000 KVA Westinghouse generators, directly connected to these turbines and generating three-phase, 51.3 cycles, 5400-volt alternating current.

Eight wound-rotor Westinghouse motors (two to each propeller), which are to be rated at 22,500 horsepower each, and will be the largest in the world.

THE GEARED TURBINES OF THE NEW SWEDISH BATTLESHIPS

EARLY in the coming fall, Sweden will try out its two new coast defense battleships, the Drottning Victoria and the Gustaf V. These vessels are 396 feet long, have beam of 64 feet, draught of 21 feet, displace 7000 tons, and will have maximum speeds of 22½ knots. The main batteries consist of four 11-inch and eight 6-inch guns, and the main armor belt is 8 inches thick.

The propelling equipment of each of these ships consists of two Westinghouse turbines, which are rated at 22,000 S. H. P. and drive the two propellers through floating-frame reduction gears. The turbines were built in accordance with Westinghouse designs by the Motala Verkstads Nya Aktiebolag, at Motala, Sweden, and the gears were designed and built by the Machine Works of the Westinghouse Electric & Manufacturing Company, at East Pittsburgh, Pa.

Each turbine consists of two separate units, rated at 5500 S. H. P. each, which drive a propeller through a common gear. Steam from the boiler enters the high-pressure unit and passes through a set of impulse blades. It then divides into two parts, one of which continues through the high-pressure unit, while the other goes into the low-pressure unit. In both units the steam is fully expanded in reaction blades and passes into the condenser through a common discharge.

The chief advantage of this arrangement, which is known as the "divided-flow," is that all four units are available for propelling the ship at maximum speeds; but for ordinary cruising speeds, the low-pressure units can be cut out, and the ship propelled by the high-pressure units only. These, being of the complete expansion type, produce low speeds with good economy. Should an accident put a high-pressure unit out of commission, the ship can be propelled by the low-pressure units, which are designed to receive steam at boiler pressures. When any unit is out of use, it usually turns idly in a vacuum, but it can be mechanically disconnected.

The divided-flow turbine is not quite as efficient for full speed operation as the cross-compound turbine, in which part of the expansion of the steam is effected in the high-pressure unit, and the rest in the low-pressure unit. It is, however, more efficient at low speeds because one unit can be cut out, and this makes it especially applicable to naval service. In addition it can be operated at somewhat higher speeds, which tends to counterbalance its slightly poorer efficiency.

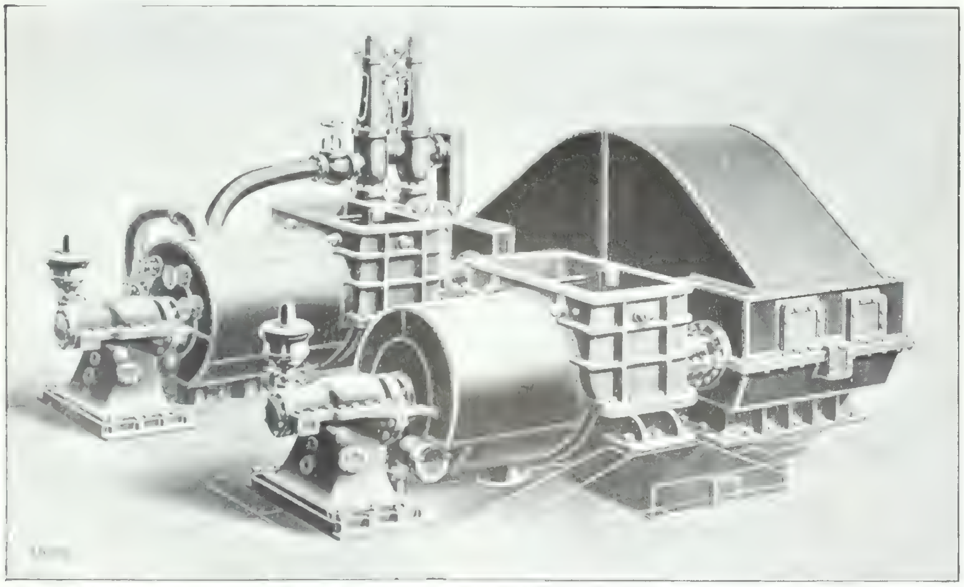
The performance of the Swedish turbines, with steam at 265 lbs. and a vacuum of 28.27 inches, is as follows:

Speed, knots	22½	20	12½
Propeller R.P.M.	200	177	115
Turbine R.P.M.	3,600	3,186	2070
S.H.P.	22,000	15,000	3150
Steam consumption, lbs. per S.H.P.	10.9	11.1	13.3

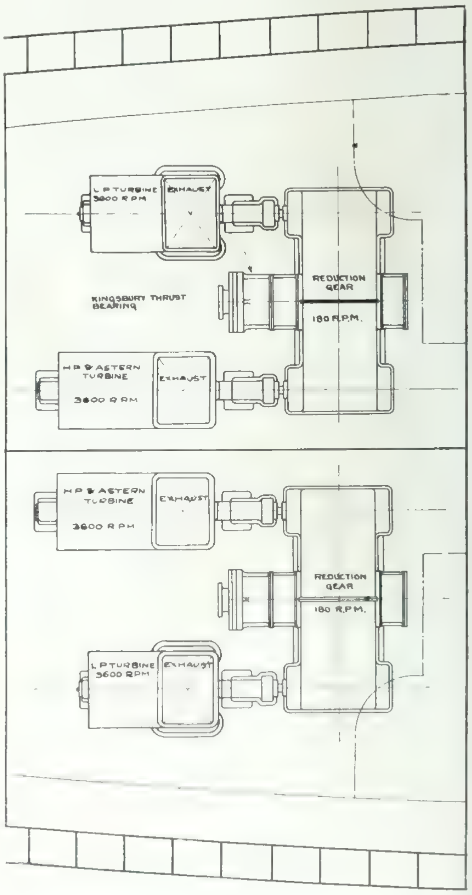
The water rate at 12½ knots is for operation with the high-pressure units only. Were all four units, lightly loaded, used to obtain this speed the water rate would be about 17 pounds.

An astern turbine, composed of impulse blades and giving 4500 S. H. P. with full steam flow, is incorporated in each high-pressure unit.

The reduction gears reduce the turbine speed of 3600 R. P. M. to the propeller speed of 180 R. P. M., a 20 to 1 ratio, in a single step. Each has two pinions (one for each unit of its turbine) and one gear wheel. The gears are placed forward of the turbines and the propeller shafts pass aft between the two units of each turbine. Kingsbury thrust bearings take up the thrust of the propellers.



Divided flow cross-compound geared turbine built for the New Swedish battleships. These turbines were built from Westinghouse designs by a Swedish engineering firm. The gears were built by the Westinghouse Company at East Pittsburgh, Pennsylvania



Diagrammatic sketch of the arrangement of turbines and reduction gears in the new Swedish battleships

TOOL METHODS AT HOG ISLAND

By H. J. BARINGER
Assistant Superintendent, Tool Maintenance Department

THE care and the protection of $670,000 worth of portable pneumatic tools has been a problem of no mean size at the shipyard of the United States Shipping Board Emergency Fleet Corporation, American International Shipbuilding Corporation, agent, Hog Island, Pennsylvania.

Under a single department Mr. Charles A. Plank, superintendent, an organization known as the Tool Maintenance Department, cares for the distribution, repair, protection and records of approximately 12,000 portable pneumatic machines. The success in handling such a large number of machines has been largely due to a carefully balanced organization and a systematic use of forms to methodically report each and every operation in the dispensation and repair of the greatest number of this class of tools ever recorded in use, on any single operation in the world.

The following list by classes will give the reader some idea of the number of machines involved:

Drilling and reaming machines	3,600
Riveting hammers	3,200
Chipping and caulking hammers	2,600
Scaling hammers	300
Grinding machines	250
Holder-on machines	1,450
Jambs and comb. riveters, etc.	600
Total	12,000

DISTRIBUTION, ISSUANCE AND ACCOUNTS

These machines were purchased from various manufacturers of this class of tools, and having been received by the Tool Maintenance Department at the plant and rigidly inspected and tested, are turned over to the stock distribution room at the main tool shop. From this point distribution of all equipment is made to the ten tool service stations located along the fifty shipways (one station to each five ships), and the two tool service stations located at the outfitting basins. In these tool service stations each machine is placed in its respective position on racks provided near the service windows and in view of employes to facilitate rapid handling and allow easy identification of the specific machine wanted by the employe.

To obtain a tool or machine at these windows the employe must surrender a brass check, of which he is furnished ten with his original kit gotten upon signed order from his foreman in the craft.

At the time of issuing an employe his original kit he (the employe) is requested to sign a form receipt which acts as a record of the kit and an acknowledgment of the responsibility for same, and any tools he may check out later upon the checks furnished him.

This card is filed in the tool service station and a ledger entry made of the data surrounding the issuance of tools against employe's name and badge number, together with the serial number of any machines included. The drawings of successive machines upon check are subject to the same attention and are carried on the open account against the employe and likewise a credit is established upon return of the machine, at which time his check is returned to him.

PROTECTION TO EMPLOYES

The brass checks are kept upon a nail against the rack space provided for each machine, together with a metal disc bearing the serial number and shop number of the machine, and are turned face back to protect the employe from having his check called for by another employe who might attempt to obtain false credit at the tool room by lifting his fellow employe's check and placing same on some other tool.

The checks of the respective tool stations are also numbered on the reverse side with their particular yard numbers to guard against the issuance of tools or machines to employes from other yards. The reason for forcing an employe to withdraw equipment only from the station in his division will be readily grasped when it comes to clearance upon termination.

Furthermore, the checks are assigned, by the service station, to the various crafts in blocks. That is, 100 to 499 might be issued only to riveters, 600 to 999 only to drillers and reamers, and so on. This facilitates rapid service during the peak hours—namely, at starting time in the forenoon and closing time in the afternoon—and makes for efficiency on the part of the tool room employe, as he can easily spot the checks in the craft which he serves. It might be of interest to say at this point that the service force is approximately one to every seventy-five employes in the tool using crafts.

CLEARANCES AND DEDUCTIONS

The method of clearing an employe upon termination of service is likewise handled entirely at the tool service station in the following manner: Providing the employe returns all tools charged to him, either by kit or upon check, and can clear his account thereby, he is issued, by the foreman in charge of the service station, a clearance slip which is an acknowledgment by the department that he has returned the tools entrusted to him. Only upon presentation of such a slip to the time office, properly signed, can he withdraw the final pay due him.

Should he be unable to properly clear his account in the foregoing manner, he is issued, by the foreman of the service station, what is known as a deduction slip (a sort of charge memorandum) which acts as a notice to the time department that the specified amount be withheld from his final pay. The deduction must be accepted by the employe and a space for his signature is provided on the form.

Should the employe refuse the charge as specified on his deduction slip there is only one recourse, and that is to obtain a missing tool report form and have it properly filled out by his foreman and countersigned by the division superintendent and manager of his respective department or division. Such cases are comparatively few, owing to the rigid enforcement of penalty for misrepresentation or false statement of facts and often times these are turned over to the secret service department for final investigation prior to adjustment.

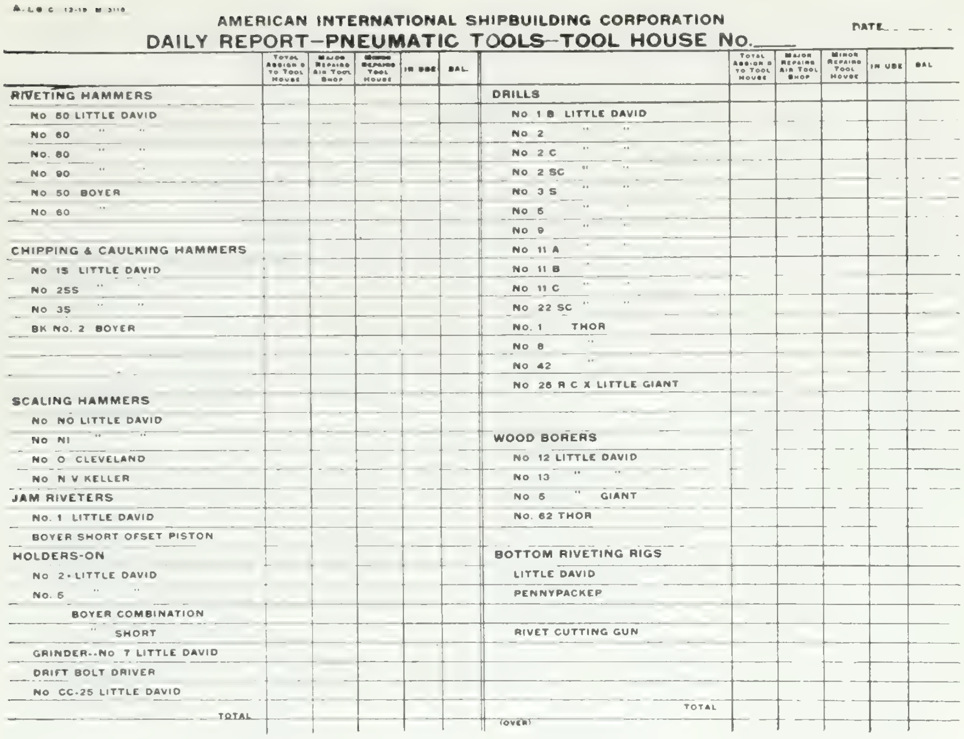
FINAL ADJUSTMENT AND RESULTS

All this care in connection with an employe's clearance has had a tendency to make the employe careful of the equipment entrusted to him and providing that at a later date, after accepting the charge as set up, under deductions, he is able to return the tools he has been previously charged for, he is issued a refund order which provides for a settlement in lieu of such deduction.

The care of the equipment as outlined in the foregoing paragraphs has resulted in a very low percentage of loss, and since the system as perfected has been in full operation the loss has been recorded at less than 0.5 per cent for all pneumatic tools over a period of six months ending December 31, 1919. This result has been accomplished to some extent by propaganda among the employes of the tool-using crafts to make them understand that what is really essential is the keeping track of all the tools entrusted to them and that the company would far rather have the equipment than the employe's money to cover losses and wilful breakage.

MAINTENANCE AND COSTS

The repairing of the equipment also constitutes a major portion of the functions of the department, and again the ample use of printed forms plays a prominent part. The tool service stations, previously referred to, handle only such repair as would be customarily termed "minor repairs," while the main tool shop serves as a general repair depot for all troubles of a major class. At both of these places the repairman records on a separate slip, against each machine, the parts supplied and the time charge. These



A.-L.& C. 12-19 M 3118

AMERICAN INTERNATIONAL SHIPBUILDING CORPORATION

DAILY REPORT—PNEUMATIC TOOLS—TOOL HOUSE No.____ DATE______

	TOTAL ASSIGN'D TO TOOL HOUSE	MAJOR REPAIRS AIR TOOL SHOP	MINOR REPAIRS TOOL HOUSE	IN USE	BAL.		TOTAL ASSIGN'D TO TOOL HOUSE	MAJOR REPAIRS AIR TOOL SHOP	MINOR REPAIRS TOOL HOUSE	IN USE	BAL.
RIVETING HAMMERS						DRILLS					
No 50 LITTLE DAVID						No 1 B LITTLE DAVID					
No 60 " "						No 2 " "					
No. 80 " "						No 2 C " "					
No 90 " "						No 2 SC " "					
No 50 BOYER						No 3 S " "					
No 60 "						No 5 " "					
						No 9 " "					
CHIPPING & CAULKING HAMMERS						No 11 A " "					
No 15 LITTLE DAVID						No 11 B "					
No 25S " "						No 11 C " "					
No 35 " "						No 22 SC " "					
BK No. 2 BOYER						No. 1 THOR					
						No 8 "					
						No 42 "					
						No 26 R C X LITTLE GIANT					
SCALING HAMMERS											
No NO LITTLE DAVID											
No NI " "						WOOD BORERS					
No O CLEVELAND						No 12 LITTLE DAVID					
No N V KELLER						No 13 " "					
JAM RIVETERS						No 5 " GIANT					
No. 1 LITTLE DAVID						No. 62 THOR					
BOYER SHORT OFSET PISTON											
HOLDERS-ON						BOTTOM RIVETING RIGS					
No 2 LITTLE DAVID						LITTLE DAVID					
No. 5 " "						PENNYPACKEP					
BOYER COMBINATION											
" SHORT						RIVET CUTTING GUN					
GRINDER--No 7 LITTLE DAVID											
DRIFT BOLT DRIVER											
No CC-25 LITTLE DAVID											
TOTAL						TOTAL					
						(OVER)					

slips are forwarded, by the various foremen, to the main office at the close of each day, where the data is assembled on printed sheets known as Daily Report, Pneumatic Tools. From these slips and report sheets the actual life of any specific machine, class of tools, or make of equipment, may be computed and a recapitulation by yards or divisions will often show most interesting results. On the reverse side of this daily report sheet is printed a form for the detailed repair-cost record of the tool house.

Drilling and reaming machines constituted, for a long time, the bulk of repair troubles, and this was directly traceable to the lack of proper and frequent lubrication. Steps were taken to force the craftsmen to turn in his machine each night by co-operation through the hull construction superintendents and each day at the close of work a count of the checkboards would reveal at once the machines still out. These are listed daily on a weekly report sheet at each tool station and copies of this report are sent back to the hull construction offices. Machines which appeared on the list, when returned, would be withheld from the craftsman until he could obtain a written request from his superintendent to have the machine replaced. These cases soon became negligible and resulted in cutting total maintenance costs on this class of tools to the surprising average of $2.47 per month per machine over a period of six months. The drilling and reaming machines are still the heaviest maintenance factor and the following table will show the comparative scale of maintenance costs, including labor and parts for the various classes, covering all makes of pneumatic shipyard tools in use at the plant:

COST PER TOOL PER MONTH

Drilling and reaming machines	$2.47
Riveting hammers	1.34
Grinding machines	1.24
Chipping and caulking hammers	.40
Jambs and combination riveters	.30
Scaling hammers	.18
Holder-on machines	.07
Average by classes	$ .86

Many other smaller operations and allied duties, such as caring for the jacks, chain hoists, oil-burning equipment and oxy-acetylene cutting and burning apparatus, also fall to the tool maintenance department, and the majority of these are covered by their respective forms which, being interspersed with the former operations, care for each and every step in maintenance, with clear, accurate records from which much valuable data can be gathered.

A typical yard tool house at the Hog Island plant of the American International Shipbuilding Corporation

BUSINESS IDEALS CHANGING

"OLD words like 'co-operation' and 'service,' so badly hacked by past abuses of them, come again as new thoughts, cleansed for new recognition and in fresh significance," said Mr. Charles G. DuBois, president of the Western Electric Company, in a recent statement regarding the changes which have come over industry during the past year.

He declared that the Western Electric Company, realizing the changing of ideals throughout the commercial world recently, had arranged to pattern its own motifs to keep pace with the times. This necessitates an insight into the realm beyond the mere physical and commercial growth of its national system of distributing houses.

It is not a question of merely selling today, according to Mr. DuBois, but a sympathetic study of the problems of the producer who is the original source of supply, and the ultimate consumer. The role of the middleman has ceased to exist as such. He must study the requirements of the public which all three classes of industrial organizations serve; and by such analysis he will benefit himself by creating an universal understanding. Old antipathies must be banished by co-operating to show real conditions, to dispel the old-time lack of confidence which some branches of public servants were always subject to.

Mr. DuBois also said: "But we believe that only to the extent that we serve the whole electrical industry can we share in the hoped-for and well-deserved prosperity of an industry that is of incalculable benefit to civilization. Ten years ago such a belief would have been called blue sky; today it is what we believe may be called helpfulness."

The "good will" advertising which the Western Electric Company has been publishing recently in the current magazines explaining to the public the problems of the various branches of the electrical industry which are its customers, is an example of business helpfulness.

THE DEVELOPMENT OF WELDED SHIPS

By WILLIAM T. BONNER
Engineer Welding Research, New York Shipbuilding Corporation

IT must have been in 1884 that I commenced to lay the foundations for my interest in welded ships. Although I was only a young chap I had been sent West to supervise the construction of large works for a Toledo corporation. The plant was located in a hilly section about five miles from Omaha, where little occurred beyond the excitement of neighboring Indian camps and passing prairie schooners.

Among other items of equipment we required one hundred cooling tanks for our charred bone. These were to be 32 x 32 x 12 inches and made of No. 10 gauge plate. A loose cover 12 x 32 inches, having a 1-inch angle stiffener set back 1 inch from edges, was provided for each tank, and by filling the groove thus formed with a luting of moistened "spent black," the tank when filled could be sealed and kept practically air tight.

Our efforts to find a shop willing to undertake the construction of these tanks at reasonable figures failed utterly. Thus it was that I became a tank builder and, notwithstanding our equipment was limited to a hand lever punch, several hammers and rivet sets and a bending outfit which we made out of oak planks, I think after discarding the first three or four as "experimental" our tanks would have been passed by Lloyds as A-1.

From that day to this my interests have centered about plate and other structural work and the same spirit which prompted me to devise short cuts and better methods for making those Omaha tanks has continually urged me on toward the development of welded ships.

A LOGICAL CONCLUSION

From building small riveted tanks in the woods of Nebraska to building welded ships on tide water may seem to you a far cry, but I presume the spirit of my ancestors, all of whom came from the Belfast district, had something to do with it. Suffice it to say the history of my own experience clearly indicates a gradual approach toward the specialty which, for nearly eight years, has occupied my entire time and attention, and while I did not, at first,, have very great confidence in the value of welding for general use, the more I observed its wonderful possibilities the more I realized the certainty of its ultimate substitution for riveting.

In all truth and sincerity, therefore, I make the unqualified statement that **no one** can **live** with welding for any considerable time without becoming a firm convert to its use.

QUALIFIED CONVICTIONS

It is my particular desire to get firmly intrenched, in your minds, the conviction that electrically welded jointures, when properly made, are superior to every other method of connecting together the various parts of a ship.

Already, 90 per cent or more of those who have thoroughly investigated the subject are convinced that welded joints **can** be made more than 100 per cent efficient for strength, but most of them qualify that conviction with the corollary that 100 per cent strength welds can only be obtained by competent, conscientious operators.

SOLVING THE PERSONAL EQUATION

Granted. That, then, defines our course. Having learned the **how** we must develop a class of workmen with the **will** to perform this service which is bound to survive as the fittest and which must also prove profitable and honorable to all who undertake its promotion with energy and sincerity.

It is for the engineer and the draftsman to write into their specifications the requirements that jointures may be electrically welded, that they must be of proven homogeneity and of sufficient cross sectional area to fully equal the strength of the virgin plate.

This, of course, presupposes that the engineer has familiarized himself with the various forms of welded jointures and has selected for his structure those which are best adapted to the requirements—having in mind the fabricating condition and materials available.

It is scarcely believable that a widespread movement in favor of the adoption of electrically welded ships will not, in due course, attract a sufficiently large number of skilled mechanics to dissipate the present objection to welding which I have admitted earlier in my discussion.

It has often been demonstrated that Emerson was right when he said that if a man can preach a better sermon or make a better mouse trap than his neighbor, the world will make a beaten path to his door even though he pitch his tent in a wilderness.

I am not so ready to voice my approval of a statement I recently heard that half of the riveters should become welders while the rest should be sent to jail, but I do know there is the making of a large army of competent welders among our punchers, riveters, chippers and caulkers, who must some day awaken to the possibilities of this newer art.

As compared with riveting, welding affords the true mechanic far greater opportunity for the exercise of skill in the heat treatment of metals, study of relations between electric energy and the physical structure of his work, ingenuity in the arrangement of his jigs and forms and, according to the degree of proficiency which he attains in these lines, greater remuneration.

The ideal welder, one who can be depended upon to satisy the classification societies' requirements, differs very materially from our estimate of the average riveter as we meet the latter day by day. The characteristics which fit him for his work are as largely mental as physical and the work itself further develops his acuteness of mind, powers of observation, judgment and ingenuity.

As in other departments of shipbuilding, thorough mastery of the welding art cannot be obtained either through correspondence or so-called welding schools. It is just as necessary for a welder to learn by experience how to assemble and prepare his parts and to conduct the various finishing treatments, as to gain dexterity in drawing an arc.

The latter can easily be picked up while serving his apprenticeship in the former, hence my preference always to choose my welders from among the handy ship owrkers, boilermakers and forge shop helpers. These men have learned heat treatment and know how to handle tools and the degree of intelligence they show in manipulating the arc will indicate the measure of their success as welders.

The conditions which I have enumerated as the price of success may not appeal to the rank and file of the workers, as evidenced by our experiences of the past year or more, but I am hopeful that we shall shortly witness a reorganization of labor by which the better element may be divorced from the drones and those who have both ability and desire to advance, be left free to attain that eminence which is the due of every earnest worker.

WELDING DEFINED

The development of welded ships may be regarded as the obverse corollary of the elimination, or partial elimination, of riveted work and the substitution therefor of welded jointures in the construction of marine vessels.

In my dealings with this relatively new art I have continually featured the word "jointure" as indicating the act of joining, or condition of being joined at a common point, a plurality of structural members. Similarly, I employ the expressions "fillet weld," butt weld," etc., to describe the mass of metal deposited as a progressive casting, for the jointure of a plurality of members into homogeneous mono-structures, as by welding, at their conjunctive edges. These may be called "unified" or "unific" structures.

If further definition be required it should be understood that the fused weld

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[1] Delivered April 9, 1930, before the Delaware River Section, American Society of Marine Draftsmen, at the Engineers' Club of Philadelphia.

material, e. g., the weld, is in reality a casting and therefore has its limintations as to tensile strength, ductility and elongation. As we progress in our development of the art we shall no doubt learn to convert our cast steel or other metal welds into jointures of high ductility just as we learned, years ago, to convert our steel ingots into forgings.

The mere fact of our not having attained this proficiency in welding should not defer its progressive adoption for, even though we wholly ignore ductility and elongation in our catalog of virtues, its tensile strength and adaptability for multitudes of ships' jointures places it far in the lead of riveting.

By using welded jointures we obtain maximum strength with minimum weight of parts. We effect great savings in the construction cost by eliminating various processes such as templating, punching, riveting, chipping and caulking plates, slotting or notching beams and plates for inserts, shaping and forging difficult brackets and angles, and the many other operations akin thereto.

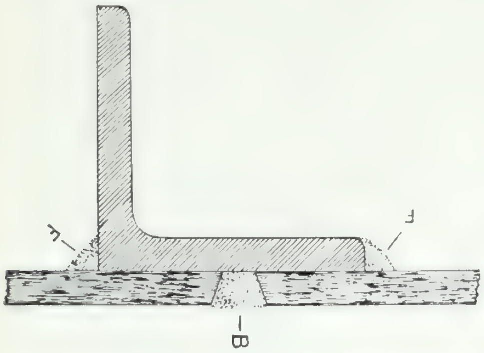


Figure 1

It is not claimed that the actual welding of plating joints is more rapid or less expensive than riveting, but, considered as a whole, welded construction can be executed more rapidly and with less expense than the aggregation of operations which, together, constitute riveted construction.

By no possible means can a riveted joint be made stronger or more durable than the plate itself, neither can the loss of strength due to perforating a plate be regained, even in part, by filling the hole with a rivet.

With welding it is only necessary to slightly increase the area of section to obtain a joint having 100 per cent plus efficiency.

METHODS OF WELDING

In the development of welded ship construction it is already evident some one system must ultimately survive as the fittest of the many methods now offered for forming the joints.

First, we have the forge welding which has served its purpose through all the ages since the days of Tubal Cain.

Second: Oxy-hydrogen and other gas welding, blow pipe puddling we might call it, used in various ways and degrees of efficiency for fifty years or more.

Third: Carbon arc welding, first introduced something over thirty years ago. By this process the current is carried through a carbon rod to within arcing distance of the plate and a separate metallic rod interposed in the field of the arc in such manner as to cause the plate edges and metallic rod to fuse together as a homogeneous weld. Like gas welding the carbon arc is more or less of a puddling operation and as such is relatively slow, limited in application and expensive.

Fourth: Thermit welding, invented by Goldschmidt. This has a wide range of application and gives excellent satisfaction, but, on account of having to first provide a mold for casting the weld, its use in ship construction is rather limited.

Fifth: Electric spot, or compression, welding; also known as resistance welding, developed by Elihu Thompson. For ventilator cowls, stacks and other light plate work and for end butt welding railing rods, spot welding is both rapid and efficient. It is not, however, suitable for heavy plating ointures, first, because the intermittent spot welds have no advantage over rivets for water tightness, and, second, the frequent pulling away of one or more spots among a group renders the process too uncertain to risk its use for important structures. Moreover, the great weight of units, if employed in field work, would make the cost of equipment prohibitive and the size of generating station necessary for supplying the 100,000 or more amperes of current required for welding one-half-inch plates would likewise prevent its extended use.

Sixth: Metallic arc welding, first patented by a Russian in 1887. In its present highly developed state this system appears to meet every requirement of the modern shipbuilder, excepting perhaps the welding of hull plates under water. It is entirely feasible to weld bulkhead plates and other fixtures to the inner surface of hull plating below water line while ship is afloat, and it excels both gas and carbon arc welding in that vertical and overhead seams can be perfectly **made** by any experienced operator. Moreover, with the possible exception of low ductility and elongation, good metallic arc welds are practically 100 per cent efficient.

Further than this, it would not be possible, within the limits of a single paper, to discuss the merits of the systems I have enumerated and also give the attention to questions of construction which I know are of far greater interest to you as designers.

Before passing on, however, I desire to relieve your minds of any fears you may have regarding the possibility of danger due to grounding the ship for arc welding. There really is no danger, especially where direct current apparatus is used, since the strength of current carried by the welding leads seldom exceeds twenty-five volts.

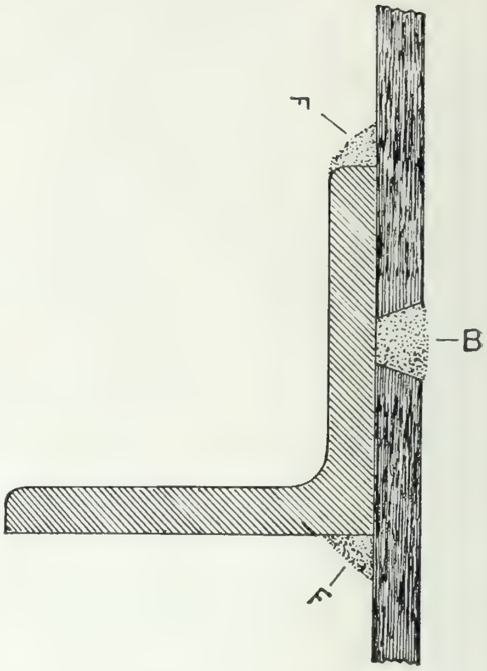


Figure 2

In a contribution to the current number of Marine Engineering I made the statement that welding has really suffered most at the hands of certain over-enthusiastic friends who urged the building of structures much beyond the proper capacity of their organization and equipment.

THE ULTIMATE SURVIVAL OF WELDED CONSTRUCTION

Making haste slowly has proved particularly beneficial in the development of this new method of ship construction, because it is enabling builders to gradually readjust their personnel and accumulate the necessary mechanical equipment.

These have been very necessary preliminaries which, fortunately, are being successfully accomplished and there now appears to be nothing in the way of attempting the larger problems beyond the organization of the welding staff. Will our shipbuilders rally to the new standard? Of course they will. Welded ship construction, as I said at the outset, is bound to survive as the fittest of our present known methods and, to repeat my preceding statement, the riveters and their allied operatives will be welcomed to the welding ranks with every prospect of peace and profit to all who conscientiously endeavor to make good.

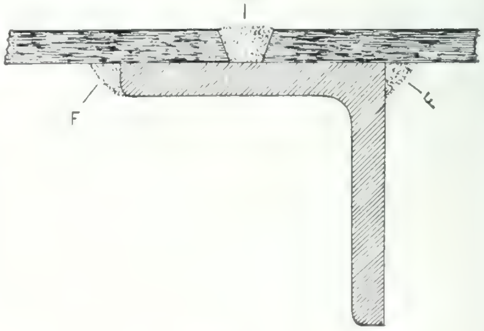


Figure 3

In their last official circular (No. 1328) of October 6, 1919, Lloyds state that "proposals to electrically weld parts of a vessel other than those previously listed . . . can be granted . . . provided the arrangements proposed are considered to be satisfactory and the system of welding intended to be employed has been recognized by the committee as complying with the prescribed regulations and tests."

In this connection I may add that Lloyd's present attitude toward welding is all that can be desired, as I think you must admit from the statement made to me less than ten days ago by Mr. H. J. Cox, assistant chief surveyor for the United States and Canada, that they stand ready to accept electric welding for any and all portions of vessels building to Lloyd's classification, provided, of course, said welding is done in accordance with the specification laid down in their circular of October 6.

NOMENCLATURE

The development of a welding nomenclature and system of designating symbols occupied a very considerable part of the Emergency Fleet welding committee's attention during its war-time activities and it was my intention to reproduce for you the various typical designs and symbols which they proposed should be standardized for general use.

My reason for not carrying out that intention is this: The briefest reproduction I have found of the so-called official nomenclature covers twelve 8-inch by 10-inch pages of pica type and small design sketches, and it seemed to me inadvisable to burden my story with a repetition of matter which has already been used by a number of catalog publishers.

Whether the welding committee's code will ever come into general use among marine draughtsmen is a question owing to its very complex nature, but I have no doubt its adoption or discard will be automatically accomplished as a natural operation of our daily experiences.

It is my belief that a very limited nomenclature, with not more than three or four characteristic symbols, will meet every requirement of inter-communication between draughting room and shop. If the foreman welder can be given a simple yet definite direction as to the strength or pressure requirements, plus arrangement of structure usually found on drawings, he will no doubt be fully competent to properly interpret that direction and perhaps execute the work more efficiently than he would with a drawing so filled with symbols and legendary directions as to place its interpretation far beyond the capacity of any ordinary mechanic.

Every arc weld of whatsoever form may be classed as a fillet weld (F), butt weld (B), or a plug weld (P), as may be better understood by reference to sketch, Figures 1 to 8, inclusive.

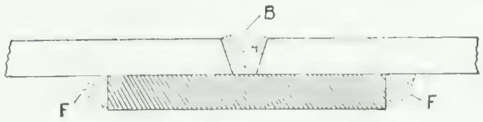


FIG. 4

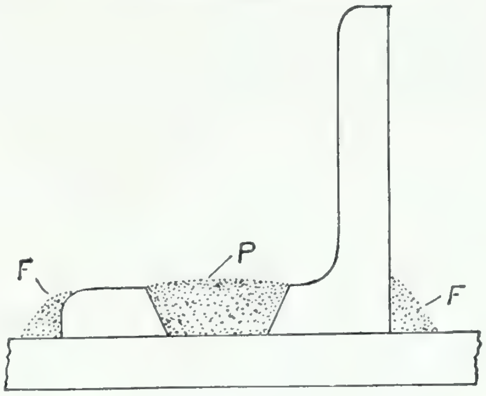


FIG. 5

According to position these become flat, side or overhead welds as, for illustration, in Figure 1 the F welds are flat while the B is shown as an overhead butt weld. By turning Figure 1 to position shown as Figure 2, B and F become side welds and F^1 an overhead weld..

By turning Figure 1 still further to position as in Figure 3, B becomes a flat weld, while both F and F^1 are overhead welds.

In Figure 4 the B and F welds are differently combined to produce a butt strap weld, or jointure, yet no essential change need be made in the instructions required for the proper interpretation of shop drawings which are usually complete at least to the extent of showing the assembly of parts.

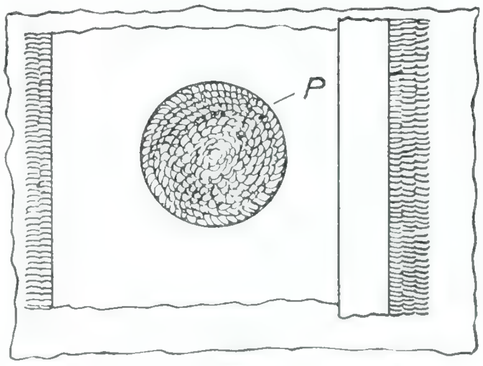


FIG. 6

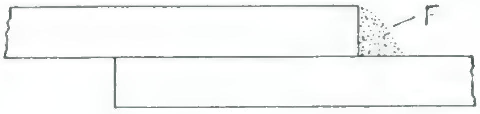


FIG. 7

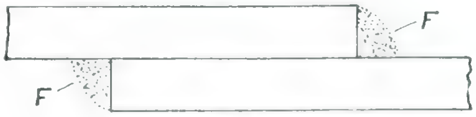


FIG. 8

In Figures 5 and 6 the plug weld (P) is introduced as a means of attaching angles or other like members to plating. This form of arc weld is a cheap but very efficient substitute for riveting and does not require any perforating of plates.

Figures 7 and 8 show another application of the F welds. If only one of the plate edges is to be welded, a single F can be used for its designation, but if both edges are welded the joint may be referred to in specifications as FF and the symbol F shown against each plate edge on drawing.

Further than above, it does not seem necessary to venture in the exploitation of symbolic directions for welding.

ELIMINATION OF UNNECESSARY MATERIALS

In conclusion let me suggest that in the preparation of drawings and shop orders for the fabrication of welded structures, the designer should keep constantly in mind the lesser dimensions of the plating required because of substituting open butt joints for the customary riveted laps.

He should also take advantage of the many opportunities for eliminating angles and other junction members so essential for riveted jointures but **wholly unnecessary in electrically welded seams.**

It is recommended that the designer consult freely with the welding engineer when developing the layout of new work as, between them, more efficient and economical results are secured.

A REVOLUTIONARY DEVELOPMENT

It should also be borne in mind that no holes are required in plating or shapes either for permanent jointures or assembling.

The latter operation is a special development of the welding art and its accomplishment emphasizes the possible elimination of the layer-out, all operations accessory to riveting and the greater portion of all mold loft and template work.

Plates for the welded ship will be mill sheared to specification and templates furnished by drafting room, delivered direct to job and erected without further fabrication except in special cases requiring beveling or shaping.

By some these ideas will no doubt be considered revolutionary in the extreme, and yet, who among them all, can prove my statement wrong?

It is not many rods from this platform to that sacred spot where, less than a century and a half ago, the greatest revolution in all history was confirmed and while that success may not stand as the godfather of all revolutionary propaganda promoted within the shadow of Independence Hall, my experience with welding prompts the belief that the present decade will witness the complete realization of my prodiction.

DAY LINE ADDS TO FLEET

A FINE passenger carrying steel steamer, to be known as the De Witt Clinton, will take her place next spring as one of the fleet which for more than fifty years has offered daylight trips on the Hudson River between New York and Albany. Famous in this fleet was the Mary Powell, known to thousands of New Yorkers and only recently ending her long and honored career. The present fleet comprises the Washington Irving, Hendrick Hudson, Robert Fulton and Albany. Together with the De Witt Clinton, this fleet will have a licensed passenger carrying capacity of almost 24,000. So great has been the growth of the Day Line business that on recent holidays thousands of people have been disappointed in their effort to buy tickets, and the new boat was purchased in order to better care for the regular and special business of the company.

The De Witt Clinton has a length of 320 feet 2 inches and a breadth of 48 feet 1 inch. She was purchased by the government for use during the war and, like many so acquired, the need for her ceased when the fighting was over and our troops returned home. She has now been bought by the Day Line and will be rebuilt from the main deck up to resemble the Washington Irving, with numerous plate glass windows and large open decks. She will be ready for service when the Day Line seasons reopens in May, 1921.

In keeping with the policy of the Day Line to commemorate in the names of its boats some of the famous characters of early Hudson history, the De Witt Clinton is to honor the memory of the man who, as Senator, mayor, and twice governor of New York, did more perhaps than any other to inaugurate our public school system.

In recognition of this fact, 5000 students of the De Witt Clinton high school of New York will be asked to submit for prizes some of the famous sayings of Governor Clinton, and these will be inscribed in suitable panel decorations on the new boat.

VESSELS OF U. S. SHIPPING BOARD

Class	Total		Cargo		Cargo & Passenger		Tankers		Refrigerators		Transports	
Contract Steel Vessels	956	6,429,059	902	5,913,788	....	....	45	438,342	8	68,107	1	8,822
Requisition Steel Vessels	205	1,334,609	182	1,161,359	....	....	14	110,938	7	44,513	2	17,799
Wood and Composite Vessels	271	997,854	271	997,854	....	....	....	....	....	....	....	....
Concrete Vessels	4	13,500	4	13,500		....	....	....	....	....	....	....
Purchased Vessels	24	157,921	24	157,921	....	....	....	....	....	....	....	....
Seized German and Austrian Vessels	31	291,821	5	28,824	26	262,997	....	....	....	....	....	....
Chartered from Peru (Callao-Eten)	2	18,700	....	....	2	18,700	....	....	....	....	....	....
Total	1,493	9,243,464	1388	8,273,246	28	281,697	59	549,280	15	112,620	3	26,621

ACTUAL KEEL LAYINGS, LAUNCHINGS AND DELIVERIES

Month to Date	No.	Keels Laid D. W. T.	No.	Launched D. W. T.	No.	Delivered D. W. T.
Contract steel	1	10,200	1	10,000	1	5,075
Requisitioned steel	....	....			....	....
Composite		..			....	....
Wood		..			2	....
Concrete						....
Total	1	10,200	1	10,000	3	5,075

Year to Date	No.	Keels Laid D. W. T.	No.	Launched D. W. T.	No.	Delivered D. W. T.
Contract steel	25	228,150	158	1,204,718	220	1,486,139
Requisitioned steel	6	61,400	7	61,770	10	82,870
Composite	....				..	....
Wood	....		16	31,050	43	84,650
Concrete	....				3	18,500
Total	31	289,550	181	1,297,538	276	1,672,159

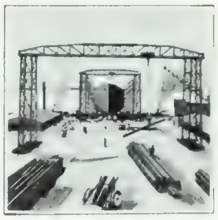
Total to Date	No.	Keels Laid D. W. T.	No.	Launched D. W. T.	No.	Delivered D. W. T.
1300 Contract steel	1287	8,597,245	1172	7,649,215	1073	6,842,187
384 Requisitioned steel	384	2,687,266	374	2,585,966	372	2,572,666
18 Composite	18	63,000	18	63,000	18	63,000
589 Wood	589	1,885,250	589	1,885,250	570	1,881,250
12 Concrete	12	73,500	7	36,000	6	28.500
Grand Total, 2303	2281	13,306,261	2160	12,219,461	2039	11,387,603

THE UNION SHIPBUILDING COMPANY OPENS NEW YORK OFFICE

THE Union Shipbuilding Company of Baltimore, Maryland, has opened a New York office. The office is located at the Hudson Terminal Building, 50 Church street, and will be under the charge of P. L. Rhodes, who has been appointed New York representative. Mr. Rhodes has been identified with the various departments of the yard in the past and was previously connected with several yards of the North Atlantic Coast and the Great Lakes.

The Union Shipbuilding Company is rapidly extending its repair facilities to meet the needs of Baltimore's increasing tonnage. Their new marine railway, capable of handling a vessel up to 10,000 tons deadweight, is under construction and will be in operation within a few months. Two 9700-ton tankers are now building for the Gulf Refining Company, and two 4700-ton cargo steamers and a steel tug have just been delivered to the Aluminum Line, a subsidiary corporation of the Aluminum Company of America. Preparations have been made for laying down two of the company's 9500-ton standard cargo steamers.

Material Handling



PORT FACILITIES*

By CHARLES EVAN FOWLER

Member American Society Civil Engineers, Engineering Institute of Canada

THE certainty that the construction of a Great Lakes - St. Lawrence ocean waterway is to be seriously undertaken, immediately shows the need for a comprehensive study of the harbors of the world by upwards of fifty million people of the North American continent, who have heretofore regarded ocean commerce as of little personal concern. With the completion of such a waterway, not only do Toronto, Buffalo, Cleveland, Toledo, Detroit, Windsor, Chicago, Milwaukee, Duluth and other Lake cities become world ports, but vast areas of their hinterland become territory from which to draw directly for ocean commerce.

The harbors of the world as they now exist, with regard to channels, safe anchorages, docks and facilities for taking care of the ships carrying world commerce, have been the development of the past two generations, and what we regard as modern has been created during the past quarter of a century.

The pre-war expenditure for the construction of ports was only comparatively moderate in amount, and not sufficient to provide the most permanent form of improvements and modern freight-handling equipment. The amount expended for the port of London, while of necessity large, was less than $200,000,000; for Liverpool about $125,000,000; for Antwerp less than $50,000,000; for Hamburg about $100,000,000; for New York less than $100,000,000; for San Francisco about $40,000,000; for Seattle about $25,000,000; and for Montreal upwards of $10,000,000. The total now invested by the ports themselves, by private interests, and by governmental war investments, will undoubtedly in many harbors be double or treble the pre-war figures, but in no case has it been sufficient to provide permanent improvements, nor a sufficiency of modern freight-handling equipment.

The development in European ports during the war was confined mostly to England, France and Italy, the largest increase having been in French ports, where the construction was of necessity largely of a temporary nature, and for meeting the war emergency. The greatest seaports of Continental Europe before the war were Hamburg and Bremen in Germany, and Antwerp in Belgium, from which were handled the commerce of a great area of Europe. The sea-walls, docks and warehouses were of a permanent character, and the freight-handling equipment good and very extensive.

South America has developed many of its ports in a manner second only to Europe, and Buenos Aires may be considered as one of the world's best constructed harbors, with an equipment of grain elevators and freight-handling machinery of first-class character. Oriental countries are as a rule not provided with modern harbors, and this is due largely to the great supply of cheap labor. Shanghai, for instance, as one of the great China ports, requires the anchoring of large ships offshore and the lightering of freight to and from the vessel.

North American ports up to 1900 showed only a very moderate average in improvements and equipment. New York City, as one of the great world ports, even now has no permanent docks, and none of design for the proper handling of large ships and great quantities of cargoes, unless we except some of the private docks, like those of the Bush Terminal. Freight-handling machinery is conspicuous chiefly by its absence. The government improvements, such as the South Brooklyn terminals, were of a more permanent type, and represent an expenditure of tens of millions of dollars, which will accrue to the good of New York harbor.

Boston, Philadelphia and Baltimore benefited very greatly by government expenditures during the war, and Philadelphia has gained the reputation of being the best equipped with freight-handling machinery of any of the Atlantic ports of the United States, although comparative figures are not available to confirm this statement.

New Orleans is the only Gulf port with extensive improvements, and on account of the public control of the waterfront

Ore unloaders at the port of Baltimore

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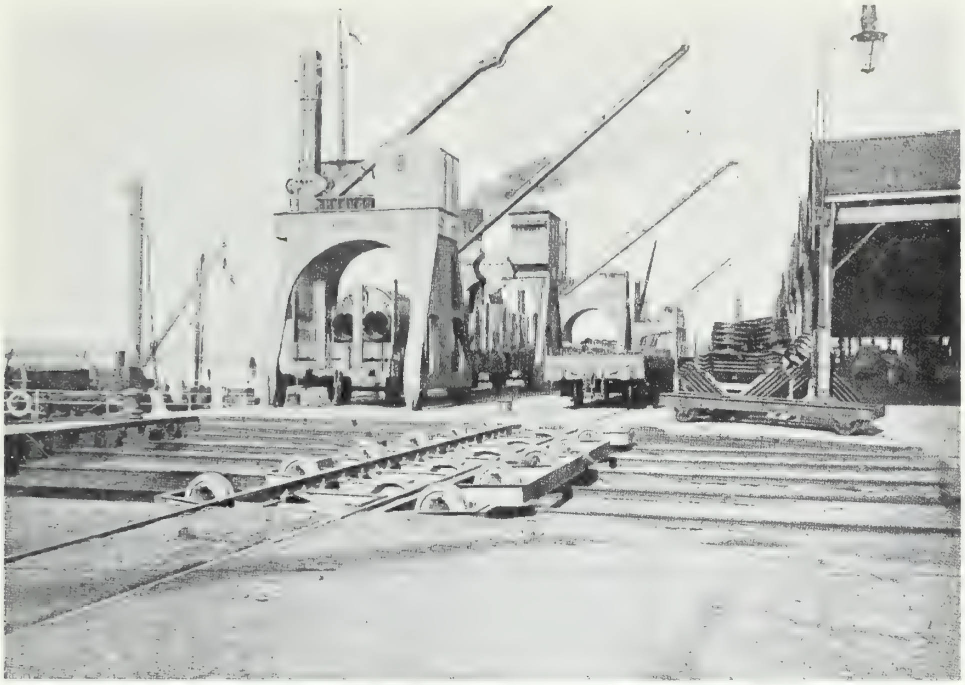
* Address delivered at the Great Lakes and St. Lawrence Water Way Congress, July 22-24



Dock cranes at the port of Antwerp

may be expected to develop into one of the principal North American ports. Mobile and Galveston are so situated that much more may be anticipated of them in the future as world ports.

The Pacific Coast of the United States is one of the sections of the world best provided by nature with commodious harbors. Puget Sound on the north is a great inland sea with about 1500 miles of coast line; Grays Harbor and Willapa Harbor are two more fine natural harbors on the north coast, while the Columbia River provides a great ocean waterway for Portland and Oregon. San Francisco Bay is second only to Puget Sound, and San Diego Bay is the most southern of these natural harbors. San Francisco leads in the largest investment, the most permanent docks, and the most highly organized governing authority of any Pacific Coast harbor and probably the best in the United States. The state of California exercises full control through the State Board of Harbor Commissions. Seattle ranks first in the commerce of the Pacific Coast ports, second in the extent and permanency of its harbor developments and government control, and first in freight-handling equipment. Los Angeles has spent large sums in dredging a harbor out of low lands adjacent to San Pedro Bay, and, with the smallest natural advantages, has undoubtedly made the greatest proportional progress.

Canadian ocean ports have been largely the development of the past fifteen years. Montreal, through its harbor commission, has undertaken the construction of a harbor in the most logical and systematic manner of any North American city, unless we regard Seattle as being on an equality with it in most respects. With a deep-water channel by way of the St. Lawrence to the ocean, they have more vital interests at stake than any of the present ocean ports that will be affected by the Great Lakes waterway. The new government docks at Halifax have made that city the principal Atlantic Coast port of Canada, and extensive improvements at Vancouver, Victoria and Prince Rupert have made the Canadian Pacific Coast a great factor in handling Oriental and world commerce.

GREAT LAKES PORTS

The Great Lakes cities are well calculated to handle an immense volume of ocean commerce in perhaps the most economical manner of any region in the world, the reason for this being the schooling that shipping men have had through the handling of the immense tonnage of ore cargoes, as well as a large amount of coal, wheat and lumber. The tonnage passing Detroit in 1919 was the great total of 100,000,000,000 tons, and this is handled in a truly wonderful manner. Ships carrying 5000 tons of ore are loaded by chutes at the Lake Superior ore docks in a few hours and are unloaded by batteries of gantry cranes (or by ore unloaders of the type described in another article in this issue of Pacific Marine Review) at the Lake Erie docks in about five to eight hours. The coal cargoes are also handled in a very rapid manner by special loaders and unloaders, and the grain elevators of the Lakes cities are famed the world over for size and equipment. Toronto, for example, has expended a large portion of a $25,000,000 appropriation for an extensive harbor and dock development. The dredging of 16,000,000 cubic yards of material has resulted also in reclaiming about 800 acres of land and has provided large ship channels, one of which is 400 feet wide, 8000 feet long, with a turning basin 1100 feet square. There have been constructed six moles of concrete wharf wall, and seven and a third miles of waterfront rail lines.

The Great Lakes cities of Buffalo, Cleveland, Toledo, Detroit, Chicago, Milwaukee and Duluth have planned extensive ship terminals, and a large amount of construction has been completed. These cities and a great number of smaller ones are in a position to have extensive ocean terminals completed and ready for operation by the opening of the ship channel for ocean business.

The reasons for the need of port development have been most plainly stated by the Montreal Harbor Commission, and should be adopted by any city desiring to become a factor in handling water-borne commerce:

"The ports that are doing the biggest business, and doing it most efficiently, are the ports that have kept their facilities ahead of actual requirements.

"The ports that have remained stationary or lost in prestige have been those which neglected to provide facilities before business was forced to seek elsewhere the same facilities provided by rival terminals. Business follows the facilities.

"Unity of authority, concentration of business, depth of water areas and facilities for dispatch of business are the prominent characteristics of successful port administration.

"The necessity of providing large and convenient storage areas where cargo may be collected and cared for.

"The lowest cost of handling cargo from the hold of the ship to consignee, and vice versa, was found to be in a port where one authority controlled the entire operation, and where transit sheds were three to five stories high.

"Great port developments have invariably been followed by increase of trade and population."

In making an exhaustive study of the subject, three types of ports will be found to exist: First, piers or docks projected out from the shore line, much as are found in most of the ports of the United States. Analogous to these are docks or quays built parallel to the shore line. With both types the vessels lie in tidal basins and are subject to the rise and fall of the tide. Many of the European ports are of this type. Wet docks, the third type, consist of basins artificially constructed and approached through locks, so that the vessels discharge and load under a uniform stage of water. Each type has its advantages, although the method of construction depends very largely upon the local conditions to be contended with.

PORT ADMINISTRATION

Port administration is of various types, although it has been found to be universally the case that where one authority has full charge of a port the best results are obtained. This may be either as a department of the city government adjacent to the port, like the department of docks

Ore or crushed rock conveyor steamer used on the Great Lakes

and ferries of New York City, or as a separate organization, such as the Port of Portland, having charge of all navigation questions within the port district; or it may be under state control, as in the case of San Francisco harbor, where the State Harbor Commission controls. The other type of control is where various corporations and organizations exercise separate control of various portions of a port. This leads to almost endless trouble and a great lack of uniformity in the carrying out of improvements; to say nothing of the great delay that results in extensive works which must be carried out by the co-operation of various organizations. The conclusion is reached that a port district governed by a port commission having authority to regulate all matters and provide for its own finances, and carry out its own work, will be the most desirable of the several types enumerated.

PORT CHARGES

The question of port charges is a very complicated one, but it may be divided generally into three classe: first, a charge against the ship; second, a charge against the cargo or goods carried upon the vessel; and third, a charge for rental of the berth for the ship and storage space in the warehouses or freight sheds on the piers.

In London the channel of the river is being deepened by doubling the tonnage dues on the ship for three years. In Antwerp there is no charge against the goods. In Hamburg the Hamburg-American Steamship Company leases seven piers fully equipped by the port authorities with transit sheds, cranes, etc. The company pays for these privileges:

1. (1) An annual rental of $325,000 for the space rented.
2. (2) The regular tonnage dues imposed by the port; and
3. (3) Maintains the leased property in good condition.

It is, however, universally recognized that the maintenance of a port and the interest on the cost of its development cannot in its early stages be wholly paid out of the charges imposed. It is also recognized as a matter of policy that modern harbor improvement is essential, notwithstanding the above fact, and that the state or the controlling power of the harbor must make up the difference in the cost of maintenance and interest from other sources in the interest of the whole country at large.

TYPES OF DOCKS AND PIERS

Many of the types of docks or piers employed in the harbors of the United States are of only temporary character, the cheapest being ordinary untreated piles with timber deck and timber sheds or warehouses. These are subject to very rapid decay and to loss from fire. The depreciation on docks of this character will amount to from 12 to 15 per cent per annum. Where creosoted piles are used the depreciation would probably be reduced to from 7 to 10 per cent per annum, as piles creosoted with sixteen pounds of creosote per cubic foot should last from fifteen to twenty years. The wharves constructed at the Puget Sound navy yard with creosoted piles spaced eight feet centers in both directions, have cost before 1914 from 90 cents to $1 per square foot of floor surface, exclusive of warehouses.

The new Chelsea docks on North River in New York, nine in number, are founded on untreated piles, as no teredos are to be guarded against, with timber deck on which paving is laid, and on which two-story fire-proof warehouses have been constructed. The warehouses alone have cost in the neighborhood of six cents per cubic foot.

Proposed new piers at South Brooklyn

Birdseye view of the port of Southampton, England, showing dock cranes and big trans-Atlantic liners at dock

will be constructed with solid filling between masonry walls throughout the central portion of the pier, supporting fireproof sheds with cantilever arms extended out over wooden piers built alongside of the central solid portion. The piles in this type of pier will be creosoted on account of the necessity for guarding against the teredo in this part of New York harbor.

The Chelsea piers have a length of about 800 feet and width of 125 feet, with slips 250 feet in width. The Bush terminals have piers with a length of over 1300 feet, width of 150 feet, with slips 270 feet wide. These piers have fire-proof warehouses immediately adjoining them upon shore, together with railroad yards and tracks extending to the warehouse and out on to the piers, so that cargoes may be handled direct from rail to vessel, and vice versa.

The five new piers constructed at Baltimore have been constructed of oblong cylinders sunk along the outer margin, twenty-five feet apart, connected together with steel girders and anchored across the width of the piers, so that reinforced concrete sheet piling has been driven back of those connecting girders, and the central space filled in solid with earth on which to construct the warehouses. The depth of water in the slips is only twenty-four feet at low tide, or sufficient to take care of the coastwise vessels entering that port.

Various other types of permanent piers have been constructed founded upon steel cylinders filled with concrete, but in one case, notably at Long Beach, California, where the cylinders had become badly corroded, the concrete filling was so poor that the dock collapsed in the heavy breakers. The United States Navy Department has constructed reinforced concrete piers founded upon four reinforced cylindrical columns in each bent connected together with reinforced concrete deck. This type of pier will cost approximately two and one-half times what would be necessary to build a wooden pier upon creosoted piling, such as was previously used.

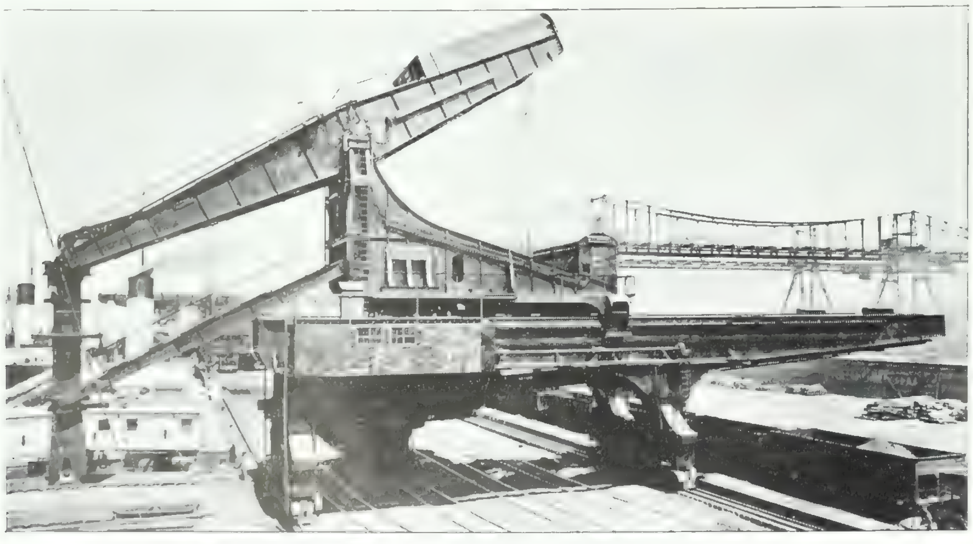
PORT EQUIPMENT

Port equipment is a very essential feature with even the best class of docks and warehouses. While such freight ships as the vessels of the American-Hawaiian Line are provided with cargo booms sufficient for fairly economical handling of freight in the ports to which they ply, when these latter ships discharge a load at the Isthmus of Tehuantepec in the ports of Salina Cruz and Puerto Mexico, they are discharged and loaded by means of the cargo booms and two traveling cranes on the dock for each ship as well. Twelve gangs of from twelve to fifteen men each are employed, and 12,500 tons of cargo are discharged and 10,000 tons of cargo are loaded into the vessel in a period of thirteen days. This is presented merely as an illustration of the necessity for freight-handling devices where economical handling of cargo is desired. On the Great Lakes, as has been stated, the ore vessels are loaded with ore at the docks on Lake Superior in a few hours and are discharged at the ports in the vicinity of Cleveland on Lake Erie by means of bridge tramways which cover all hatches of vessels, in from five hours to one day's time. These same vessels carry coal from Lake Erie to upper Lake points and discharge as high as 9000 tons of coal in less than twenty-four hours. It is only necessary to contrast these results with the slow loading and unloading of vessels where no freight-handling devices are provided, to see the advantage that one port can have over another.

From their reports, it will be seen that London docks were provided before the war wilth upwards of 1800 handling cranes; Hamburg with approximately 1000 cranes; Antwerp with approximately 400 handling cranes, all of which are rented to the vessels with fuel and operators at from $4 to $5 per day for the smaller sizes and proportionately for the larger, thus giving these ports a great prestige over others not so equipped. The larger docks of New York, represented by the Chelsea group, may be later equipped with handling devices for unloading and loading vessels, but are now provided to some extent with telerpherage systems for distribution of freight through the warehouses. Many ports are also provided with electric conveyors for handling package freight between the vessel and the dock, similar to those employed on Puget Sound for loading sacked grain.

The folly of temporary construction is being brought home forcibly to many of the largest North American ports, and inadequate improvements are also a very great handicap to any port. The old type of short, narrow piers, of only about 100 feet width, are giving way to such as are being built at Seattle. These have a width of about 350 feet and a length of about 2500 feet; thus giving about a mile of water frontage to one pier, plenty of room alongside the warehouses and an abundance of space for piling cargo in the open when it is such as will not be damaged by the weather. Then, too, the old-fashioned slips or water space between piers of only 100 feet in width is giving way to slips from 200 to 300 feet wide, giving room for lightering cargo alongside the ship as is often necessary.

The final word may be to point out the great need for more labor-saving cargo-handling machinery, and then to recommend still more cargo-handling machinery. What shall it profit a port in the future if, having fine natural advantages, it is not built on the best plan and construction, and lacks labor-saving equipment in sufficient amount to handle large cargoes quickly and cheaply. Let the Great Lakes cities profit by the mistakes made by their elders, the great salt water ports.



Wellman-Seaver-Morgan ore unloader at Conneaut, Ohio. Figure 1 of article on page 95

ACTIVE ATLANTIC COAST IMPROVEMENTS IN BULK CARGO HANDLING

IN the past four years several factors have caused a stimulation of interest among shippers of heavy bulk materials in a cheaper and more rapid scheme of handling such commodities. The manufacturers of apparatus, especially the pioneers in this line, started a movement in this direction some twenty years ago, and succeeded in getting a limited number of plants installed as early as 1902. The development of plants for handling large tonnage of coal and iron ore was the most obvious necessity, and it was naturally the first problem attacked on a large scale. The necessity for such development centered around the Great Lakes region and the pioneer installations were put in in this vicinity. The short season of navigation from the Minnesota, Wisconsin and Michigan ore fields to the blast furnaces of the lower lakes and the Pittsburgh district, require a movement of twelve months' supply of ore in about seven months. The coal supply of the states bordering on the iron ore region was largely taken from the lower lakes on the return trip of the ore boats. In order to perform this task with the minimum of equipment and operating costs per ton, it was plainly necessary to provide machinery for cheap and rapid discharge of cargo from ship to dock or railroad, and vice versa, the length of time the ship was tied up to the dock being a vital factor in costs. The result has been a high state of development and concentration of bulk cargo-handling plants in the Lakes region.

In the late nineties the Wellman-Seaver-Morgan Company brought out their ore unloader, each machine capable of handling ore at from 500 tons per hour upward. At about the same time car dumpers for overturning standard railway cars and dumping their contents were developed. The latter have been evolved until at present they will handle thirty dumps per hour and upward, some installations handling as much as 3000 tons per hour of net material, two cars in tandem.

Conditions largely due to the European war caused a more general interest to be developed along our coast line in these methods. Prior to our participation in the war, a few installations had been made on the Atlantic Coast, especially in the line of loading cargo and bunker coal. Rising labor costs and necessity of rapid "turn around" on the comparatively few vessels available brought the issue of improved dock facilities to the forefront. It was a question of time, tonnage capacity, over a given waterfront, and cost per ton. All the above items in the problem are satisfactorily answered by equipment of the type previously mentioned, and what was still more vital the item of labor in normal volume being unobtainable at any price.

Two contracts recently secured by Wellman-Seaver-Morgan on the Atlantic Coast are interesting at this time. A contract with the Lehigh Valley Railroad Company covers an automatic ore unloader carrying a fifteen-ton clam-shell bucket on the unloader leg and designed to make a complete cycle or round trip in fifty seconds. The machine electrically operated throughout is illustrated by Figure 1 accompanying this article. This view, together with Figure 2, llustrates the general appearance of similar apparatus in action.

The automatic unloader illustrated is unique in design and has proved through many years of service to be one of the most successful devices for unloading ore cargoes from steamers with suitable hatches. Although of immense proportions, the design has been simplified and the control perfected to such a point that the machine is the last word in delicacy of control and operation. .

The unloader consists of a main framework mounted on trucks which travel along the runway rails which are located approximately as shown in the photograph. The main framework extends back beyond the rear runway over a temporary storage pile where the ore can be discharged if desired. It is then picked up by the ore bridge and carried to the stock pile. Between the front and rear runways, space is provided for railroad tracks where ore-carrying cars are placed under the machines and loaded with ore for transportation to the furnace plants. The girders of the main framework form a support for runway rails, on which a trolley travels. This trolley supports a balanced walking beam, from the outer end of which a stiff bucket leg depends. At the lower end of this leg is the bucket, which is operated by machinery located on the walking beam. All horizontal movements of the bucket are accomplished by means of moving the trolley backward and forward on the girders. The vertical movements of the bucket are accomplished by the operation of the walking beam. The forward portion of the beam being out of balance, the bucket descends by gravity as soon as the brakes of the hoisting mechanism are released.

Only two operators are required for the entire operation of one of these machines. One of the operators, whose station is in the bucket leg directly over the bucket shells, controls all of the motions of raising and lowering the bucket, of traveling the trolley back and forth, and moving the machine along the dock from one hatch to another. The second operator is stationed in a cab on the larry and from this station he controls the movement of the larry, the operation of the larry gates, and the weighing of the ore.

Some idea of the capacities of unloading by this method may be derived from a record which was made in Ashtabula by eight machines of this type, having a capacity of fifteen tons each, unloading seven boats having a total capacity of 70,000 tons in twenty-two hours' actual time. At other points, four machines working in boats having capacities up to 13,000 tons have unloaded these cargoes

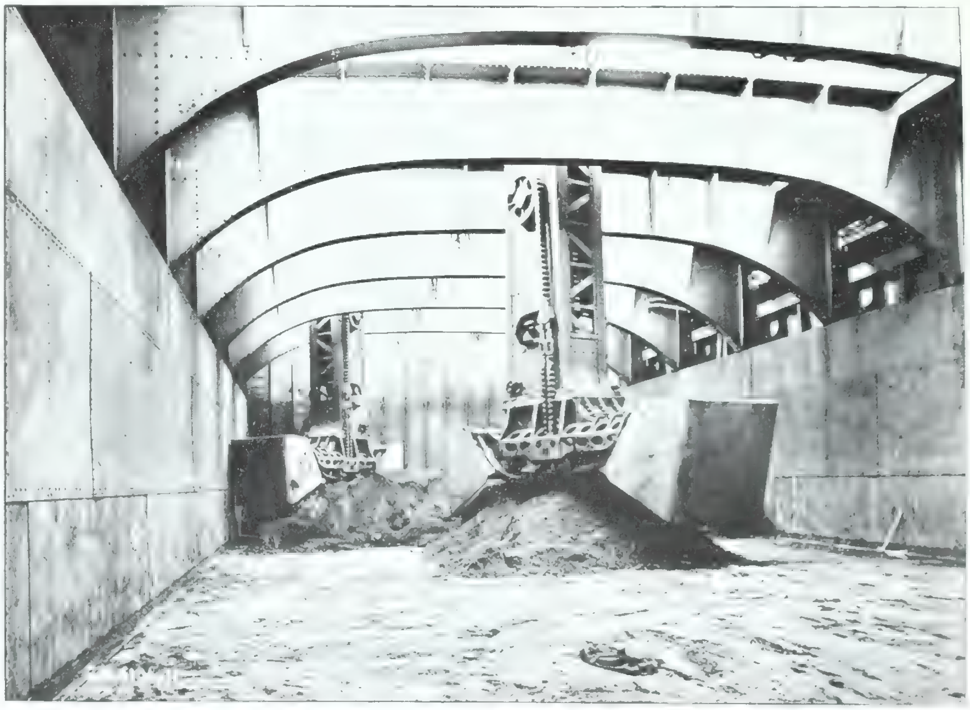


Figure 2. View in hold of Great Lakes ore steamer showing the bucket legs of two Wellman-Seaver-Morgan ore unloaders in action

in about three hours and twenty-five minutes.

In addition to the vertical movement, which is given to the bucket leg by means of the walking beam, it also has a motion of rotation around its vertical axis. This motion is introduced to enable the machine to reach along the kell of the boat and clean up ore between hatches. The distance from point to point of bucket shells when open is approximately twenty-one feet. About 97 per cent of the ore is removed from the boat without hand labor.

Records of fifty machines in operation indicate that this type of machine will handle ore at 2½ to 4½ cents per ton, including all fixed charges, and records of as high as 783 tons of ore per hour per machine from tie-up to cast-off of boat have been made.

The Lehigh ore unloader will be installed at the Claremont terminals, New York harbor, to handle Chilean and Cuban ore. A cost of pig iron lower than that based on Minnesota ore is preduicted, due to economies effected.

A contract with the Western Maryland Railroad Company at Port Covington, Baltimore, covers a Wellman car dumper to handle 100-ton road cars. It is the first electrically operated lifting dumper for seaboard coal loading to be negotiated. The lifting feature is designed to raise the road car high enough before overturning to cause the coal to run down the apron and chute into the ship's hold, as illustrated in Figure 3. Dumping directly to the ship eliminates breakage and waste due to rehandling. The entire cargo is trimmed without the use of hand labor.

The machine consists essentially of a rectangular framework supporting a rotating cradle in which the loaded railroad car is held while discharging. An entirely automatic counterweight device clamps the car to cradle which is inverted by the revolving mechanism, carrying the car with it. The top of the cradle forms a chute for directing the material as it flows out.

This installation will have a nominal capacity of thirty to forty-five cars per hour of cargo and bunker coal, principally for export. The coal is delivered to the dumper by the Western Maryland Railroad from the West Virginia, Virginia and Pennsylvania fields. One million tons will be handled annually with a probable increase to twice that capacity later.

These typical plants indicate the essential soundness and progress of our basic industries, and the gradual elimination of hand labor, which is then diverted to more useful and productive work. These plants also indicate that beneath the surface froth of labor unrest and business uncertainty of the day, there is a constant current of accomplishment and confidence. The former are merely the phenomena of a business cycle and the latter is the foundation of the commercial future.

WESTINGHOUSE CHANGES

L. D. CANFIELD, assistant district service manager at the New York office of the Westinghouse Electric & Manufacturing Company, was appointed district service manager to succeed L. G. Richards, who has been transferred to East Pittsburgh.

W. E. Freeman has been appointed director of commercial training of the Westinghouse Electric & Manufacturing Company.

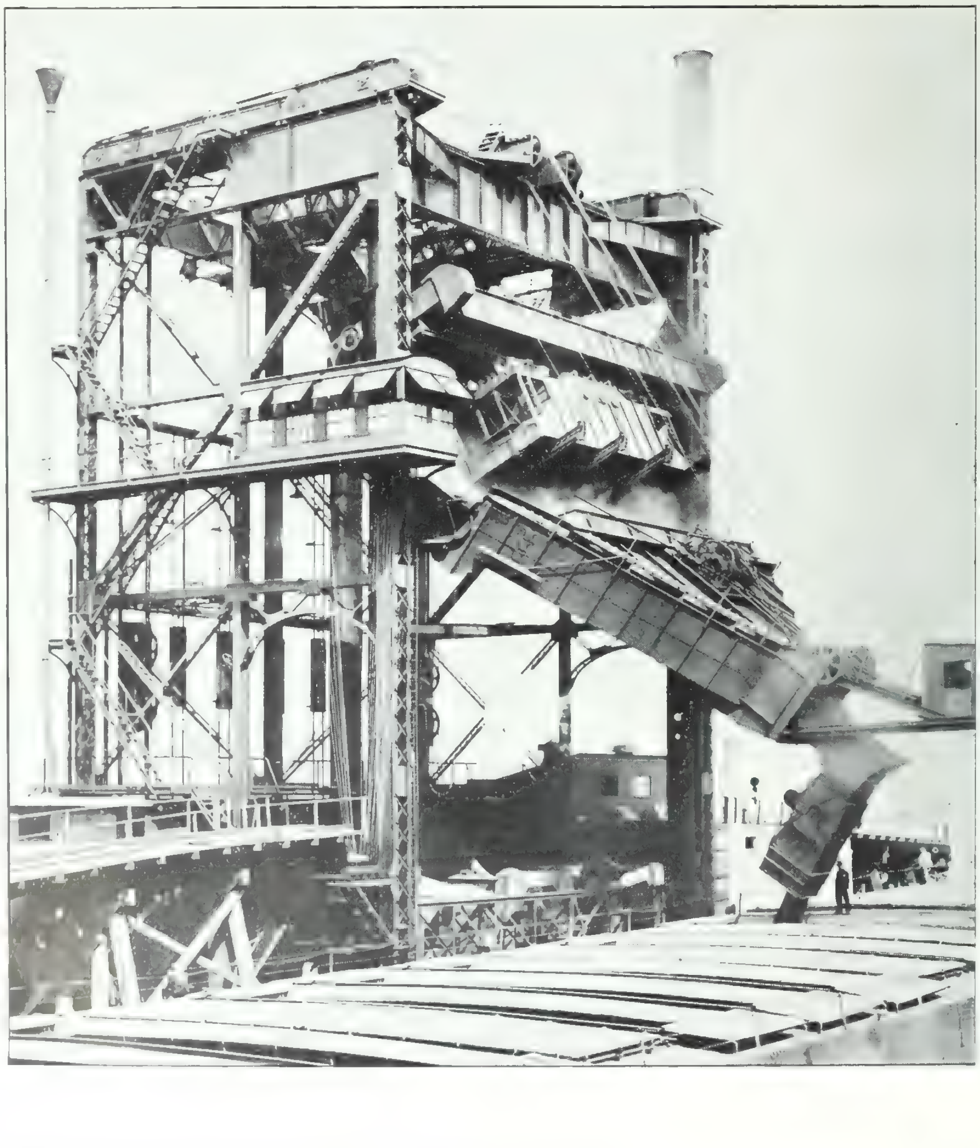
The following appointments have been made in the Los Angeles district office of the Westinghouse Electric & Manufacturing Company:

G. O. Noble, appointed special representative.

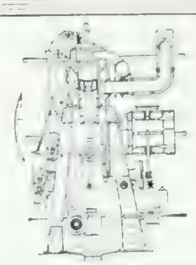
G. B. Kirker, appointed manager railway division.

R. A. Hopkins, appointed manager of the power and marine division.

THE interesting looking structure illustrated herewith is an electrically operated car dumper installed by the Wellman-Seaver-Morgan Company at the Sandusky, Ohio, docks of the Pennsylvania Railroad. A similar machine is being installed by Wellman-Seaver-Morgan at Port Covington, Baltimore, for the Western Maryland Railroad Company. This mechanism handles 100-ton coal cars as easily as you would handle an apple or an orange. The car having run onto the cradle of the machine is elevated, inverted, and its contents dumped into a huge hopper from which they run by gravity through a chute into the holds of the waiting cargo carrier. The theoretical capacity of the machine is from thirty to forty-five cars per hour, so that these machines can easily handle 3000 tons of coal on an eight-hour shift. As the great bulk of the world's merchant marine fleet is still burning coal under its boilers, the importance of such handling facilities as this at our ocean terminals can hardly be over-estimated.



Oil Engines and Motorships



MOTORSHIP BUILDING IN EUROPE

THE possibilities of the motor passenger ship are now being fully realized by European motorship owners, and following on the decision of the British India Steam Navigation Company to construct three large passenger boats for the Indian service, details of which were recently given in Pacific Marine Review, Mr. Dan Brostrom has placed an order for a motor passenger vessel for service between Scandinavia and America which will be a good deal larger than the ships being built for the British firm. The new liner will be run by the Swedish American Line and everything tends to confirm the belief that all Scandinavian shipowners are now thoroughly converted to the exclusive adoption of motor vessels. Perhaps no clearer proof of this could be given than the commencement which has been made towards the conversion of the fleet of steamers of the Transatlantic Company of Gothenburg to motor power. The first vessel on which conversion is to be carried out is the Bolmen, constructed in 1896, from which reciprocating steam engines are to be removed and a 1700-horsepower two-cycle Diesel engine, built by the Atlas Polar Company of Stockholm, installed. An even more interestng conversion is that which is now being effected at Hamburg to a vessel owned by the Hamburg-American Company, and in this case Diesel engines of the Sulzer two-cycle type are to replace the existing steam engine.

The Sulzer type of motor appears likely to play an important part in motor shipbuilding in the next few years. Two ships fitted with machinery of this design will shortly be completed in Great Britain, the first being a vessel for the British India Steam Navigation Company, now under consideration with Alexander Stephen & Sons, who recently acquired a license for Sulzer Diesel engines. This ship is 430 feet in length with a beam of 54 feet 6 inches, and is provided with two 1600-horsepower four-cylinder engines. Another Sulzer-engined ship is approaching completion at Armstrongs' yard for Scandinavian owners, and in both of these vessels a distinct departure will be made from existing motorship practice. This lies in the separation of the scavenging pump from the engine, which will only drive the air compressors for injection and starting air. The scavenging air will be supplied from electrically-driven turbo-blowers. The cost of installation is slightly higher, but the engine is shorter in length, while it is claimed the scavenging is more efficient and additional scavenging air may be supplied when required, and, generally speaking, a better control effected.

Another new feature of the Sulzer engine, which is also adopted in the Busch Sulzer motor, is the combination of the air-starting and fuel valves in one cage, so that only one hole has to be bored in the cylinder cover. This, combined with the fact that the covers are made of cast steel, will, it is hoped, lead to the elimination of any possibility of cracks in the covers which have always been the bugbear in two-cycle motors. A further modification from the pre-war design is the adoption of a semi-rotary valve for the admission of the scavenging air through the top row of scavenging ports in the cylinder. It will be remembered that Sulzers were the first Diesel engine manufacturers to adopt the system of scavenging through two rows of ports, the idea being to supercharge the cylinder with air after the exhaust ports had been closed. This results in a higher specific output for given cylinder dimensions and the arrangement has proved extremely successful even in large sizes up to 4000 b. h. p.

Originally the admission of extra scavenging air to the top row of ports was controlled by means of a double beat valve operated from the camshaft, but this has now been superseded by the rotary type of valve, all the valves for the four or six cylinders being actuated from a horizontal shaft contained wholly within the scavenging trunk and driven from the vertical governor shaft, which also turns the camshaft at the top of the engine.

MOTORSHIP BUILDING IN GERMANY

Although little has been heard since the armistice of any development in motorship construction in Germany, there now appears to be some signs of a revival and

British motorship Glenavy

when the economic conditions of that country improve it is not unlikely that internal combustion - engined vessels will be built almost exclusively, although it is doubtful whether Germany will build motorships to hand over to the allies under the terms of the armistice. The conversion of the steamer mentioned above is a sign of the times and a more interesting development is the fact that two orders have recently been placed by the Hamburg-American Line with Blohm & Voss for motor vessels of about 10,000 tons with 2400-horsepower twin-screw machinery. It is not yet known whether these engines are to be of the double-acting type, such as Blohm & Voss installed in the motorship Fritz before the war, but it is by no means improbable that this will be the case. The Fritz is now sailing under the British flag, being run by the Glen Line, and during the few months she has been in operation, no troubles have been experienced. It may be remembered that in many respects the Fritz was considered an experimental vessel, being the first, and still the only, ship equipped with two-cycle double-acting motors, and the comparative degree of success which has been achieved proves that there are certain possibilities in this design. The Fritz is equipped with two 850 b. h. p. motors, having only three cylinders, which would seem to indicate that such a type of motor is considerably less complicated than the average six-cylinder machine. It must be remembered, however, that the adoption of the double - acting principle involves the employment of two sets of valves, top and bottom; and as in this case scavenging by means of valves is employed, this necessitates two scavenging valves at top and bottom, one fuel valve and one starting valve at the top, and two fuel valves and one starting valve at the bottom, a total of nine valves for each cylinder. The saving as compared with a four-cycle motor or a single-acting two-cycle engine is perhaps therefore more apparent than real. Nevertheless, the problem of the double-acting engine is receiving considerable attention in England, and the North British Diesel Engine Works has lately taken out several important patents for such a motor, this fact being additionally interesting since this concern was originally established to construct single and double - acting engines under license from the Krupp firm.

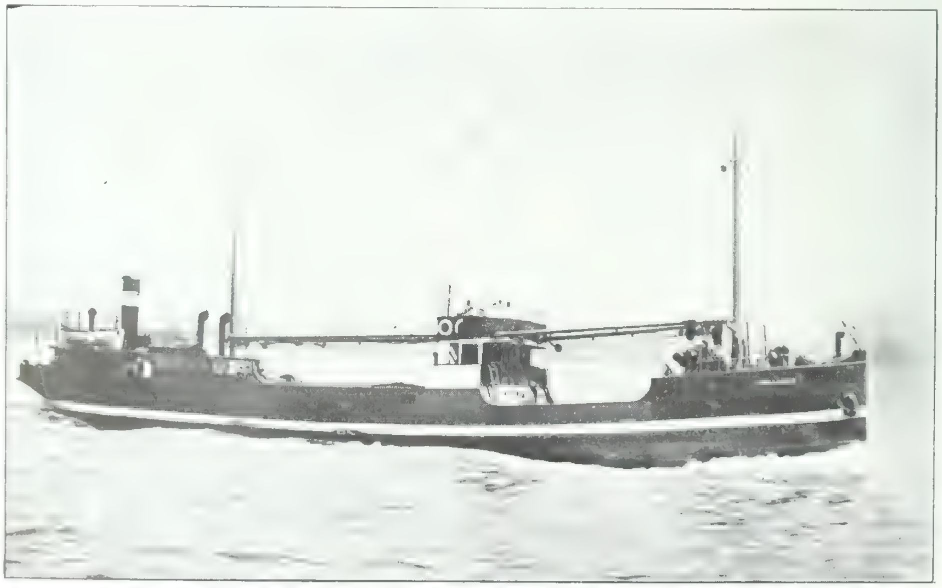
A 14,000-TON MOTORSHIP

Early in September the largest motorship ever constructed will start on her maiden voyage from London to the East. This is the 14,000-ton motor vessel Glenogle for the Glen Line, built by Harland & Wolff at Glasgow, and is equipped with machinery of 6400 i. h. p., constructed by the same firm. Her advent is being watched with the very closest interest by all European shipowners, as she represents what is considered to be the last word in the design of general cargo-carrying vessels. It is hoped shortly to publish a full description of this interesting craft in these columns, but it may be mentioned that she is 502 feet in length and that the machinery comprises a pair of eight-cylinder four--cycle engines of the Burmeister & Wain design, with cylinders 740 m.m. bore and 1150 m.m. stroke. Although the Glenapp (a smaller ship built during the war) is equipped with engines of nominally the same power, actually these have been run at a lower output, and the machinery of the Glenogle will in fact be of greater power than any which has yet been put in a vessel.

Another interesting British-built motorship which will be completed in August is the Dorsetshire. The construction of this vessel for the Bibby Line is more significant than would seem to be the case when it is considered that the owners are looked upon as one of the typical class of conservative British shipowners who do not undertake new experiments unless they are convinced of the advantages that can be derived. Moreover, the Dorsetshire is a large vessel, carrying 12,000 tons and having a speed of over twelve knots. The machinery installation comprises two 2250 i. h. p. Diesel engines built by Harland & Wolf of exactly the same dimensions and type as those being installed in the United States Shipping Board's motor vessel William Penn.

A second similar ship for the Bibby Line is approaching completion, and it is a proof of the hold which the motorship has gained on British shipowners to note that, in addition, motor vessels are under construction for the following well-known firms: The British India Steam Navigation Company; the Royal Mail Steam Packet Company (for whom three 8000-ton craft are being built); the Pacific Mail Steam Navigation Company; the Union Steamship Company of New Zealand; the Glen Line; the Anchor Brocklebank Line; not to speak of several lesser important owners.

The electrically-welded motor vessel Fullagar, fitted with the Camellaird Fullagar engine, ran her trials recently and is now in regular service. Up to the present time the engine has run without a hitch of any sort, and it is interesting to record that she is being used very largely as a demonstration boat, and is being visited regularly by representatives of all the important shipowning and shipbuilding firms. While giving full credit to the builders, however, for the satisfactory nature of the operation of the engine, it must be remembered that it is relatively small, developing only 500 b. h. p., and most Diesel engine experts consider that it is impossible to express any final opinion regarding the reliability and suitability of any motor of this class until it is constructed in moderately large sizes. For instance, it is thought that in the opposed piston engine the chief difficulties likely to be encountered are in connection with the cylinder liner, but these troubles will only probably be met with in cylinders over twenty-four or twenty-five inches in diameter. This point should perhaps be borne in mind before expressing any opinion on the future prospects of motors of the Camellaird Fullagar type. Incidentally, it is of interest to learn that a license for the construction of this engine has recently been acquired by a well-known American firm.



Electrically welded Diesel engined coaster Fullager on her trial run

WITH THE EXPORTERS AND IMPORTERS

THE RAIL RATE INCREASES

BY the order of the Interstate Commerce Commission advancing railroad rates August 26, the whole delicately-adjusted mechanism of import and export rail rates has been disrupted. At a time when the attention of the Pacific Coast was fixed on Section 28 of the Merchant Marine Act, which would withdraw the privilege of import and export rates from cargo transported by foreign vessels, the action of the Interstate Commerce Commission has created a new and much more immediately pressing situation with which steamship operators, importers and exporters have to deal.

LOWER RATES FOR FOREIGN TRADE

Goods moving to and from the Pacific Coast in the import and export trades have received rail rates lower than those governing domestic freights. These rates have enabled Pacific Coast ports, despite the much longer rail haul involved, to compete with the Atlantic seaboard in attracting goods moving from the interior, so that steel can move from Pittsburgh, for example, as cheaply as via San Francisco or Seattle as New York; steamship rates, of course, being based on the import and export rail tariffs. As a result of the increases in rail rates, however, the balance has been destroyed; because, although the Eastern group rates have been increased 40 per cent and the transcontinental only 33-1/3, the longer haul to the Pacific, and the consequent higher rate, have given the Atlantic a decided advantage in dollars and cents. Take, for example, the case of steel moving from Pittsburgh to an Oriental port: the rail rate, Pittsburgh to New York, has been $5.40, to which is to be added a water rate of $17.85, making a total of $23.25; the rail rate, Pittsburgh to San Francisco, has been $12, and the water rate, $11.25; the two total rates were the same, therefore, and neither the Atlantic nor the Pacific had an advantage. Under the new tariffs, New York will have a preferential differential of $1.84, the seriousness of which may be seen when it is stated that cargoes will be attracted by differentials of 25 cents or even less.

By "breaking point" is meant the city in which the Pacific and Atlantic are on a basis of equality, freight rates, service and other elements considered; for superior service at times will enable the Pacific to compete with the Atlantic despite differentials in rates favorable to the Eastern steamship lines.

RATES NECESSARY TO COMPETE

In order for Pacific Coast ports to compete with New York with the increased rail rates in effect, trans-Pacific rates would have to be reduced as follows (M indicates measurement cargo; W, weight):

	Present Rate	Rate Necessary to Compete
Agricultural implts.	$16.00 M	$14.00 M
Automobiles	10.00 M	6.53 M
Cigarettes	11.00 M	8.96 M
Cotton, standard	32.00 W	28.20 W
Iron and Steel	11.25 W	9.41 W
Machinery	14.00 M	11.32 M
Paper	14.00 M	11.52 M
Soap	14.00 W	10.94 W
Tires	12.50 M	8.44 M
Tobacco, mfgd.	25.00 M	17.48 M
Canned goods	16.00 M	13.52 M
Condensed milk	12.00 W	8.68 W

Of these twelve principal commodities, which constitute the bulk of trans-Pacific freight, the decreased earnings a deadweight ton will be approximately $5.10. Inasmuch as an 8800-ton vessel, fully loaded with both weight and measurement freight, will average about 6500 tons of deadweight cargo, the decreased earnings of such a vessel will be $33,000 a voyage; and, since a favorable freight list at the present time is $130,000, the earnings will fall 25 per cent to the voyage with a full cargo.

LOSING MONEY NOW

Trans-Pacific steamships in general cannot endure such a loss of earnings. On twenty-four round trips to the Orient from March 1 a loss of $935,532 was incurred, after all expenses of operation, including agents' fees, had been paid, and after depreciation, interest, insurance, reserves, etc., had been computed on a valuation basis of $200 a deadweight ton. Only one vessel of the twenty-four made a profit. If the value were computed at $150 a deadweight ton, the total loss would be $250,751. Some of the losses were as great as $78,000 a round-voyage, on the $200 a ton basis of computation. And, finally, though not of least importance, these losses for the most part were incurred prior to the recent reductions in rates made by the Pacific Coast Oriental Tariff Bureau at the Vancouver meeting. Those reductions, added to what would be necessary in order to meet Eastern competition under the new import and export rates, would be quite more than could be borne.

MUST REDUCE RAIL RATES

But, of course, some action to alleviate the situation is anticipated. There is no hope of the steamship lines plying from Atlantic ports increasing their rates, which would tend to equalize the combined rail and water tariffs: they refused to raise their rates in May, when requested to do so by the Pacific lines, which wished to restore the adjustment between Atlantic and Pacific steamships, destroyed when Atlantic rates fell; and the Pacific lines consequently were forced to reduce their charges. If the present problem were one that concerned the steamship lines alone the same action would be necessary. The railroads, however, also are concerned, and it is to the railroads that the Pacific Coast turns for relief, in the expectation that they will make new transcontinental tariffs on the basis of the old rates plus the increases made in the Eastern district, so that the balance again would be restored; that is, to increase the rates on steel from Pittsburgh to San Francisco or Seattle by $2.16, the amount of the 40 per cent increase in the Eastern district, instead of by $4, the 33-1/3 per cent in inter-group rates—action that would permit steel to move from Pittsburgh via San Francisco or Seattle as cheaply as via New York; and other rates should be dealt with in the same manner.

COMMISSION DID NOTHING

During the hearings on the rail rate increases, the attention of the Interstate Commerce Commission was invited to the effect upon trans-continental business; without result, for the decision of the commission provided: "Joint or single line through rates between points in one group and points in other groups should be increased 33-1/3 per cent," the country being divided into four groups: Eastern,

Effect of Rail Increases—Atlantic Preferential Differentials, in Tons of 2000 Pounds

	Present	Increases in Present Differential	New	Breaking Point
Agricultural implements	.03	3.22	3.25	Moline, Ill.
Automobiles	5.60	13.88	19.48	Detroit
Cigarettes	.75	4.59	5.34	Durham, N. C.
Cotton, standard	.90	3.39	4.29	Fort Worth
Iron and steel		1.84	1.84	Pittsburgh
Machinery	1.20	4.50	5.70	Pittsburgh
Paper and paper articles	.80	2.87	3.67	Hamilton, O.
Soap	4.40	3.06	7.46	Cincinnati
Tires	7.27	12.37	19.64	Akron, O.
Tobacco, manufactured	8.50	7.52	16.02	Durham, N. C.
Canned goods	2.43	3.06	5.49	Chicago
Condensed milk	1.40	2.66	4.06	Chicago

Southern, Western and Mountain-Pacific. Immediately after the effect of the increases was apparent, the San Francisco Chamber of Commerce requested that the increases not apply to import and export traffic unless ninety days' notice was given; this with a view to protecting business already contracted for. The commission, through W. V. Hardie, director of traffic, replied: "The report of the commission contemplates publication of the increases in all rates, including export and import traffic. If readjustments are necessary, they may be made hereafter. The report does not contemplate postponement for ninety days or any other period of the increases therein authorized as to rates."

DECISION PERMISSIVE, BUT—

At the same time the question arose as to whether the decision of the commission should be construed as permissive or mandatory, inasmuch as, if the former, the railroads themselves might make the adjustments desired. This point apparently was definitely settled by the commission's officials, for, according to the Traffic World, the decision was to be construed as permissive, but the roads were not permitted to accept less than the commission had awarded: they were to take the whole increase or reject it in toto. Short lines operating in Nevada were told that, if they desired to take less, they would have to proceed in the regular way, by filing tariffs making the desired increases; operative, however, on statutory notice. Traffic commissions that handled the case before the commission advised carriers to adhere to the letter of the decision and order, regardless of how unjust they might deem the resulting situation, leaving corrections to the future. And from the standpoint of the roads, the best solution was to accept the increase as a whole and then later seek to modify it, rather than to reject it and throw the whole situation into confusion.

By and large, the railroads are anxious to restore the equilibrium. Some lines are much more dependent than others upon the revenues derived from trans-continental business: those that pass through thickly-populated territories, for example, and that have numerous feeders, could forego import and export business to much better advantage than lines the principal function of which is to serve as connecting links in through groups. But all the roads, on the whole, would be the losers by a decline in overland business.

OVERLAND BUSINESS NECESSARY

On a superficial view, one might conclude that moving freight overland from Pittsburgh to San Francisco by rail, for transportation overseas, was economic folly, when the goods might move a shorter distance by rail to New York, and there be loaded in steamships; but the fact is that the transportation of freight overland to the Pacific Coast is true economy. Year by year the preponderating movement of domestic goods is eastward from the Pacific Coast; the West, that is, ships out in bulk to the East far more than it receives in return; with the result that a west-bound movement of empty cars goes on continually. This has been estimated to be as much as 45 per cent of the total west-bound traffic.

ADMIRAL BENSON ON RAIL TRAFFIC

Said Admiral W. S. Benson, chairman of the Shipping Board, in an address before the meeting of the National Association of Manufacturers on the Merchant Marine Act: "It is a matter of record that 45 per cent of the west-bound movement upon American railroads consists of empty cars, and that great difficulty is experienced in economically moving into Western territory sufficient cars to provide for the transportation of domestic products, principally foodstuffs, to Eastern centers of population. Western roads have just been before the commission seeking an increase of not less than 24 per cent in the domestic rates. Any considerable further diversion of business from these roads would make it necessary for them to seek additional increases in rates. It has been claimed that if Western roads were to lose the export business via Pacific Coast they would require further increases of not less than 30 per cent if they are to be permitted the net return of 5½ per cent upon their properties engaged in transportation as provided for in the transportation act. Such increases would react very unfavorably upon living costs of the general public and would greatly restrict Western markets for Eastern manufacturers. If there were no other reasons, such adverse effect upon the American railroads and the American public would constitute an emergency requiring drastic action by the commission. The 45 per cent west-bound movement of American cars upon American railroads extends by districts from the Atlantic Coast to the Pacific Coast and has existed since at least 1917, and during the same period there has been almost continuous congestion of Atlantic ports, particularly New York. Such conditions are not economic and adversely affect the interstate welfare of all the American people. It should be the desire of all Americans to help insure the success of an American merchant marine. You can greatly help to that end if you co-operate with the government to prevent the success of foreign efforts adverse to American institutions by continuing to route your imports and exports in such manner as will permit the facilities of the rail and water carriers of the United States to be used to the best advantage. If through such endeavor a balanced traffic movement over American carriers can even be approximated there must of necessity be a reaction favorable to shippers, evidenced in rate decreases rather than rate increases."

That Admiral Benson was speaking of the Merchant Marine Act, Section 28, and the threats of foreign steamship lines to make Atlantic and Canadian Pacific ports their terminals, is quite true; but it is no less true that his observations on the effect of a decline in overland business are pertinent to the present situation. Not only the steamship lines but the railroads, and the business men of the West, and, indeed, business of the entire country, are interested in maintaining a flow of export goods to the Pacific Coast.

INCREASE INTERCOASTAL TRADE

There are other aspects scarcely less interesting than this to shipping operators and importers and exporters. Even should adjustments of the transcontinental rates be made, as appears probable, indeed certain, the new tariffs will be higher than the old. So far as domestic trans-continental business is concerned, the intercoastal steamship lines will benefit greatly. As an example, there may be cited the statement of Robert D. Allen, manager of the West Coast Lumbermen's Association, Seattle, that the increase would cost the lumbermen of Washington and Oregon $15,000,000 a year in added charges (this estimate being based upon the volume moved during the last year); and automatically would cut off the West Coast from its largest and most profitable trade. "Under the maximum percentage increase effective August 26, local freight could be handled much more cheaply by motor transport; and Atlantic Coast freight by water," said he; and, pending reductions in trans-continental rates, Western pine moving by rail would be placed under a great handicap in competition with Southern pine, the present differentials, ranging from $3.87 at Hastings, Nebraska, to $8.82 at Boston, being increased to $5.25 at Hastings and $11.68 at Boston. On the other hand, rates in the Mountain-Pacific and Southern groups were increased only 25 per cent, as compared with 40 per cent in the Eastern and 35 per cent in the Western; whence it follows that industries situated in the Mountain-Pacific and Southern sections may reap advantage in competition with the Western and Eastern for foreign trade.

ADVERSE EFFECT ON FOREIGN TRADE

In general, however, the effect of the increases on foreign trade will be adverse, since goods laid down in Yokohama, Bombay or Cape Town will cost the foreign purchaser more, regardless of the place of origin and port of loading. In some instances the advantage of the United States over foreign competitors is slight; in steel, for example, in which Great Britain and Belgium, according to foreign trade authorities, are running America a close race. There doubtless are other commodities, the foreign and American prices of which are so nearly equal as to be affected decisively by the rail increases, to the disadvantage of American foreign trade.

FREIGHT REPORT

SINCE our last report, dated July 11, chartering has been quite active. The advance in rates made by the United States Shipping Board, to which we referred in our last report, resulted in the charter of three steamers from Portland by M. H. Houser for wheat or flour to the United Kingdom or Continent at $28 and $29, respectively. These charters were made about July 17, but there was no further business because of the high rates asked, and also because the Shipping Board lifted the demurrage from 50 cents a ton to $1 a ton on the net register, and also insisted on 800 tons a day discharge, as against the former dispatch which ran from 500 tons a day in some Continental ports, 650 in some United Kingdom ports, and up to 800 tons in the larger ports of the United Kingdom, and this lack of chartering continued until about August 2, when several British steamers, formerly German flag, were offered on the market at 125/- a ton, less 2½ per cent to charterers, and freight payable at destination. The steamer Dannenberg was taken by Balfour, Guthrie & Company, and the steamer Heilbronn by Kerr-Griffith for Portland loading, and possibly one more by another charterer there at the same rate, and a few days later one of the same kind of steamers was reported chartered at 120/-, but this we cannot vouch for. This invasion of British steamers, of course, made quite a commotion, and naturally the Shipping Board was obliged to take notice, resulting in several conferences, which after a day or two brought forth the announcement that the Shipping Board had lowered their rates from $28 a ton to $20 a ton for full cargoes of wheat and/or flour from either San Francisco, Portland or Puget Sound to the United Kingdom or Continent, Bordeaux to Hamburg. The board, however, still insisted on 800 tons discharge and freight prepaid, but lowered the demurrage from $1 a net ton to 48 cents a gross register ton, which is equal to about 70 cents on the net register.

It is today reported that three steamers of the Shipping Board have been chartered from the North at $20 a ton.

The lack of further chartering has been caused by a lagging grain market in the United Kingdom and Europe, and possibly also because of the political troubles everywhere.

We forgot to mention that the Swedish steamer Indus was closed at $25 for the United Kingdom and $27.50 for the Continent or Scandinavia by M. H. Houser from Portland.

Kerr-Griffith also succeeded in making a sale of flour from Portland to a South African port by the British steamer Trelissick, paying her a rate of 157/6.

For lumber from the North the barkentine Rolph was chartered by J. J. Moore & Company at $37.50 to Melbourne or Adelaide. The same firm chartered the Dutch steamer Tjitaroem for three ports in Australia at $40, Canadian currency.

The Swedish steamer Pacific of the Johnson Line has been chartered to carry coal from British Columbia to Gothenburg at $30 a ton. Other steamers have been offered since on the same basis, but have been declined. Shippers came back indicating $23 would be paid.

The motorboat Astoria, which has been a long time repairing here and vainly tried to sell at about $200,000, was eventually chartered at $20 a thousand to carry ties from the North to New York or Philadelphia by Charles R. McCormick & Company.

Andrew Weir & Company is reported to have chartered the Japanese steamer Genzan Maru at 6½ yen for one round trip to Australia, delivery and re-delivery Japan.

Grace & Company chartered the schooner Makaweli for coal from Newcastle, Australia, to Callao at 120/-, the highest rate so far paid for this business. They have also chartered the steam schooners Idaho and Oregon at $32.50, lumber to Callao, and some weeks after succeeded in chartering the barkentine Lahaina at $30 to Callao.

The schooner W. F. Burnham has been chartered by the owners for nitrate from Chile to a Gulf port in the United States at $14.50, and the U. S. S. B. steamer Delisle has been chartered by Eastern parties at $13 for nitrate to the Gulf.

The little motorboat Advance (ex Parthia) was chartered by A. F. Thane & Company for lumber from the North to Cuba at $26.

The steamer Florence Olson accepted a charter for a full cargo of railway ties from Eureka to Mollendo, from W. L. Comyn & Company at $32.50.

Hind, Rolph & Company chartered their barkentine James Rolph at 115/- coal from Australia to a nitrate port, and the Swedish sailer Monkbarns has been chartered at 110/- for coal to a nitrate port.

Nitrate freights are practically nominal at about $7 to San Francisco, which rate the steamer La Primera was obliged to accept. She had been previously chartered at $17.50 for nitrate to this coast, but in making a coastwise trip in Chile she was delayed and unfortunately lost the good freight at which she had been fixed, and the best the owner could get from the charterers was the above rate. Nitrate buyers, therefore, consider that $7 is the market rate, and apparently so much Japanese nitrate has been offered for re-sale at low prices that we fear this condition may last for two or three months more.

The schooner Dauntless was chartered from Grays Harbor to Taltal by Mohns Commercial Company at $31.50, and the schooner W. H. Talbot on private terms for lumber to Mollendo by the American Finance & Export Company.

Skinner & Eddy's fine steamer Robin Goodfellow has been closed for a charter from Comox or Nanaimo to Rio Janeiro by Balfour, Guthrie & Company on private terms.

H. R. McMillan Export Company, Ltd., are reported to have chartered a steamer belonging to the Canadian government for creosoted ties from British Columbia to Calcutta for December loading, at $45 a thousand.

Amsinck & Company chartered steamer Stanwood and steamer Eastern Bell at $32.50 a thousand to Callao, and Grace & Company chartered steamer Lake Gebhardt at $30, same destination.

The Green Star liner Apus has been chartered by the Ocean Lumber Company at $45, two ports of discharge, for sleepers and crossings from British Columbia and Puget Sound to the United Kingdom.

G. W. McNear, Inc., some time back bought steel sailer tankers Marion Chilcott and Falls of Clyde on private terms, from the Associated Oil Company, and is now running them with oil from the East Coast of the United States to Continental and Scandinavian ports at very profitable rates of freight, and the same firm has just bought the steamer Asuncion at a reported rate of about $400,000. She will also take a cargo of oil from this port to Scandinavia on private terms of freight.

It is also reported that Gulf interests have bought Henry T. Scott from Lindermann at $450,000, and Walter Scammell reports to us the sale of his steamer La Primera for delivery in Peru to Peruvian parties at $120,000.

PAGE BROTHERS, Brokers.

HOLLAND-AMERICA LINE COMING

The foreign trade department of the San Francisco Chamber of Commerce has been advised by the Holland-American Chamber of Commerce that, as soon as sufficient tonnage can be obtained, the Holland-America line in conjunction with the Royal Packet Company, intends to open a regular freight service between the Netherlands and San Francisco and other Pacific ports, via the Panama canal. It is stated that if the necessary ships can be obtained the new line will probably be inaugurated around the first of September.

SHIPOGRAMS

Intercoastal sailings — Sailings of the steamships of the North Atlantic & Western Steamship Company, represented on the Pacific Coast by the Pacific Steamship Company, have been announced as follows: Springfield, Boston August 12, arrive Seattle September 15; Artigas, Boston August 20, arrive Seattle September 25; Lehigh, Boston September 5, arrive Puget Sound October 10; West Togas, Boston September 25, arrive Seattle October 30.

To Continue Service—At the head office of the Pacific Mail Steamship Company, San Francisco, the statement was made that published reports that the around-the-world service would be discontinued were incorrect. The service will go on as usual. Seven steamers are being used.

Kerr Steamship Moves—Announcement has been made by the Kerr Steamship Company that its head offices have been removed to the Kerr Building, 44 Beaver street, New York, from August 16.

Aquitania Sets Record—As a result of being changed to an oil-burner, the Cunarder Aquitania made a three-hour run at an average speed of 27.40 knots an hour, which surpasses the Mauretania's record for short distance. The Mauretania, however, still holds the trans-Atlantic record, Queenstown-New York, of four days, ten hours and forty-one minutes, an average of 26.06 knots an hour.

Heads New District—Dudley W. Burchard, Seattle, has been appointed head of the new North Pacific district of the Shipping Board. Mr. Burchard was district agent in Seattle prior to the creation of the new district.

Coastwise Line Formed—A new service between San Francisco and Puget Sound has been announced by the Coastwise Steamship Company, which will operate a fleet of steam schooners. The General Steamship Corporation will be the Puget Sound agent.

Call at Seattle—Seattle has been added to the ports of call of the Pacific Mail Steamship Company's around - the - world service. The first vessel of this line to depart from Seattle was the steamship Eastern Importer, which also was the first vessel flying the Pacific Mail flag to be seen in that port.

Ties for Britain—Ten million feet of ties for British railways will be carried from North Pacific ports by the steamships Argus and Antinous of the Green Star Line, represented on the Pacific by Struthers & Dixon. These cargoes are part of an order for 100,000,000 feet placed by Great Britain last year.

Suspension Until 1921 — The Shipping Board has certified to the Interstate Commerce Commission the necessity of suspending until January 1, 1921, the provisions of Section 28, Merchant Marine Act, by which freight carried on foreign lines would be forbidden import and export rail rates. This action was recommended by different Pacific Coast organizations.

Canadian Line to Orient — Announcement has been made by the Canadian government merchant marine that a new line will be established in September with 8300-ton vessels plying between Vancouver and Shanghai, Hongkong, Singapore, Colombo, Calcutta and Rangoon as freights offer for these ports. Sailings probably will be monthly.

Oil Bids Asked — The Shipping Board has called for bids for 3,000,000 gallons of fuel oil to be supplied at Pacific Coast ports and Honolulu for the year beginning October 4. Bids will be opened at Washington September 15.

Luckenbach Buys Two — The Luckenbach Steamship Company has bought the 12,000-ton army transports Marica and South Bend. These vessels were laid down for the Luckenbach Line, but were commandeered by the government while on the ways, so that the purchase really is a return to the original owner. Two other steamers commandeered by the government have been repurchased by the Luckenbach Line, which now has all the vessels taken over during the war.

Calls at Portland—A call at Portland will be made by the steamship Seiyo Maru of the Toyo Kisen Kaisha South American service in September. No call will be made at Honolulu on this voyage, the vessel steaming directly for Yokohama. Whether the Portland service will be permanent is not yet known.

Shields for U. S. S. B.—Four hundred shields, bearing stars and stripes in the national colors, are being made by the Morse Drydock & Repair Company, Brooklyn, for the Shipping Board. The shields will be placed on the funnels of Shipping Board vessels. They are acorn-shaped, of black annealed steel; are 72½ inches high and 63¾ inches wide; the base is of 3/16 inch steel and the red stripes and white stars are of ⅛ inch steel. By these shields the Shipping Board vessels will be marked distinctively.

Bunkering Station Proposed—John Barton Payne, secretary of the interior, upon his return from a visit to Alaska with Josephus Daniels, secretary of the navy, advocated the establishment of a coal bunkering station in the Aleutian Islands, at which coal from the Matanaska field should be held in stock. A bunkering station midway between America and Asia would permit vessels to take larger cargoes.

Frey to Los Angeles—A. J. Frey, formerly of the Pacific Mail Steamship Company and recently in charge of construction and repairs for the Shipping Board on the Pacific Coast, has been appointed general manager of the Los Angeles Steamship Company, which will operate the steamships Yale and Harvard. William Chisholm, Mr. Frey's assistant, has succeeded him.

Record Foreign Trade—A statement issued by the Bureau of Foreign and Domestic Commerce says that the export shipments of the United States during the fiscal year ending June 30 were $8,111,000,000, the greatest value in the country's history and an increase of $879,000,000 over exports of 1919, during which a value of $7,232,000,000 was set. The imports of $5,239,000,000 during the fiscal year 1920 exceeded by $2,143,000,000 the imports of 1919, which were valued at $3,096,000,000.

Blanket Suspension Withdrawn — The blanket suspension of the coastwise shipping laws, under which foreign vessels were permitted to engage in trade between San Francisco and Honolulu, has been withdrawn, and in its stead suspensions for periods of sixty days are being made under the section of the Jones bill permitting such suspensions up to February 1, 1922. In each case now the situation is considered by the San Francisco offices of the Shipping Board, which recommends an additional suspension when it finds that present American facilities are inadequate. The only lines affected are the T. K. K. and the China Mail, the latter of which, however, has much less interest than the former, inasmuch as the China Mail operates only one vessel, the Nile, of foreign registry.

West Kasson Back—The Steamship West Kasson, first of the around - the - world freighters of the Shipping Board, operated by the Pacific Mail Steamship Company, arrived at Boston in July and New York and Baltimore in August, and steamed for San Francisco on the last leg of her voyage. The West Kasson departed from San Francisco March 12, and called at Honolulu, Yokohama, Kobe, Shanghai, Hongkong, Manila, Calcutta, Marseilles, Barcelona and Bilboa. From Bilboa she steamed for Boston and New York. Much of her cargo was discharged at Boston, where she loaded freight for the Orient before all of the inbound cargo was out of her holds, so that the voyage may well be called a "continuous performance."

Operators Quizzed—Questionnaires have been sent by the general committee on the managing agents' agreement to the operators of Shipping Board vessels requesting

(Continued on page 119)

THE VENETIA

Pacific Coast Yacht Brings Home Two Gold Stars

LATE in July, 1917, John D. Spreckels was advised by the government that his steam yacht Venetia had been accepted for immediate conversion into an auxiliary cruiser. There was an urgent demand for auxiliary vessels, and the Venetia answered the requirements to an unusual degree: the sturdy build of her decks fitted them for carrying gun mountings; her unusual speed and cruising radius adapted her admirably for a dispatch boat; and, not of least importance, her long overhanging stern and its rigid build would permit her to launch depth charges without undue danger to herself.

On August 6 the Venetia arrived at Mare Island navy yard and was turned over to the navy. A design of Harrison Fisher, the well-known artist, was used in camouflaging her. When this work had been done she presented a bizarre appearance, having pink, green and blue spots and diamonds on backgrounds of green, blue and pink on all exposed parts of the vessel except the decks. By October 15 the work had been completed, and Commander L. B. Porterfield took command. Except for the captain and two other officers of the regular navy, the crew was composed almost entirely of tenderfeet. Mounting guns and loading and stowing stores were completed by October 23, when the Venetia anchored in San Francisco Bay, to sail the next day for Norfolk.

Her voyage to Panama was broken by a call at San Diego, where an ill sailor was put ashore. She arrived at Balboa November 5; sailed from Colon November 6; and arrived at League Island navy yard, Philadelphia, November 14, new orders having designated League Island instead of of Norfolk as her destination. At League Island her guns and mounts, which had proved quite unsatisfactory, were gone over, and the launching gear for depth charges was installed. After a voyage to the Brooklyn navy yard and return, the Venetia sailed from Philadelphia December 21 with another converted yacht and three tugs, each of which had a submarine chaser in tow; departed from Delaware Breakwater December 22; arrived at the Burmudas December 28; and, the squadron having been increased until there were eight towing vessels and nine submarine chasers, sailed January 7 for the Azores.

On the voyage across the Atlantic extremely bad weather was encountered. The small chasers were lost frequently; indeed, when the squadron arrived at the Azores on January 23, sixteen days from the Bermudas, three chasers were missing, one of which never was found, and several men had been lost. The squadron sailed from the Azores February 6 for Leixos, Portugal. At that port the convoy was divided, one-half going to Brest and the remainder to Gibraltar, at which the Venetia arrived February 21.

The Venetia's actual career in the war zone began March 2, when she moved into the stream at Gibraltar after improved gears had been installed and extra stores, oil and ammunition had been loaded. Three quiet voyages to Bizerta and return, convoying merchantmen, were made. On the fourth voyage the British merchantman Dronning Maud was torpedoed and sunk in twenty minutes. On May 11 the French steamship Susette Fraissinet was torpedoed, to sink in thirty-three minutes. At this time the Venetia sighted a submarine and exploded several depth charges which were without effect, so far as any visible signs, such as wreckage, were concerned; but a submarine that came to the surface a few days later and was captured by a British destroyer may have been damaged by the Venetia.

On the sixth convoying voyage from Gibraltar to Bizerta the Venetia sailed May 16. This voyage resulted in the first positive claim that the Venetia had sunk a submarine, which was allowed by both the British and American governments, a gold star being awarded. Following upon the torpedoing of a merchantman of the convoy, the steamship Sculptor, the Venetia dropped several depth bombs, as did the U. S. S. Surveyor. Three vessels in all of this convoy were torpedoed; but they were not unavenged, because two German submarines soon interned at Cartagena, both badly damaged, one, in fact, only floating when she arrived at that Spanish port. They reported that they had been operating against an allied convoy and had sunk three vessels, and that seven depth charges had been launched against them by "a gaily camouflaged yacht," evidently the Venetia.

After this voyage the Venetia was transferred to the Gibraltar-Genoa convoy service. The British steamship Messidor, a vessel of the first Genoa convoy, was sunk by a submarine; and on the next night the steamship Rutlinglin also was lost. Upon the Venitia's return to Gibraltar Commander Porterfield was ordered to the command of the U. S. S. Wheeling and was succeeded on the Venetia by Captain Charles F. Howell, of the Coast Guard Service. The Venetia was returned to the Bizerta convoy work. Having been damaged in a collision with the U. S. S. Seneca, the Venetia was drydocked and repaired, and at the same time her brilliant camouflage was painted over with gray, inasmuch as her garb was too well-known to the Germans. The change made little difference, however, for the armistice was signed soon afterward, news of it being received by the Venetia at Funchal, Madeira.

From Funchal the Venetia returned to Gibraltar and thence sailed to Lisbon. On December 21, 1918, she sailed from Gibraltar, one of a squadron convoying submarine chasers to the United States; departed from the Azores January 2, 1919; arrived at St. Thomas, Virgin Islands, fourteen days from the Azores; called at Santo Domingo and Guantanamo, and arrived at Balboa, on the Pacific side of the Panama Canal, February 3. On the next day she sailed for San Diego, arriving in twelve days, and from San Diego sailed for San Francisco, to be placed out of commission at Mare Island April 5. During her war service she had assisted in two towing squadrons; had acted as guardship in twenty-eight convoys, numbering 352 ships, of which seven were lost; was the only converted yacht to remain in the American naval service until the end of the war, and the only vessel from the Pacific to return to her home waters with a gold star.

What evidence exists that the Venetia disabled the submarine U-39 that sunk the Lusitania is given in "Venetia, Avenger of the Lusitania," by Clay M. Greene, of San Francisco, published for private distribution by Mr. Spreckels. Says Mr. Greene:

"Before the appointed day of departure for home the long-awaited authority to wear the gold star arrived from London. This was in the shape of a copy of Admiral Sims' confidential bulletin, in which it was stated that both his office and the British Admiralty had awarded gold stars to the American converted yacht Venetia and U. S. S. Surveyor, each having surely destroyed at least one sumbarine. In the opinion of Admiral Sims the Venetia should have been awarded two stars, since apparently it must have been she who disabled the U-39, now interned with other U-boats in the port of Cartagena. This view of the matter, however, the Admiralty declined to accept in the absence of what is considered incontrovertible proof; and this in spite of the fact that the American adimral had based his latter opinion upon the diary of a junior officer of the U-39, which stated that it must have been the converted yacht Venetia, well known on account of her conspicuous camouflage. This, it will be remembered, was afterwards changed to battle gray, because as discovered from an interned German, she has become an object of superstitious dread.

"There was general joy aboard the now officially honored little ship. Two governments had awarded her a gold star, and, while the records of the Navy Department would strictly name two avengers of the Lusitania, for reasons already enumerated, all aboard the Venetia felt quite justified in declining to consent to such partnership, with a divided glory which they could not bring themselves to believe should have been so arbitrarily insisted upon. So the chief machinist was directed to begin the construction of a gold star at once. Then, following the assured belief of Admiral Sims, who had expressed his opinion that in all fairness there should be two, the order was increased by one star—he being the only recognized commander of the American navy abroad—so the two stars were duly completed and mounted on the funnel top out at sea, one on either side."

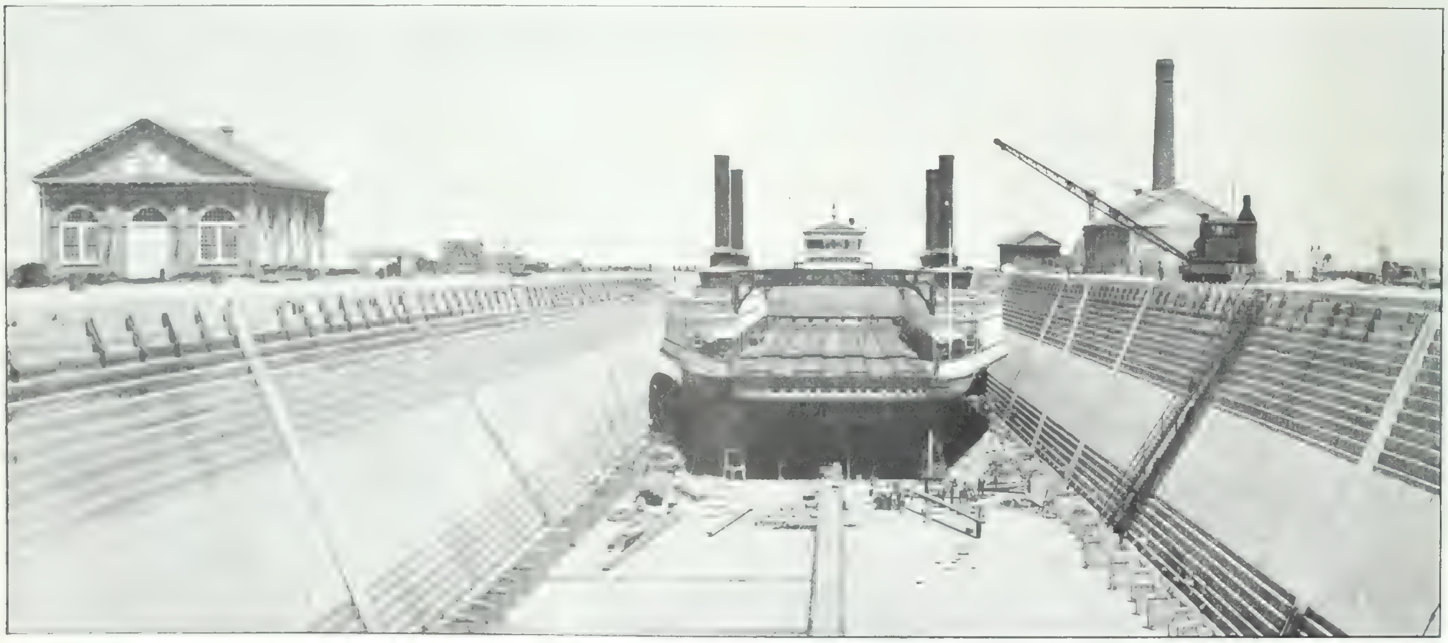
The Venetia was built in 1903 by Hawthorns & Company, Limited, of Leith, Scotland. She is 226 feet in length over all; 196 feet on the water line; 24 feet beam; 17 feet molded depth, and is powered with two Scotch boilers delivering steam at 180 pounds pressure to triple expansion engines of 888 I. H. P. Her decks, cabins, and all of the living quarters are beautifully finished in hardwoods, and she is considered one of the most beautiful yachts on the Pacific Ocean.

She was originally fitted out for coal-burning but was converted to burn fuel oil by the Union Iron Works in 1912. Her fuel oil tanks were given a capacity of 1236 barrels and, working one boiler, it was found that she would travel 250 miles a day with a total consumption of 35 barrels of oil, including all auxiliaries, which gives her a cruising radius of about 8000 miles. It is believed that this was the first conversion of a large steam yacht to the burning of fuel oil, and her performance at the time created a great deal of comment and startled the steam yacht world.

At the close of her war operations, as would naturally be expected, she was found to be in a very sorry condition, and at the request of John D. Spreckels, Pillsbury and Curtis, of San Francisco, made a survey of the vessel in October, 1919. This survey resulted in a report of specifications for repairs covering twenty closely typewritten pages, it having been found that practically all of the interior fittings and finish needed either renewing or renovating and that much of the structural work in the ship needed renewing and fairing to the original lines. It is very evident to anyone reading these specifications that eighteen months of sea service, during which "she did towing in heavy weather;" was used "in the Mediterranean for purposes for which she was not originally intended," and frequently "dropped depth bombs which exploded in close proximity to her own hull," and "was in collision at sea at least once," was enough to naturally cause a tremendous amount of damage in a finely fitted up yacht, especially when we consider that much of this work in convoy service had to be performed with little or no light at night and under constant strain of watchfulness for the ubiquitous "sub."

The contract for these repairs on the Venetia was let to the Union plant of the Bethlehem Shipbuilding Corporation, and she has been put into a condition as good or better than new and is now on her first trip as a pleasure yacht since her return from the war zone.

These repairs, as already stated, cover practically every portion of the vessel. The bulk of the work, however, lays in the underdeck spaces and in the after-section of the lower deck. The space formerly used as officers' quarters and spare staterooms extending aft from the engine room bulkhead to the afterpeak had been entirely gutted right out to the skin of the ship, with the exception of one small bathroom and lavatory. This space had to be restored to the original plan. The space between No. 1 watertight bulkhead aft and No. 2 watertight steel bulkhead had been re-arranged by the navy to suit their purposes, and in this space it was necessary to do a very considerable amount of joiner work in the way of building in storerooms to suit the old arrangement. In making the changes in these portions of the ship and in all of the under-deck spaces the navy had re-arranged wiring and piping to suit their own ideas, and all of this wiring and piping had to be replaced in the original locations in order to renew the interior finish of the vessel as a pleasure yacht. All the machinery in the vessel was thoroughly overhauled and bearings and liners renewed wherever necessary, and the Union plant of the Bethlehem Shipbuilding Corporation has been receiving many congratulations on the splendid appearance which their repairs have again brought to the Venetia.



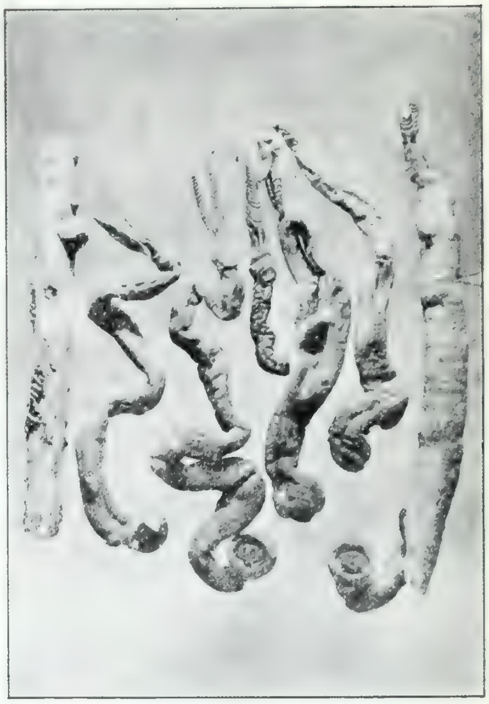
Southern Pacific Car Ferry Steamer Contra Costa in Hunters Point Dry Dock. The Contra Costa Exceeds 100 Feet in Width Over the Guards and Hunters Point Was Therefore the Only Dock That Would Accommodate the Big Wooden Ferry. Extensive Repairs Were Made to the Bottom of the Contra Costa on Account of Teredo Damage. See Article Next Page.

SOWING RICE—REAPING SHIPWORMS

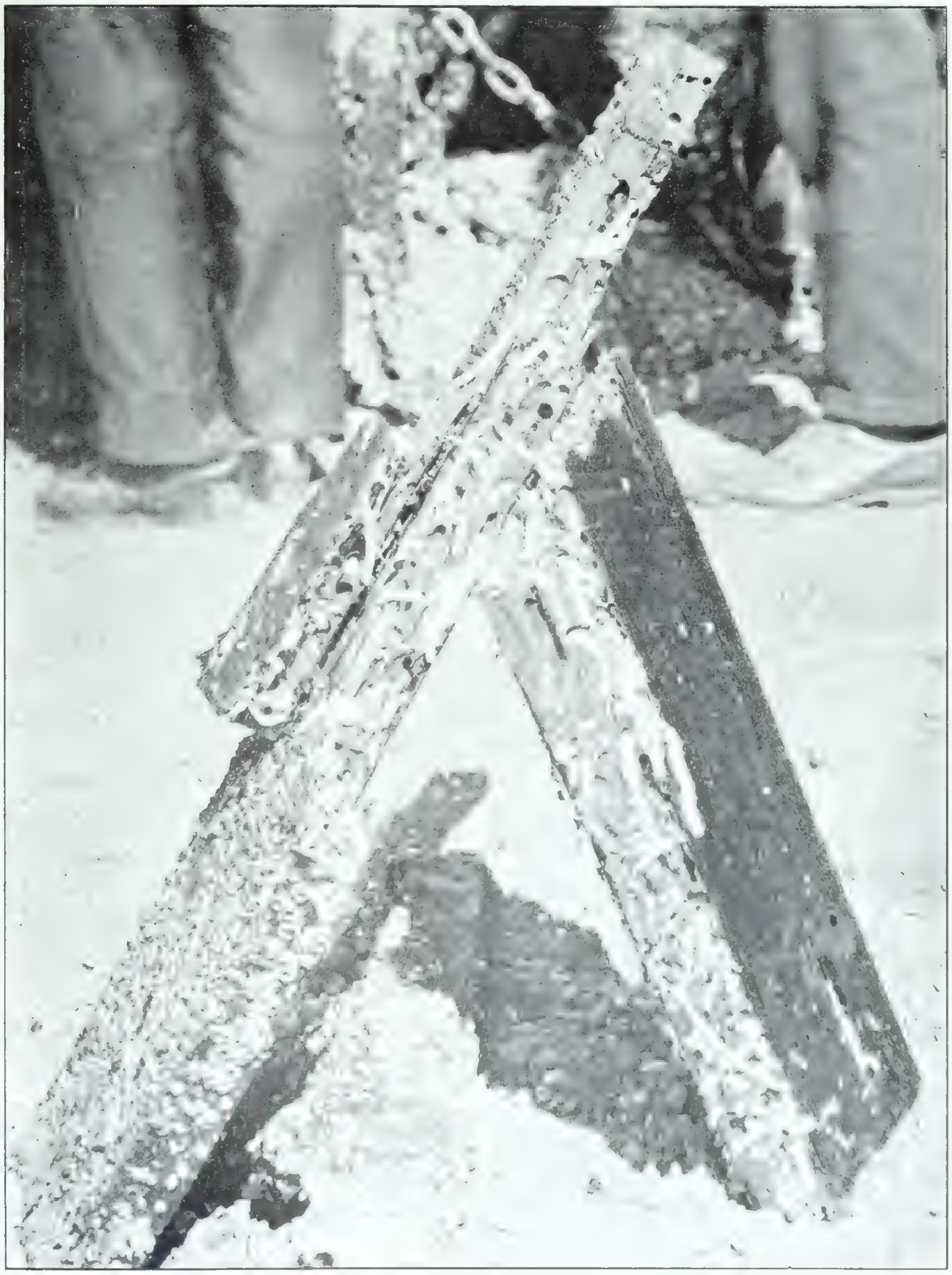
IN the year 1914 increase in service on the main line of the Southern Pacific Company's railway necessitated additional ferry accommodations to carry the trains across the Carquinez Straits between Port Costa and Benecia. The Southern Pacific Company's engineers designed for this service and built in their own shipyards at Oakland, California, a new train ferry entirely of wood. This vessel, the Contra Costa, was 420 feet in length over the transom; 66 feet 6 inches beam molded; 19 feet 5 inches depth molded. Over 2,000,000 board feet of lumber were used in her construction, together with 16,000 treenails, 30 tons of spikes, and 76 tons of round iron. It is said that there are in this vessel single timbers 26 inches by 36 inches over 66 feet long and there are 18 inches by 18 inches over 116 feet long. She was given an innovation in ferry boat engineering in the way of independently driven side paddle wheels so that by reversing one engine and running the other ahead she could be spun on her own length. In short, this vessel was when built about the last word in ferry boat design and construction.

When she was put into commission the water in Carquinez Straits was practically fresh, being kept in that condition by the flow of the Sacramento and San Joaquin Rivers.

In January, 1917, however, Mr. Teredo Dilatata and his cousin, Xylotrya Gouldi, paid a visit to Crockett, California, and, finding the climate to their liking, decided to remain. Here they were joined by many of their relatives, with the result that during the summer of 1917 and the years since, the waters of Carquinez Straits have become badly infested with these wood borers. The teredo family are what is known as the mollusc type of borer, which does not subsist upon the material bored from a wood, but is merely seeking to make for itself a home in the wood as a protection against its natural enemies. Its action, therefore, in boring into the wood always starts in the infant or larvae form and the holes which it bores, while very minute at their entrance, are subsequently enlarged so as to allow for the growth of the teredo.



Specimens of Xylotrya (Teredo Family) Showing the Shell Formation on the Head Which Is Used as a Boring Apparatus and the Calcareous Lining of the Galleries Bored by This Worm.



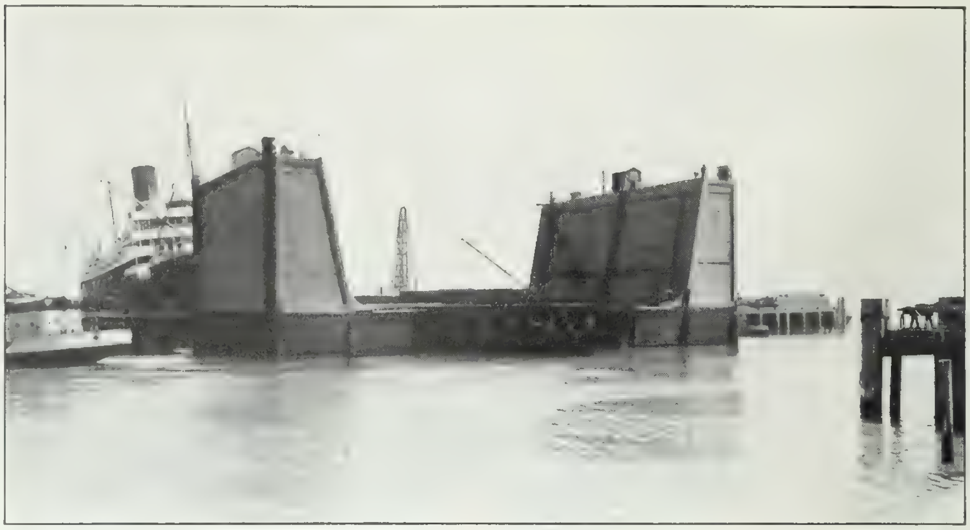
Oregon Pine Timber After Eighteen Months' Submersion in Salt Water, Showing Damage from Teredo Borings

Our illustration shows a number of handsome specimens from the teredo family. It will be seen that their heads terminate in a sort of boring apparatus. The body is traversed through its entire length by two ducts, one of which serves for expelling the woody material bored from timbers or piling and the other for drawing in sustenance from sea water.

It has been demonstrated scientifically by a long series of investigations covering the Atlantic, Gulf and Pacific Coasts that the teredo cannot exist in waters containing less than one-half of one per cent of sodium chloride or salt, and that the higher the salinity of the water the greater will be the danger from the mollusc type of marine borer. The salinity of ordinary sea water is about 3 per cent. The experiments referred to have also established the fact that this type of marine borer is always more active where there is a current in the water, because in such locations the food upon which the borer subsists is constantly renewed. This food consists principally of a marine plant form called "plankton." The pollution of sea water by sewage or oils is injurious to this plant growth, and hence we find that the marine borer action is greatly reduced in polluted water. While the range of temperature controlling the action of the borer has not been definitely established, it is found to be much more active in the warmer waters, as, for instance, along the Florida coast and in the Gulf of Mexico. The rate of propagation of the worms is tremendous in the warmer waters, and cases have been known of one large female of the teredo dilatata species being responsible for one hundred million eggs.

The gradual increase in the salinity of the water in Carquinez Straits is due to a number of causes. California, especially in the northern part of the state, has just passed through a series of years of low rainfall. During this period her irrigation projects in the northern part of the state have been greatly increased. Especially is this so of the northern end of the Sacramento Valley, where irrigation for rice growing has diverted tremendous quantities of the water. At the same time, there has been going on extensive dredging in the delta of both the Sacramento and San Joaquin Rivers and a straightening out of the river channels, as a result of which the rivers have scoured out their bottoms and reduced the hydraulic gradient, making it possible for high tides to reach farther up into Suisun Bay and the mouths of the rivers.

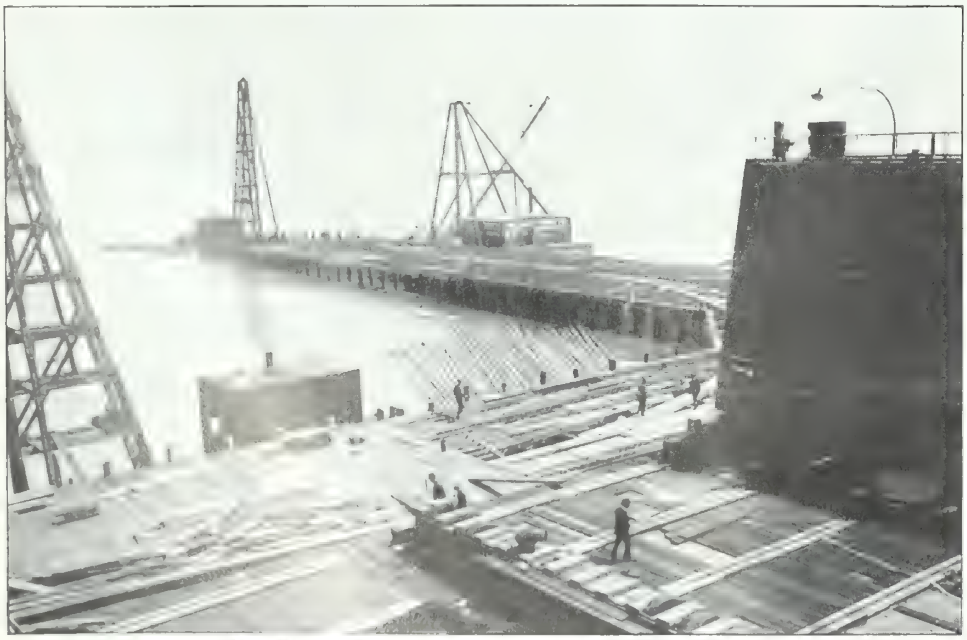
Be that as it may, the teredo family had increased in the Straits to such an extent that by February of 1920 Southern Pacific inspectors began to be alarmed about the piling on their wharves and slips and the bottoms of their ferry boats, and very recently the Contra Costa was sent to drydock at Hunters Point, and on examination was found to be pretty well honeycombed in some sections with teredos. She is therefore having a thorough overhauling, certain sections of her bottom and sides being renewed, and is being given a copper sheathing.


One Section of the New Floating Dry Dock at the Union Plant of the Bethlehem Shipbuilding Corporation

The extent of the damage may be gleaned from the following figures: On the side planking six strakes 4 by 16 by 420 feet long and four strakes 6 by 16 by 420 feet long had to be removed. The rakes at both ends were gone for about sixty feet back, requiring seventy-two planks 4 by 16 by 60 feet, and on the flat of the bottom 800 lineal feet of 4 by 16-inch planking was required. In replacing this planking 6000 treenails were used and ten kegs of 7/16 by 8-inch spikes. After the planking had been renewed, all seams of the vessel below the water line were recalked and the underwater surface was treated with a composition of tar and pitch and covered with felt preparatory for copper sheathing. In this operation 100 bales of oakum were used, twelve barrels of tar, eighteen barrels of pitch, and sixty crates of Irish felt. Munson's yellow metal was used for sheathing, the job requiring 7500 sheets and eighty kegs of copper nails for the fastening. Some trouble had been experienced with the rudder stock in maneuvering the ship, and this is being changed from 5 inches to 8 inches, as it was found that the former stock was too light.

It is a far cry from rice growing in the upper Sacramento Valley to worms in the bottom of a ferry boat at Benecia, and the connection between the two could not possibly have been foreseen six years ago by the Southern Pacific Company in building this wooden vessel.

But the present condition should show irrigation engineers the advisability of research work to determine just what effect their reclamation programs will have in upsetting the nice balance of the ordinary processes of nature. The conditions affect other properties of vastly greater value than the Contra Costa and the Southern Pacific wharves and slips. Practically every wharf, dock, foundation of buildings along shore lines, and all stationary marine structures in the upper San Pablo Bay, in Carquinez Straits, and in lower Suisun Bay are involved by the teredo invasion. This would include much of the foundation piling at Mare Island, all of the waterfronts of Vallejo, Benecia, Martinez, Crockett, and much of the foundation work of the industrial plants at Pittsburg and Bay Point. The definite lesson to be learned for all ship owners, shipbuilders and others interested in extensions of docks and of all timber work under low water mark is that all materials for such structural work should be thoroughly treated with a proven toxic material with which the timbers should be impregnated to a depth sufficient to insure poisoning of the worm before it has penetrated to the interior.


Construction Work on New Dock at the Union Plant of the Bethlehem Shipbuilding Corporation

SHIPBUILDING IN EUROPE

Some Observations on Conditions in British and Continental Shipyards

By JAMES J. PEARSON

Mr. Pearson's impressions of foreign yards were gained while he was on a trip to Europe as consulting engineer of the American International Corporation

I HAVE just returned from a tour of inspection of all the principal shipbuilding yards in Europe, made as consulting engineer for one of the largest shipbuilding corporations in the United States, and I have come here for a short rest-up in the California sun and the ozonized breezes of the Pacific.

When I say that I visited all the principal shipbuilding yards in all Europe, I will have to except Germany, for I did not call there, but cut it out of my program for two reasons: (a) I ascertained that their yards at Hamburg, Swinemunde and Stettin had been more or less stripped of yard tools and plant which had been rushed to Kiel and Wilhelmshaven to make good the navy repairs necessary after the sea battle of Jutland. I therefore decided that the German merchant yards were at present too incompletely equipped to give me a fair idea of their normal output and practice. Also, there was another reason: (b) that my experience during the war was too strong in recollection to permit my receiving or giving courtesy to a German.

Italy was the first visit on my list, and of her coast chain of small shipyards few are worth mention until the Genoa yards are reached, and chief of these is the yard of the Ansaldo Company at Sampierdarena. I was impressed with the good work they have done in yard construction, as a considerable percentage of their building space had to be dug out of the base of the hills that practically abut to the water on this coast. One of the striking novelties of the yard, and which also shows the severe limitations of yard area, is the continuation of an 800-foot way which is carried by a bridge over the main track of the Lyons & Mediterranean Railroad. One of the features of their practice is their insistence in not using liners but in joggling the landing edges of the plates up to the main strake and finishing the upper courses with butt-and-strap. It is a well handled yard, but at the time of my visit it was sadly short of fuel and all shipbuilding material. In addition to limited space, there is another drawback which contributes to handicap the cost economy of this yard, and that is that their foundry is some eight miles distant and their haulage entirely by cart over a badly surfaced road which wanders through three townships, in each of which an "octroi," or tax, is paid both going and coming.

James J. Pearson
Photo John Thompson, London

It may be said that Italian shipbuilding is badly throttled by local conditions, but they are making a very gallant effort to meet them, and if Italy can obtain a good coal mine as a part of the League of Nations award, it will very greatly relieve their national necessities.

In France I found the shipyards in rather a mixed condition. For the most part they had been re-machined and remodeled by the British. In fact, most of their "leading hands" were British workmen, and 25 per cent of their yard labor is Chinese. I found their machine shops for the most part engaged on locomotive work, due to the shortage caused by the German final steal of over 6000 locomotives, which they got away with as a post-armistice operation.

In Scandinavia there has been little increase in shipbuilding activities during the war time. Norway makes the best showing, but it is inconsiderable. They seem to be resting in the hope that Britain will soon redeem her promise of replacing their "torpedo-tonnage" at some nominal rate. By "torpedo-tonnage" is meant all of their vessels sunk by enemy mine or torpedo, and the replacing promise was stated to be made by Britain to prevent the retirement of Norwegian bottoms from North Sea service during the war.

The country of most conspicuous development during war time is Holland. They have increased their total number of yards by some 50 per cent and increased the area of their previously existing yards by some 35 per cent. The war time was a golden time for the Dutch, as all through that period they got ships plate and angles from the Germans at $30 a ton, while the British builder was paying $160 a ton. The reason for this was that the German stock of commercial shipbuilding material was lying idle, as no merchant vessel was built by Germany during the war except the roughly 1,000,000 deadweight tons that were on the stocks in 1914. Therefore, Holland got all the plates and angles she wanted and paid for them with cheese, butter and food supplies. While in Holland I made a special investigation for the United States Shipping Board as to the comparative cost of ship and engine repairs in Holland, as against the cost on the Clyde and the northeast coast of England, and the result showed it to be fortunate for Britain that her Dutch competitor had so short a coast line suitable for shipbuilding and repair yards.

Not to make this interview too long, I will briefly say that our only real competitor in shipbuilding in Europe at the present time is Great Britain. It is highly probable that within the next two years Germany will "come back," but in the meantime it is British activity that confronts us, and it will call for our best men, methods and material to hold the place we have made for ourselves as against the British training and traditions that date back for many centuries.

The Clyde yards, above and below Glasgow, taken as a whole, are the best in Britain. But the Belfast yard of Harland & Wolff is larger than any Clyde yard and carries more men than any two Clyde yards put together. The reason for this last, however, is due to the Harland & Wolff policy of making at their Belfast yard all the propelling machinery for their other yards and affiliations in Britain. Hence their engine shops at Belfast contain two-thirds of their total employees instead of the usual ratio of the yard carrying two-thirds and the shops one-third of the wage earning total.

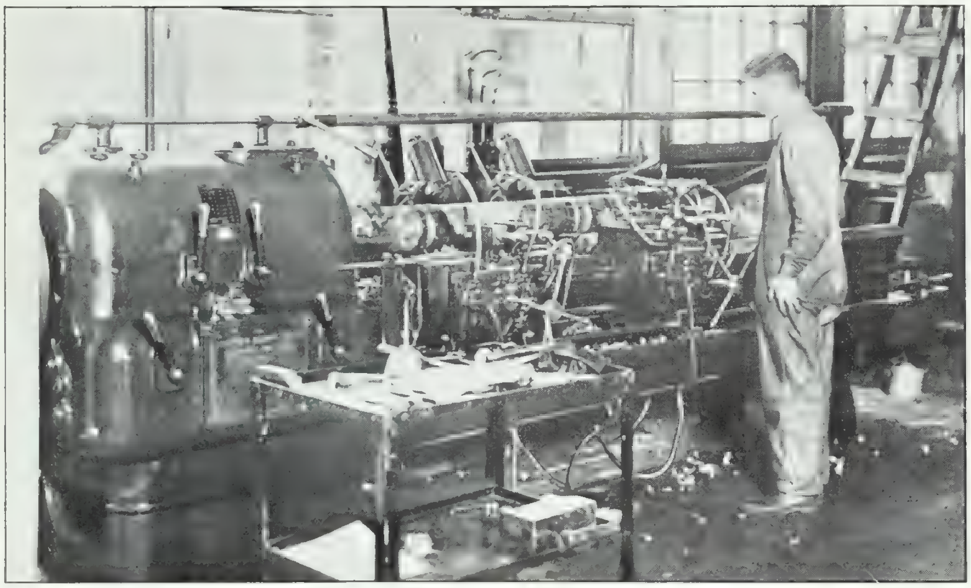
The potential shipbuilding of the English northeast coast we will find it increasingly hard to beat when their labor settles down from its present suicidal attitude of "Ca Canny" (go easy) to the steady, earnest drive which will surely come. I do not despair of our continuing to hold the position we have made for ourselves, for we will do it by means of our better labor-saving tools and our very much better methods of yard material transportation; but we cannot afford to miss any advantage while our well conditioned opponent is stripping for the ring.

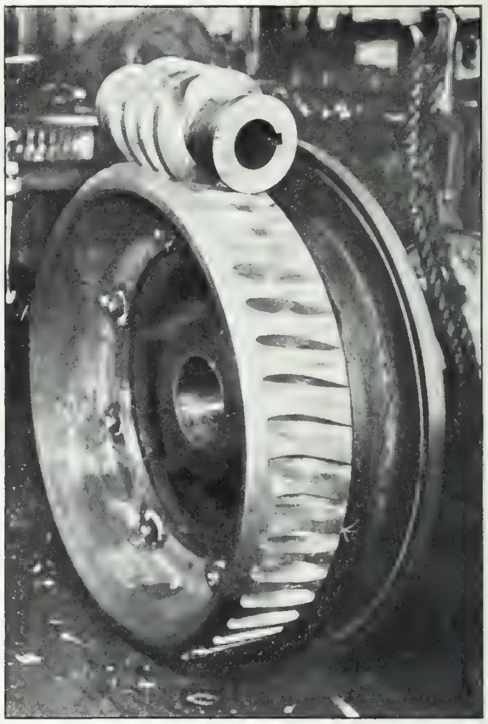
In the leading yards on the Tyne, such as Armstrong-Whitworth, Hawthorn-Leslie and Swan & Hunter, they are making vigorous efforts to popularize the use of pneumatic hand tools among the men, but as the universal use of, say, a pneumatic riveter would wipe out the riveters' branch of the boilersmiths' and platers' unions, and thereby destroy an ancient handicraft, there are numerous and trenchant "medical" reasons urged against it, such as the statement that it causes tubercular diseases, heart failure, and spinal defects. Many important yards, such as the Doxfords at Sunderland, will not have a pneumatic riveter on their premises while a hand riveter can be obtained. They also hold to their old standard of three hundred three-quarter-inch rivets knocked down and snapped per day of ten hours.

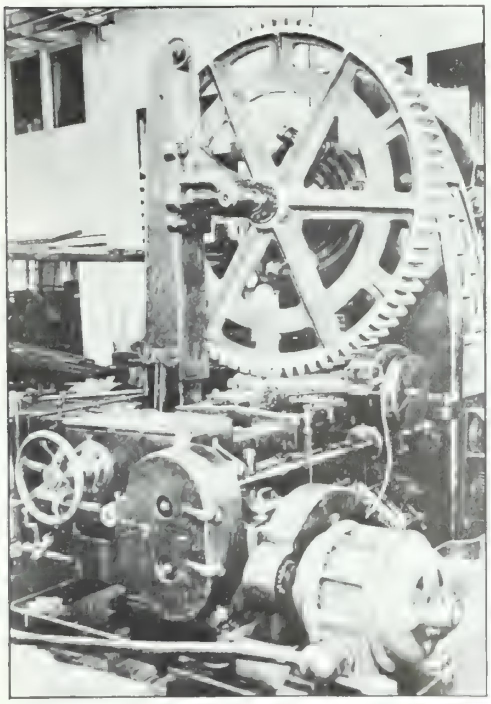
That our best methods and best machinery were inducted into Britain during the war time, I was allowed a good opportunity to observe, as I was asked by Colonel Hamilton Wilson, M. P., political secretary, on behalf of Sir Joseph McClay, minister of shipping, to make an unofficial examination and report on the government yards at Chepstow and Beachley. I found these yards to abound in absurdities, as they were laid out and equipped by a British army general, whose study of ships had probably been confined to his summer vacation time at the seashore. But however grotesque the arrangement I found that in yard machinery and equipment there is no labor-saving device in use here that was omitted from their stock list.

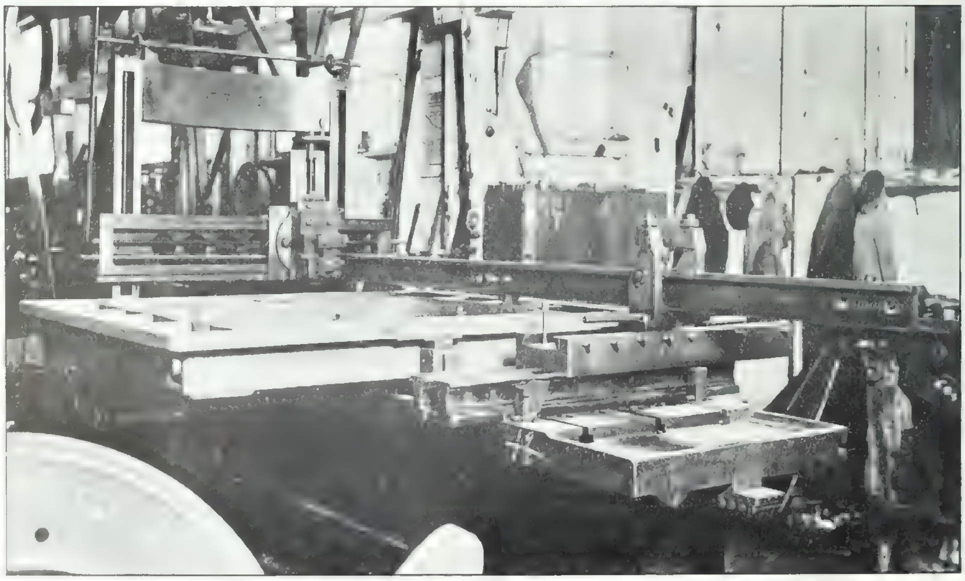
I mention this to show that we have no secrets in our shipyards. Our tools and "team" methods are all known, and the only bar to the British use of them is the interdict of the British trade unions on labor-saving tools. So long as this ban holds good we can uphold our shipbuilding supremacy. But if it is withdrawn and our tools and our methods become part of the British practice, it means that our yard labor wage rates will have to be cut in half or that the shipbuilding industry will vanish from our seaboard.

In Portland's Machine Shops


Lo-Swung Manufacturing Lathe in the Shops of the Willamette Iron & Steel Works, Portland


Large Worm and Worm Gear for the 8-10 Steam Capstans Which the Helser Machine Works of Portland Are Building for the Southwestern Shipbuilding Co. of East San Pedro. The Worm Gears Are Made by the Western Gear Works of Seattle.


No. 7-A Cincinnati Gear Cutter at Work on a Large Gear in the Machine Shop of Smith & Watson Iron Works, Portland. This Machine Was Manufactured by Cincinnati Gear Cutting Machine Co. and Sold by the Portland Machinery Co.


Niles Planer in the Shop of the Helser Machine Works, Portland, Fitted with an Extension on the Table

PACIFIC MACHINERY

RIVETING, DRILLING AND BENDING RIGS

As Developed at the Bethlehem Shipbuilding Corporation

DURING the great rush period in shipbuilding many bright American mechanics working in the shipyards developed ideas for speeding up the work on the ships. We are fortunate in being able to present in this article illustrations and descriptions of a few of the many devices so developed in the Potrero works of the Union plant of the Bethlehem Shipbuilding Corporation. The policy of this corporation has been very consistently to patent such devices when the originality or merit of the mechanism warranted such action and to share with the workman who developed the idea the proceeds, if any, arising from the patents.

Our illustration shows what is known as the Simpson riveting rig. This consists of a stiff mechanical holder-on placed opposite to a rigidly held guide in which the ordinary hand riveting hammer slides with a loose working feed. Back of this guide is a pivoted lever fitted with a spring shoulder pad. The valve for the power air is worked by means of a foot lever, and a convenient seat arranged on the support of the guide for the hammer so that the riveter working in the plate shop or fabricating park with this rig can have both hands free and at the same time put a heavier pressure back of his hammer and produce a better riveting job more quickly. Some very splendid records have been made with this rig.

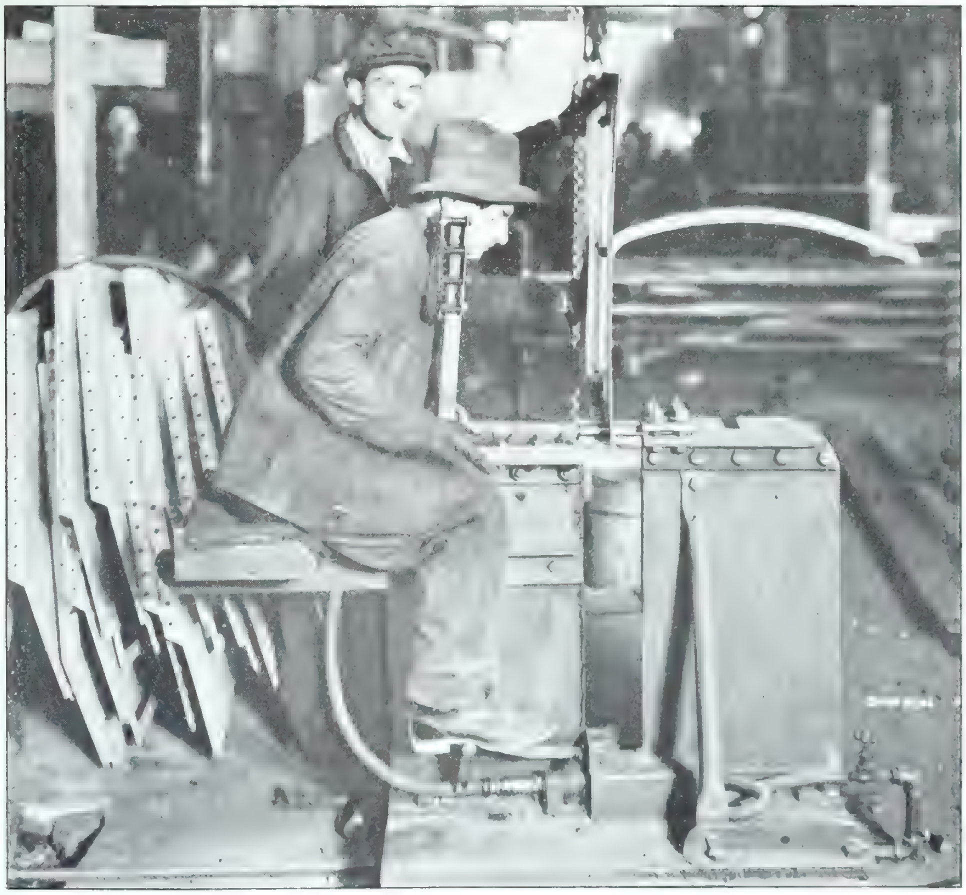


Figure 1—Simpson Riveting Rig

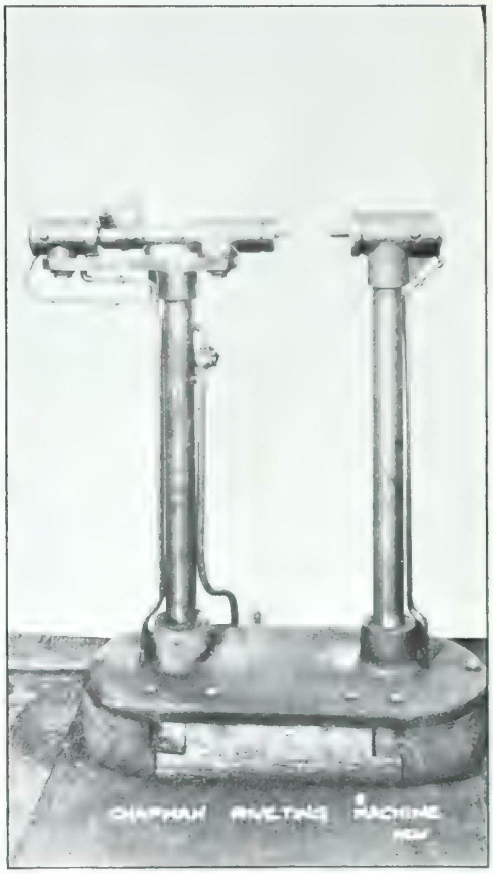


Figure 2—Chapman Riveting Machine for Sheet Metal Work

For light work another riveting rig was developed, which is illustrated in Figure No. 2. This is known as the Chapman riveting machine and consists of a small pneumatic hammer held in a guide mounted on a column and backed by a pneumatic ram. Placed opposite to the riveting die on the hammer head is another pneumatic ram with the holding-on die. This machine has been found very successful in cold riveting operations on sheet metal work up to ⅜-inch rivets.

The same workman who originated this

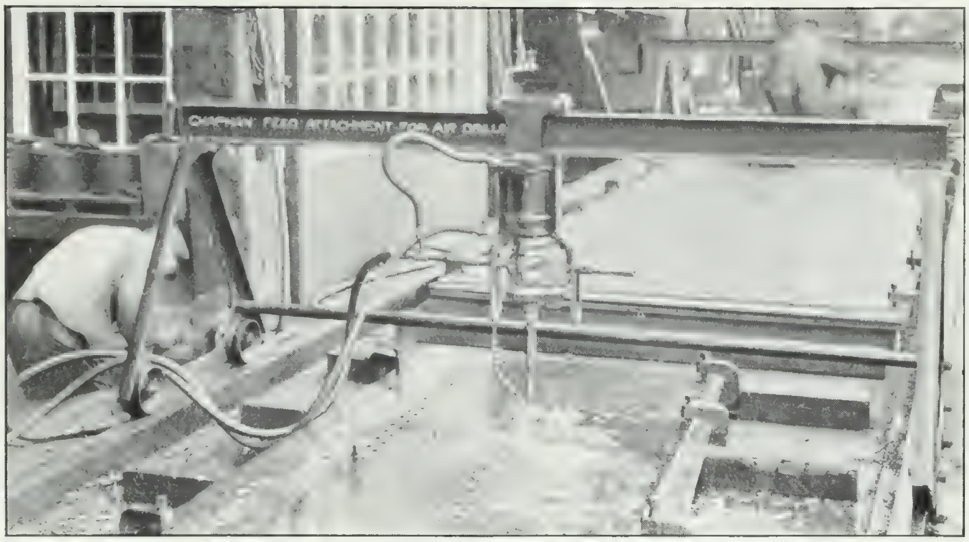


Figure 3—Chapman Feed Attachment for Air Drill

riveting machine has applied the principle of the pneumatic ram to a feed attachment for air drills, which is illustrated in Figure No. 3. The pneumatic drill is attached to the plunger of an air ram which is controlled by a two-way hand valve and supplied with power air from the same line as the cylinders of the drill. The drill is guided by two slotted arms bolted to the side of the air ram and the whole arrangement hung on a roller bearing trolley which runs on an A-frame carriage supported by roller bearing wheels on Z-bar tracks. These rigs are used in drilling the high tensile strength steel plates used on torpedo boat destroyers. The plates are usually drilled in batches of four or five, using a finished plate for a template. Some of these drilling rigs have been fitted with an automatic attachment for reversing the two-way valve by a stop when the drill has perforated the bottom plate.

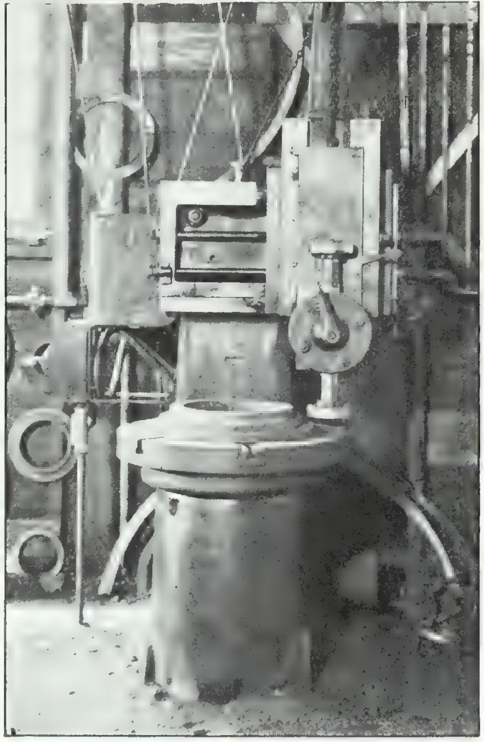


Figure 4—The Ronald Angle Bending Machine

BENDING MACHINES

In the building of ships and their fittings many duplicate bends are needed in various forms of structural steel, and so we find much of the ingenuity of the workmen directed to the making of these bends with as little effort and as great rapidity as possible. Figure No. 4 illustrates one result of this condition. The machine illustrated is known as the Ronald angle bending machine and is an adaptation of an old Bullard vertical turret boring mill. This rig was especially designed for the rolling of the circular angle frames which are used in the numerous holes in the shells of watertube boilers at the points where it is necessary to make the tubes accessible for blowing out. These circular frames are about twelve inches in diameter and composed of 3/16 by 1½ by 1½ angle iron. A cast-iron mold is attached to the table of the vertical boring machine and a suitable roller attached to the tool post of the turret head. The machine rolled these circular frames perfectly at a cost of approximately 11 cents apiece. The former cost of this work by the old hand methods had been from $1.15 to $1.30 per frame.

Figure No. 5 illustrates another Ronald angle bending machine for hand bending of angles where a flair is necessary. This is a very simple adaptation of the ordinary angle flair roller so often used in connection with the furnaces installed at bending slabs in shipyards.

Figure No. 6 illustrates the McKay hand rail bending machine, a very handy tool built from scrap and used for making duplicated parts, such as those for hand rails, ends of super-heating tubes for fire tube boilers, and many other purposes where short radius bends are required. The table of the machine as set up consists partly of the internal spur gear ring of an old gun mount. The pinion meshing in this internal gear was fastened to the shank of a No. 5 Chicago pneumatic air drill, the handles of the drill being held by the bracket arms shown in the illustration and a bearing provided in the turntable of the old gun carriage. This turntable also carries rollers which by suitable holes may be set at the desired eccentricity to produce the bend desired in the end of pipe held in clamps. Pneumatic or hydraulic rams can be used for clamps or hand clamps, if desired. This machine not only produces the desired bends much more quickly than can be done in the blacksmith shop, but it rolls up to two-inch pipe cold with no harmful results to the pipe and with practically exact duplication of bends.

There are many other developments of this character in the shops of the Potrero works of the Union plant of the Bethlehem Shipbuilding Corporation, and Pacific Marine Review is arranging to illustrate many of these in future articles. The illustrations for this article were provided through the courtesy of the Bethlehem Shipbuilding Corporation and made from photographs taken by the works photographer.

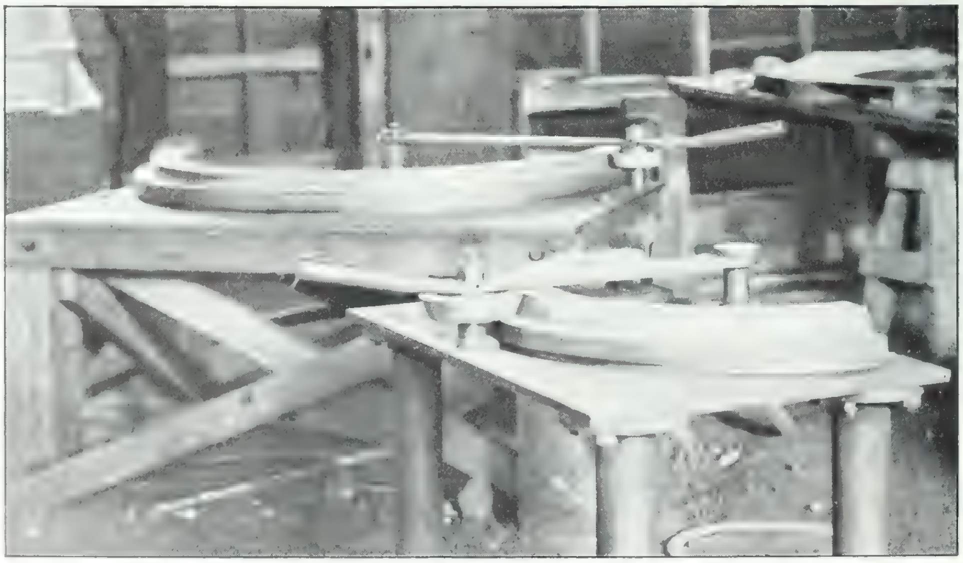
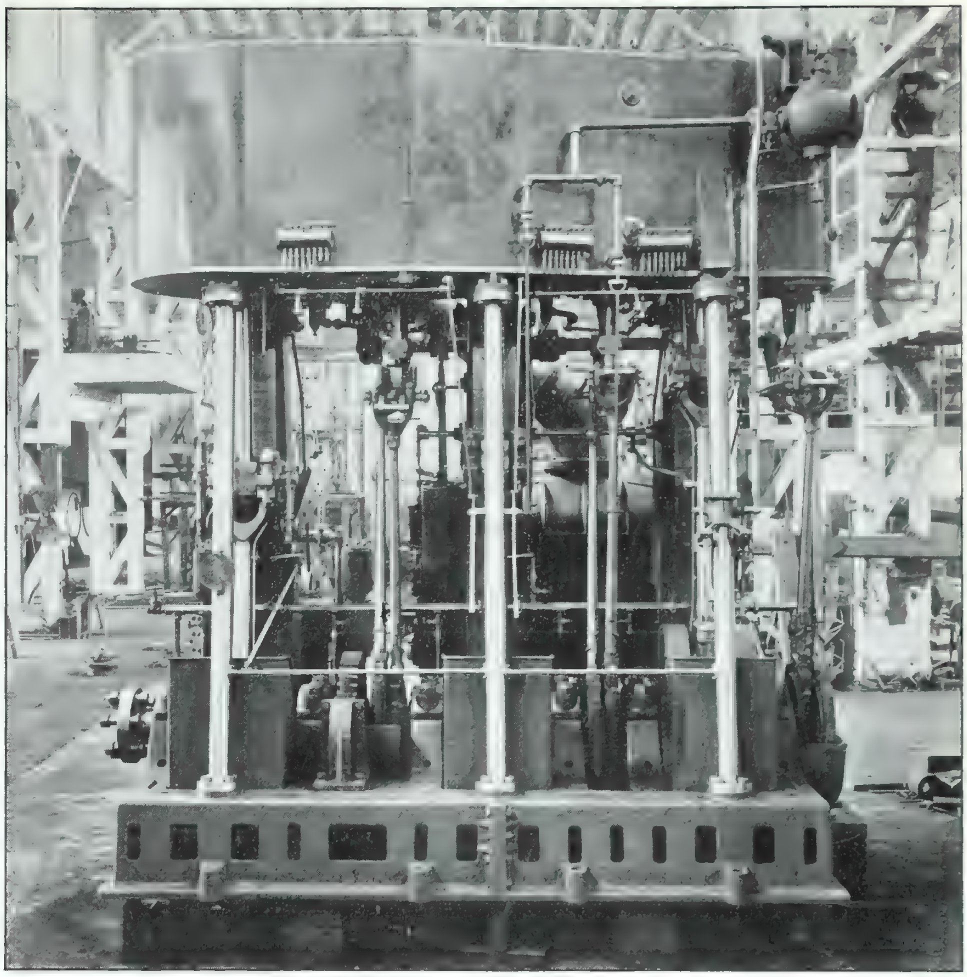


Figure 5—Hand Power Ronald Angle Bending Machine for Imparting Flair

TAKING THE SHOP TO THE SHIP

THE famous saying about the mountain and Mohammed might be brought down to date something like this: "If the ship can't come to the shop, take the shop to the ship." At least, it would apply with particular meaning to the Pacific Marine Iron Works of Portland, Oregon, whose new floating repair shop has been an important factor in expediting ship repairs while the vessel was engaged at her berth discharging or loading cargo.

Outfitting Dock and Shear Legs of the Pacific Marine Iron Works, Portland



On the Erecting Floor Pacific Iron Works, Portland

The equipment and facilities of this unique floating shop are such as to make possible any kind of repair job without the ship losing time from her cargo-handling operations. What this means in economy is readily apparent. Even when repairs are required to the underwater body, and drydocking is necessary, the floating shop draws alongside with all required equipment aboard, thereby saving time and lost action in trucking an endless variety of tools and equipment from tool room and shop to ship. Since the completion of the floating repair shop the Pacific Marine Iron Works has handled about thirty-eight important repair jobs on the Columbia River with unusual speed and exceptional economy.

The Pacific Marine Iron Works was organized by Fred Ballin, Joseph Supple and others during the war to build marine engines and boilers and also outfit the Supple & Ballin-built ships. Twenty-four Shipping Board vessels were outfitted at this plant.

The peace-time activities of this splendidly equipped plant include the construction of marine engines, Ballin boilers, ships' tanks and general marine repairs on hulls and machinery. The technical and mechanical force are experts in their particular line.

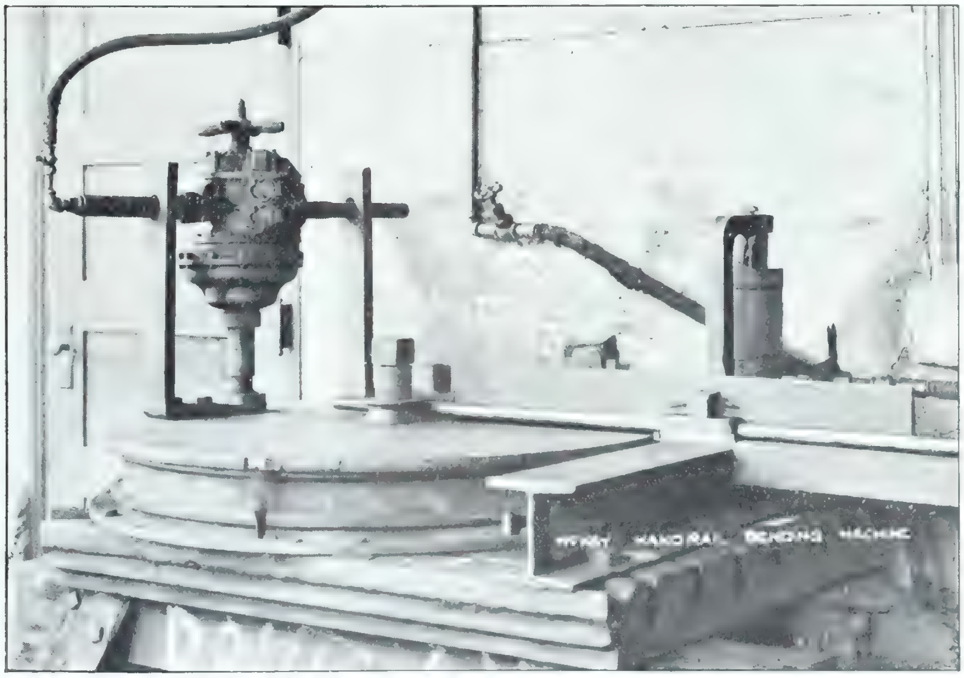
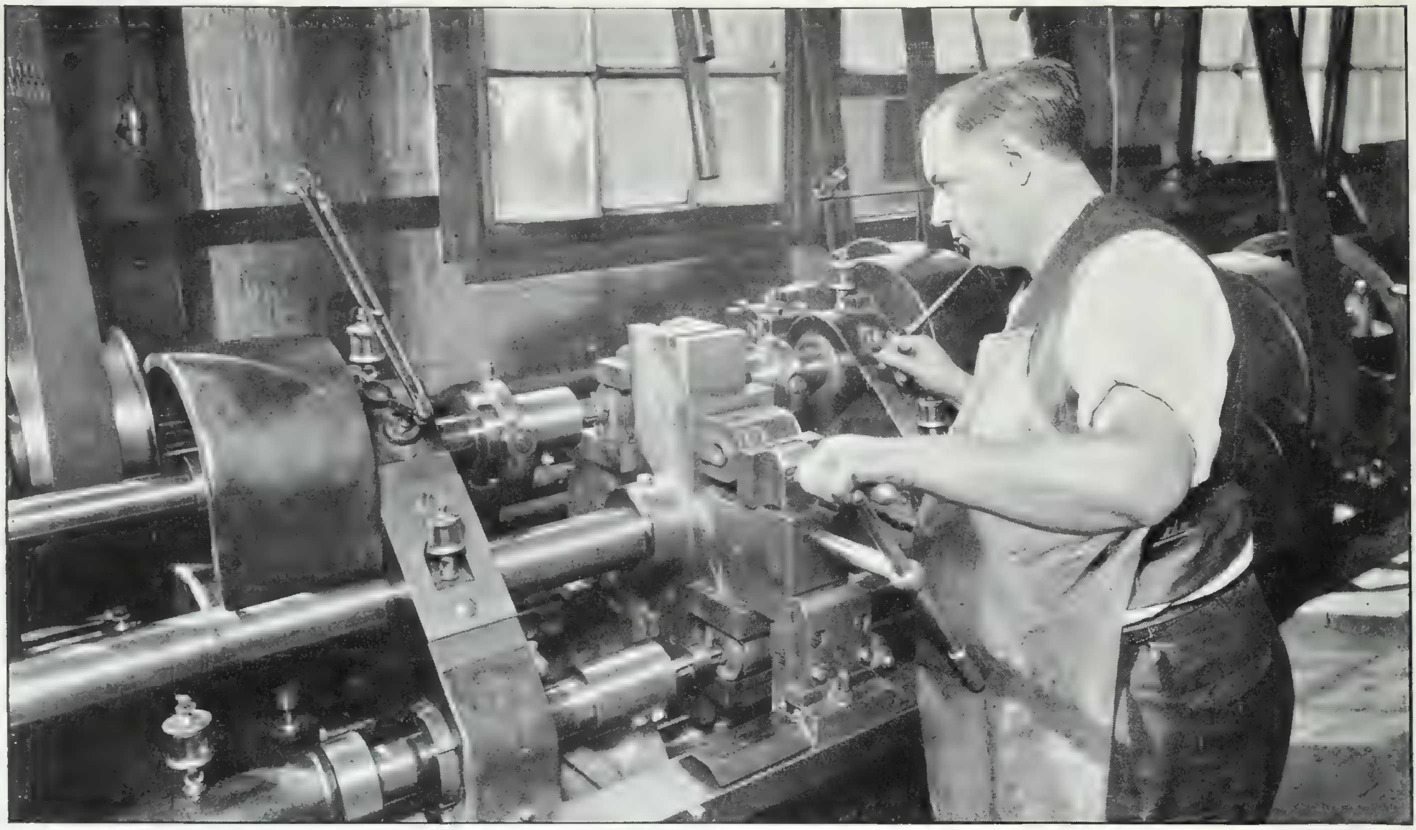


Figure 6— McKay Pneumatic Handrail Bending Machine

THE NEW BRITAIN AUTOMATIC



The New Britain Doublehead Automatic Machining Cast-Iron Housings at the Shop of the Electric & Manufacturing Co., Cleveland, Ohio. Both Ends of These Housings Are Drilled, Bored, Spot-faced and Tapped at the Rate of Forty-five Pieces Per Hour.

IN the manufacture of apparatus requiring duplicated parts in quantities, there has arisen a very great field for the automatic type of machine tool. Prominent among machines of this class built in America are those of the New Britain Machine Company of New Britain, Connecticut. This company manufactures a fine line of multiple spindle chucking machines which have been found very useful in a wide variety of operations in manufacturing plants.

These machines are built in two distinct types, single head and double head. The former are designed for machining pieces which require operations on but one end, or pieces where one end has already been machined.

The double-head type handles pieces requiring operations on both ends, accomplishing the result in one-half the time which would be required if each end were finished separately in a single-head machine.

As their name implies, these machines have several spindles, ranging from four in the small single-head machine to six in the double-head. The spindles carry and revolve the tools, while several pieces of work are held stationary in the multiple chuck turret which, when it indexes, brings each piece of work in line with the next succeeding tool. All machining operations take place in the intervals marked by the automatic progression of the turret indexing mechanism, the time necessary to complete a piece being measured by the period required for the longest single operation on it.

In the case of the single-head machine the turret advances and feeds the work against the revolving tools, while in the double-head type the revolving tools advance from both sides and perform their operation on each end of the work. In this way a series of operations are carried out on several pieces of work simultaneously, the pieces approaching completion as they progress from one tool to another.

The chuck centers of the work-holding turret form an equilateral polygon whose center lies in the axis of the turret barrel. Tool spindle centers are aligned with centers of work-holding chucks, the omission of a spindle opposite the upper turret position providing an idle chuck, which enables operator to remove the finished piece and insert rough blank while machining operations are progressing on work in other chucks.

The machine illustrated is installed in the shop of the Electric & Manufacturing Company, Cleveland, Ohio, and is engaged in boring and threading concentric holes on the opposite sides of cast-iron housings.

Formerly these cast-iron housings were finished on hand screw machines. Production was but twelve pieces per hour and, owing to the difficulty of getting the two holes concentric within .003, the percentage of scrapped parts was large. Since the installation of this New Britain double-head automatic chucking machine, an average production of forty pieces per hour (forty-five per hour while machine is running steadily) is obtained, an increase of 233 per cent over the old method. The simultaneous machining of both ends at one setting, together with the extreme accuracy with which opposite spindles are aligned, insures perfect concentricity of the finished work. In view, therefore, of the practical elimination of spoiled work, the net increase in production is even greater than indicated by the above-mentioned percentage.

Operations are as follows:

First spindles—Drill and counter-bore one end, while drilling and countersinking other end.

Second spindles—Bore and spot face both ends.

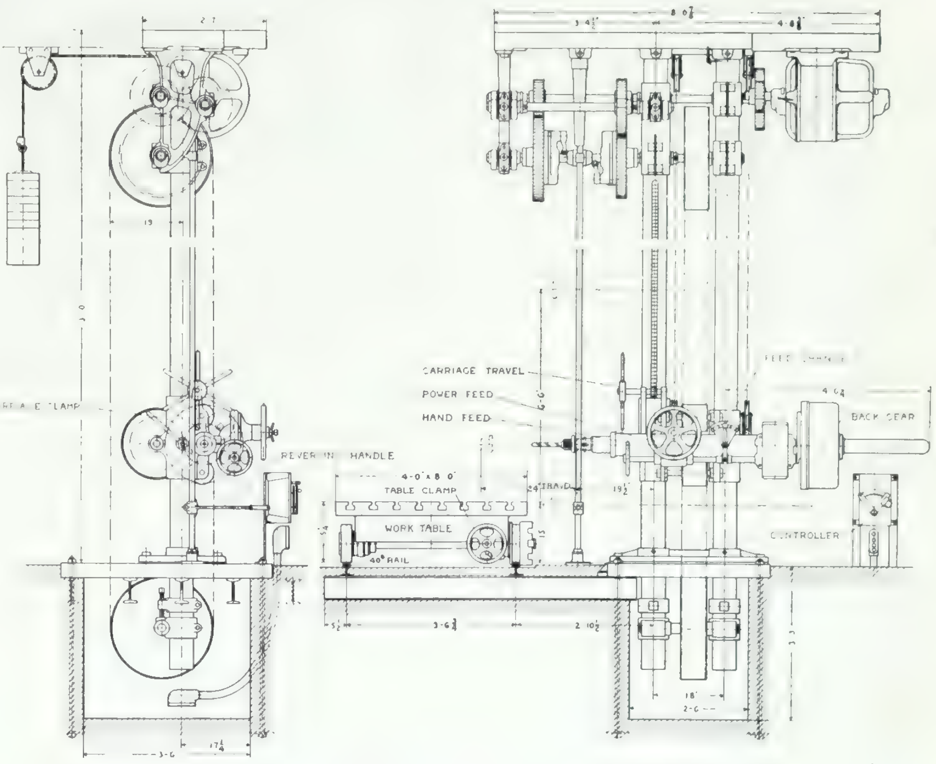
Third spindles—Tap both ends.

ERRATA

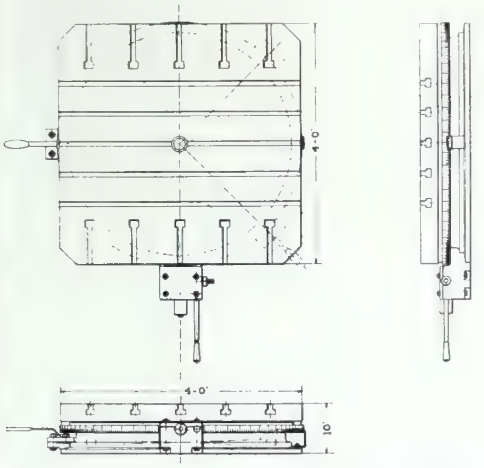
Two typographical errors which appeared in Pacific Marine Review for August have been called to our attention. On page 68 in the article on the Port of Liverpool by Captain F. T. Chambers appears the statement, "The combined pumping capacity of the five pumps is thirteen tons of water per minute." This should read thirteen hundred tons of water per minute." On page 58 in describing the marine railway at the Hanlon Dry Dock & Shipbuilding Company, the printer dropped another zero and made the capacity of the marine railway 400 tons when it should have been 4000.

AN EFFICIENT HORIZONTAL DRILLING AND BORING MACHINE

We illustrate herewith an electrically driven drilling and boring machine which has been found to be very accurate, efficient and convenient in many classes of work in Pacific Coast machine shops. It consists of what is practically a very rigid and well-designed drill press mounted horizontally on two vertical columns and provided with a work table mounted on a car running on T-rails. This combination gives very great flexibility to the tool so that it is able to handle with great ease operations on very bulky and heavy pieces. Taken in conjunction with its accessories, the turntable and the offset drilling head, it can drill in exact alignment up to its capacity holes of any size at any angle and in almost any location.



End and Side Elevations of the Horizontal Drilling and Boring Machine Manufactured by the Pawling & Harnischfeger Co.



Plan and Elevations of the Turntable Designed for Use With the Work Table of the Pawling & Harnischfeger Horizontal Drilling and Boring Machine.

The controlling mechanism is constantly within reach and under easy control of the operator, and the flexibility of the control is such that while the rates of feed cover a range of from .008 to .07 inch per revolution of the spindle advancing in geometrical progression, a quick change of feed can be made with the machine running.

The work table is of very heavy rigid construction, and its truck wheels run in bushed roller bearings. The wheels are provided with castellated lugs on which a bar can be used to revolve the wheel and thus move the table into position.

The offset drilling head consists of a cast housing containing two sprocket wheels connected by a Morse silent chain drive. It may be worked either backward or forward and forms a very valuable addition to this type of drilling machine.

RE-ORGANIZATION OF SEATTLE CHAIN COMPANY

Very recently the controlling ownership of the Seattle Chain Company has been acquired by L. D. Round of Cleveland, Ohio, and it is announced that the plant will be greatly enlarged to meet the orders which are coming in both from marine and timber sources. Friends of the plant on the Pacific Coast are rejoiced to know that H. E. Woolley, the founder of this institution, still retains his financial interest and is to be actively engaged as vice-president and general manager of the new organization.

The Seattle Chain Company was established by Mr. Woolley in June, 1913, at which time Mr. Wooley built with his own hands a small shop, set up a forge, and opened business with himself as the one skilled chain maker and employing one helper. In 1917 the plant was reorganized under the name of the Seattle Chain Company and employed twenty men. Their present site consists of two acres on East Marginal Way, the land being leased from King county. Forty fires are operated and from one hundred to one hundred and twenty-five men employed. This plant now makes chains in all sizes from ⅜-inch up to 2¾-inch stock and has supplied much of the marine and timber requirements of the Pacific Coast during the last several years.

L. D. Round, President of Seattle Chain Company

H. E. Woolley, Vice-President and General Manager Seattle Chain Company.

L. D. Round, the new owner and president of the company, is sole owner of D. Round & Sons, who operate a big block chain plant in Cleveland, Ohio, and he also holds large interests in the Cleveland Chain & Manufacturing Company of Cleveland, Ohio, and the Krein Chain Company of Wapakoneta, Ohio. The reorganized Seattle Chain Company is to be run as an entirely separate corporation from the eastern affiliations and is to have its capacity more than doubled, as it expects to operate one hundred and thirty-five fires and employ about two hundred and fifty men. New machinery and equipment will be installed, and chain will be manufactured for ships, logging camps, lumber plants, trucks, and agricultural machinery. The company will also install a complete drop-forging plant for making shackles, hooks and other marine equipment. Both Mr. Round and Mr. Woolley are practical chain-makers, having begun at that business when small boys. The company is at present working on 2¾-inch stud link chain for Mexican interests and have on hand a big anchor chain order for the new 10,000-ton oil tankers under construction at the Standifer plant in Vancouver, Washington.

The machinery and the plant of the Seattle Chain Company were well described and illustrated on page 160 of Pacific Marine Review for March, 1919. They are equipped most thoroughly for the building up of any length of chain within their size limits, and they are also equipped with a hydraulic chain testing machine of a capacity up to 400,000 pounds, which is regularly inspected by and registered with the federal government, the American Bureau of Shipping, British Lloyds, and the Bureau Veritas.

MOORE DOCKS BUSY

DURING the sixty days ending the middle of August, the four drydocks of the Moore Shipbuilding Company, Oakland, handled an average of one vessel a day. These ships were of all sizes and types, among them being the 10,000-ton liner Ecuador of the Pacific Mail Steamship Company and the concrete tank steamship Palo Alto. The largest Moore dock has a capacity of 20,000 tons, and the smallest, 5000. Within twenty-four hours after the Ecuador, one of the largest ocean-going vessels to enter the Oakland Estuary, had been taken alongside the Moore plant, she had been cleaned and painted and her engine and hull repaired; and she was on her way at midnight July 16. Overhauling vessels in this short time means that there is no delay in dispatching them on their outward voyage. Within the time given the Ecuador's tail-shaft was removed, a new shaft put in, many rivets were replaced and the vessel was given two coats of paint. One of the 7000-ton drydocks of the Moore yard was used from July 18 to August 1 for the repair of the Palo Alto, which had to be reinforced in many places. The San Francisco Shipbuilding Company, Government Island, builder of the Palo Alto, supplied most of the workmen for this job. The Northwestern Pacific ferryboat Sausalito, which had been damaged when her walking beam broke, was at the Moore yard during August undergoing extensive repairs. All machinery, the boilers, walking beam and gallows frame were removed; the engine was rebuilt; and a new engine-bed and new keelson were laid. Dredging is under way at the Moore yard to prepare a slip for the floating drydock, now moored temporarily across some of the building ways. Five pontoons were bought from the Skinner & Eddy Corporation, Seattle, and towed to San Francisco. Two pontoons building at the Moore yard are nearing completion, and besides these another will be built, making eight in all. These pontoons will be coupled by fours, so that two 12,000-ton floating docks will be available; but, should the size of these vessels demand, all the eight sections can be thrown together to make a 24,000-ton dock.

The steamers taken by the floating dock were: steamer Prentiss, June 8-16, cleaning, painting, renewing timbers of hull, calking, cement and wheel work; ferry Yerba Buena, July 16-17, cleaning, painting and repairing hull; steamer Sinasta, June 30 - July 1, cleaning, painting, and wheel work; steamer Meton, cleaning and painting; steamer Edna, cleaning, painting and general rpeairs to engine and hull; and the schooner Muriel and steamers Point Adams and Ecuador.

The vessels repaired, cleaned and painted on dock No. 3, the 5000-ton dock, were: steamers Salina, Quillwark, West Selene, West Hasseltine, Oregon, Elkhorn, and the water barge Seminole.

Those repaired on dock No. 2, or the other 7000-ton dock, were the Palo Alto, Brave Coeur and Horace Baxter and the lighthouse tender Madrona.

HOW THE OTHER FELLOW DOES IT

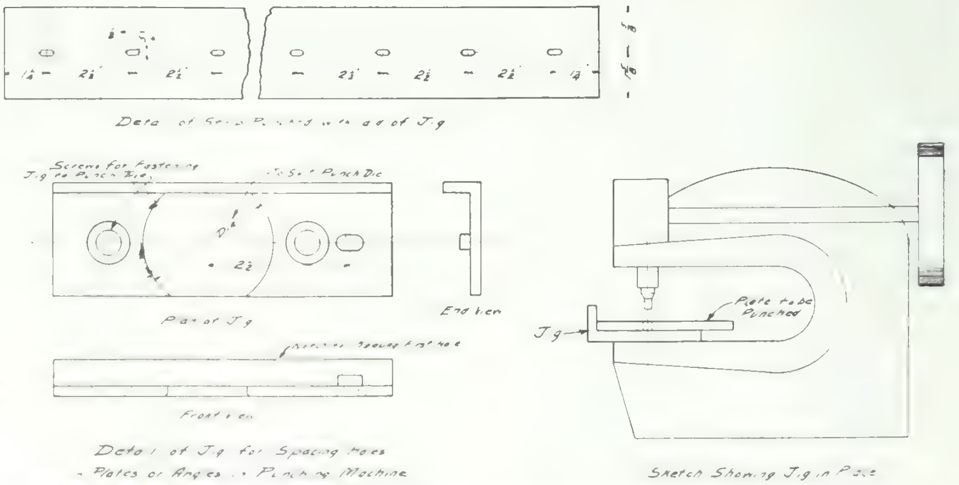
HANDY PUNCH JIG

The attached drawing shows a jig for spacing holes in steel strip or angles, where holes are equally spaced.

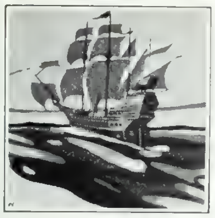
I had one job which required 60,000 feet of steel strip with ½x5/16" holes on 2½" centers. This required two men per punch to mark up the strips. With the jig I was able to use the markers on other work, and got much better results on the machine as the operator does not have to line up center punch marks with punch and die.

In starting a strip the end of same is set opposite the notch and the first hole is punched; the second operation is to move the strip over until the [illegible] the jig locks in the first hole punched, and so on until same is completed.

WM. KOPLIN.


1/4
2½
2½
2½
2½
2½
1/4
5/8
Detail of Strip Punched with aid of Jig
Screws for Fastening Jig to Punch Die
To Set Punch Die
2½
Plan of Jig
End View
Front View
Detail of Jig for Spacing Holes in Plates or Angles on Punching Machine
Plate to be Punched
Jig
Sketch Showing Jig in Place

NOTE:—This is the kind of kink illustration and article that we are looking for under the "Kink Contest."—Editor.



Marine Insurance

RECENT DEVELOPMENTS IN MARINE INSURANCE

By C. F. HOWELL

SERIOUS interest is being taken in plans for the betterment of engineering and underwriting conditions with respect to vessels propelled by internal combustion engines—a large contract in view of the extensive use of oil as a fuel in boats of all sizes and operating radii. We have had frequent occasion to call attention in these columns to the unfavorable experience had by marine insurance companies in handling the business of auxiliary schooners, motorboats and other craft of this class, and the necessity underwriters have been under for increasing rates and preparing new forms to enable them to handle these lines at all. Fires and machinery breakdowns have been so frequent, from this source, as to justify a large number of underwriters in passing the class up altogether. Last year auxiliaries burned at a wholesale rate. It was thought that the Seattle yards had produced specimens that might safely be expected to produce a more favorable experience, but the best they have turned out have gone the way of the majority. In 1918 the underwriters, stirred by the accumulating claims from boats powered by internal combustion engines, produced the auxiliary hull form. This was highly restrictive. It was a cross between the Boston schooner form and that of the American Hull Underwriters' Association. It threw out all claims for machinery break-downs, and its rate schedules were 50 per cent higher than those for wooden sailing ships. On this new basis an underwriter could be found, here and there, to write an auxiliary, but the majority still declined to go on them at all.

It was felt that the whole trouble lay with the Diesel engine, or others of allied type. The competency of the engineer also entered into the problem, for, given a properly trained and experienced man in charge of the engine, disastrous results are measurably reduced. Still, the underwriters do not like the design of these boats. It must be borne in mind that few marine underwriters are up on naval architecture. They work on statistical results. When a class gets running bad, the underwriter calls in his surveyor and wants to know just what the trouble is. It was felt that, in spite of competent engineers, losses continued to occur.

The underwriter has come to the conclusion that the majority of fire losses emanate from the engine room, despite the fact that it is impossible to trace the origin of fires to the engine itself on account of the meagerness of information generally obtainable. As a rule the engineer reports an explosion or sudden burst of flame somewhere in the engine room. The conclusion of the underwriter is that the increased cost of insurance on a Diesel type powered vessel more than offsets any saving in operation. A prominent New York marine underwriter makes this observation: "In our opinion auxiliary vessels could be made safer by having the engines and oil tanks in a watertight compartment, so no leaking oil could flow through the bilges, and such watertight bulkheads should be fire-proof or covered with some fire-resisting material so that the oil, if it does catch fire, can be confined to one compartment. This space should also be exceedingly well ventilated. There is no doubt that some fires have started through gas being generated and permeating the engine room, and then being fired by spark ignition."

Our readers will recall that an account was given in this department, a few months ago, of the important conferences held at the rooms of the American Bureau of Shipping between bureau authorities and representatives of prominent machinery manufacturing firms. At that time it was agreed that something would have to be

Clarence A. Doody, Recently Appointed Assistant to H S. Bates, Resident Director of Willcox, Peck & Hughes

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

done in the way of bringing classification rules and regulations of vessels of the internal combustion powered type up to the times. It was decided to go into the matter thoroughly, with close co-operation between the bureau and the best talent of machinery and engine manufacturers. To this end a manufacturing advisory committee of five was appointed, consisting of Dr. Charles E. Lucke, of the Worthington Pump & Machinery Company, chairman; Arthur West, of the Bethlehem Steel Corporation; Bruno Nordberg, of the Nordberg Manufacturing Company of Milwaukee; Harte Cook, of the McIntosh-Seymour Corporation of Auburn, New York; and John F. Nichols, of the Newport News Shipbuilding Company of Newport News, Virginia. Work is going along on the revision of the rules and regulations, and as fast as the bureau gets a proposition into shape it is sent in to the advisory committee and its merits or disadvantages thoroughly canvassed. It is necessarily slow work, because so full of technical problems; however, to date they have practically settled details of the following propositions: Elimination of the accumulation of waste oil, by collecting into a basin or tank; requirements for fire-extinguishing equipment; employment of higher grade material for use in the construction of internal combustion engines, so as to reduce machinery break-downs; the carrying of an increased number of spare parts, that will greatly diminish time lost by vessels in effecting repairs in ports of refuge; closer supervision of installations; and more frequent periodical engine surveys.

In this connection it should be stated that interest is growing among marine underwriters in the need for improved personnel in the engine room and higher standards for marine engineering licenses. It is pointed out that the United States Shipping Board is maintaining schools for the training of steam engineers, and it is felt that these should be extended to include Diesel engineers. It is vital to the underwriter that talent and knowledge of the first rank should be found in the engine room of oil-burning boats bound for transoceanic ports. The war has proved this. Inefficient engineers are properly chargeable with the majority of the collisions and groundings and machinery accidents that totalled up such a bill of claims for the insurance companies to settle. Because a man can scrape enough information together to pass for a license to run a little motorboat, it ought not suffice, as it does now, to permit his taking a large motorship across the ocean. Underwriters who are awake to this are beginning to urge its importance upon their less thoughtful confreres.

ORGANIZING THE SYNDICATES

Syndicates A, B and C, provided for under the terms of the Merchant Marine Act and organized by the Shipping Board with underwriting agreements signed by half a hundred leading American marine insurance companies, have been fully subscribed, and the A and B agreements have been signed. Signatures of foreign admitted companies to Syndicate C are in course of execution and the proportion of the group — namely, $500,000 — has been over-subscribed. A and B agreements have been delivered and exchanged between the Shipping Board and the representatives of the syndicates at Washington. The Association of American Marine Underwriters of the United States is an accomplished fact. The management of all three syndicates is to be under the supervision of a board of managers. Participation of the underwriters has been arranged, Mr. William H. McGee has been made managing underwriter pro tem., and risks are being bound. The so-called "miracle" is an established fact. The board of managers consists of Benjamin Rush, chairman; Louis F. Burke, Samuel Bird, Jr., Hendon Chubb, Douglas F. Cox, William H. McGee, Gomer Reese, E. C. Jameson, William R. Hedge, and Walter Wood Parsons. The following scale of rates for approved tramp steamers is tentative, without discount or refund, and provides for a brokerage not in excess of 5 per cent under regulations of the board of managers:

Shipping Board D.W.T.	Valued at not less than	Institute Warranties (A)	Eastport River Plate (B)	AGW (C)
11,500	$1,725,000	5½%	4¾%	4 %
10,000	1,500,000	5½%	4¾%	4 %
9,400	1,410,000	5½%	4¾%	4 %
8,500	1,520,000	5½%	4¾%	4 %
7,500	1,125,000	6 %	5 %	4½%
5,000	750,000	6 %	5 %	4½%
4,200	630,000	Note D	6 %	5 %
4,050	607,500	Note D	6 %	5 %
3,525	528,750	Note D	6 %	4½%
2,875	451,250	Note D	6 %	4½%

A—1. Warranted not to enter or sail from any port or ports, place or places, in British North America on the Atlantic Coast, except Halifax, Louisburg and Sydney for the purpose of coaling and not north of 50 degrees, north latitude on the Pacific Coast.

2. Warranted not to enter the Baltic beyond 13 degrees east longitude, or sail from a loading port therein between October 1 and April 1.

3. Warranted not to sail for or from any port or place on the north coast of Europe between North Cape and Cape Kanin, and not to proceed east of Cape Kanin in the Arctic Ocean.

4. Warranted not to sail with Indian coal as cargo between March 1 and June 30.

5. Warranted not to sail for or from any port or place in the Behring Sea or Alaska or Siberia (except that vessels may enter or sail from Vladivostok between May 1 and November 1).

B — Warranted confined to the waters of the American coast, not north of Eastport, Maine, nor south of River Plate, including Gulf of Mexico and (or) Central America and (or) West Indies and (or) Mexico.

C — Warranted that the vessel shall be engaged in trading between ports and (or) places on the Atlantic Coast of the United States of America (including ports and (or) places in the Gulf of Mexico) and (or) ports and (or) places in Mexico and (or) in Central America and (or) in the West Indies and the Caribbean Sea, as far south as Demerara.

D — Prohibited from trans-Atlantic or trans-Pacific voyages.

INSURANCE COMPANY
Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA
W. H. WOODRUFF, Special Agent
LOS ANGELES
230 BYRNE BUILDING
F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK
AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

IMPORTANCE OF NAVAL ARCHITECTURE

In a preceding paragraph it was observed that few marine underwriters have any working familiarity with naval architecture. This is unfortunate, and those who do possess it have an advantage over their competitors. The relationship between the structural qualifications of a vessel and her desirableness as a risk is obvious. It is true that the classification societies remove from the underwriter the necessity for familiarity with this phase of his work, but a measure of information along this line would certainly increase his skill. It is unquestionably to his advantage to see that the highest standards are maintained in preparing surveyors for the important work before them, and also in attracting the best talent into these channels. While it is quite true that at present few of the best qualified surveyors are drawn from the ranks of college men, there is no gainsaying the importance of preliminary training. To this end it would appear desirable that underwriters encourage college courses in naval architecture and the training of surveyors there; and in no way can this be so effectively done as by endowing scholarships. Through this method the student would feel the obligation of working for a time, at least, as a surveyor. It would come as a stimulating suggestion of the possibilities of such a career, and would admirably serve to attract some of our brightest young men into lines of activity that would directly further the interests of marine insurance and divert a steady flow of recruiting availability into the underwriting channel.

SHIPBUILDING OVERDONE

In certain marine insurance quarters it is feared that the inevitable result of the continued activity of shipbuilding yards, the world over, is going to be to exceed the demand for vessels in the near future. Already the tonnage is greater than that of the pre-war period, and there is no prospect of diminution in ship production. This is an element that has to be taken into consideration. One of the more recent warnings along this line was sounded by Chairman Gerard L. Bevan, of the City Equitable Fire of London, in his address before the annual meeting of that corporation. In speaking of the marine insurance outlook he took occasion to observe:

"Opinions on the outlook for marine business in the future are very divided, and while many authorities anticipate a period of meager profits, others equally capable are not so pessimistic. Many features have to be borne in mind in forming an estimate of the future trend of events. The losses sustained at sea during the war have been followed by unprecedented activity in shipyards all over the world. Already the volume of tonnage afloat exceeds the maximum pre-war figure, and it can hardly be questioned that within a short time the supply of ships will exceed the demand. Concurrent with this and again the result of war conditions, many new underwriters have entered the field, and as a result of this competition a good deal of business is now being written on terms which I am afraid will prove to be unremunerative."

SUGAR COVERAGE

Raw sugar from Cuba constitutes one of the most considerable imports of this season of the year, and the record of 1920 is of the best. It may now be reviewed as a practically completed activity, as the end of July is regarded as the close of the raw sugar period. Estimates of our annual importation of this great commodity must necessarily be rough in the extreme, but some underwriting authorities have put it down at a valuation of at least $800,000,000, figuring at $360 a ton, which is the present quotation for Cuban sugar. On this basis it is possible to estimate the insurance premium from this source at something above $2,000,000 per annum. The rate runs between 25 and 30 cents. Shippers will be interested, possibly, in some of the problems that confront underwriters in handling this large and precarious commodity. Raw sugar is a highly perishable cargo, the chief cause of loss being water damage. It is generally written subject to average, with the minimum depending, as a rule, upon the length of the voyage. In the Cuban-American sugar trade there is a very low franchise, the liability assumed by the underwriter being for loss amounting to $100. By contrast, the underwriter frequently insists upon a minimum average of $750 in the Java-American service. The most important sugar trades to the American market are those of Cuba and Porto Rico. Policies on these latter consignments cover for loss in weight and for loss in test; though there is a reduction in the demand for the latter protection because several of the leading refiners figure that the test rate of two and one-half cents per $100 of value can more profitably be carried by themselves. In adjusting a claim for loss in weight, an allowance is made for 2 per cent being absorbed by moisture, and the actual reduction in weight is found by subtracting the out-turn weight from the invoice weight. Loss in test is arrived at by a comparison of the sound and damaged values. Underwriting experience varies considerably with respect to profit or loss on the coverage of sugar; some have had a substantial gain; some a consistent loss.

COLD STORAGE AT LIVERPOOL

A COLD storage plant, claimed to be the largest and most up-to-date in Europe, is nearing completion at the Alexandria Dock, Liverpool, constructed by the Union Cold Storage Company. The first section of store, opened in August last, has a capacity sufficient for the storage of 11,000 tons of foodstuffs. When completed the total cubic capacity will be over 3,000,000 feet and the accommodation will approximate 30,000 tons of eatables, including meat, fish, poultry, game, eggs, butter, and cheese. The equipment will be the most modern obtainable. In order to avoid exposure of meat in transport from the ship to the store, the adjacent dock sheds have been fitted with a system of conveyers which enables the meat to be picked up at any point and conveyed under cover direct to the store, thus avoiding any break in the refrigeration. The building is in direct railway communication with the main railway systems of the country.

MARINE INSURANCE ON THE PACIFIC COAST

A COMPILATION of marine business written during 1919 by ninety-nine American companies shows that more than $100,000,000 in premiums was received. From a Pacific Coast standpoint, there is satisfaction in noting that the Fireman's Fund Insurance Company, of San Francisco, was second in premiums received, with $7,316,826, as compared with those of the Atlantic Mutual, $7,494,488, which led all companies, American or foreign, doing business in the United States.

Foreign admitted companies netted $43,038,263, but this sum does not include business placed directly with companies abroad, which recent New York state legislation would have reported hereafter.

LOSSES EXCEED 60 PER CER CENT

Losses paid to date absorb about 60 per cent of premiums. This ratio will be increased, however, by the settlement of outstanding claims.

American companies that received $2,000,000 or more in premiums follow:

	1919	1918
Aetna, Hartford	$3,843,196	$3,382,548
Automobile, Hartford	4,844,426	3,895,012
Atlantic Mutual, New York	7,494,488	4,927,954
Boston, of Boston	3,252,275	3,357,668
Federal, Jersey City	3,541,105	3,939,955
Fireman's Fund, San Francisco	7,316,826	6,736,040
Globe & Rutgers, New York	4,813,069	7,734,664
Hartford, of Hartford	3,401,443	3,093,140
Home, New York	4,363,841	3,042,401
Insurance Company of North America, Philadelphia	6,389,059	9.079,098
Providence - Washington, of Providence	2,468,037	2,326,704
St. Paul Fire & Marine, St. Paul	3,304,927	3,092,696
United States Lloyds, New York	3,614,590	3,637,223

BUSINESS OF FOREIGN COMPANIES

Foreign admitted companies that did more than $1,000,000 in business follow (no figures exist as to the business placed directly abroad, either with admitted or non-admitted companies):

	1919	1918
British & Foreign Marine, Liverpool	$1,530,293	$2,005,380
Commercial Union Assurance, London	2,667,654	792,420
Liverpool & London & Globe, Liverpool	1,278,181	1,136,864
London Assurance, of London	1,561,028	1,459,598
Marine, London	2,315,410	2,076,125
Norske Lloyd, Christiania	2,311,058	3,268,473
Norwegian Assurance Union, Christiania	1,479,017	2,802,466
Royal Exchange Assurance, London	1,231,903	2,175,873
Royal, Liverpool	[illegible]	1,478,303
Scandinavian-American Assurance, Christiania	[illegible]	[illegible]
Sea, Liverpool	[illegible]	[illegible]
Standard Marine, Liverpool	3,077,658	1,712,242
Thames & Mersey, London	1,338,479	1,178,522
Tokio Marine & Fire, Tokio	1,054,062	1,109,010
Union Insurance Society, Hongkong	[illegible]	[illegible]

TO WILLCOX, PECK & HUGHES

Clarence A. Doody has been appointed assistant to H. S. Bates, resident director of Willcox, Peck & Hughes, San Francisco, from September 1. Mr. Doody came to the Pacific Coast from Rochester, New York, in 1912; completed the law course of the University of California in 1915; was admitted to the California bar and was associated with the well-known firm of admiralty lawyers, McClanahan & Derby. Mr. Doody also was with the loss department of Johnson & Higgins, and on October 1, 1918, was made manager of the marine and adjusting department of C. B. Sloan & Company.

John A. Mathews, assistant general agent, marine department, Aetna Insurance Company, San Francisco, has been appointed general agent, marine department, succeeding the late Harry Durbrow. Mr. Mathews' assistant will be J. A. Murphy, agent of the Aetna in Seattle for many years. Mr. Mathews is a native of San Francisco and has been in the Aetna service since 1911.

LEAVES ALASKA STEAMSHIP

Everett P. Clark, assistant general freight and passenger agent of the Alaska Steamship Company, with headquarters in Seattle, has resigned to enter the marine insurance business. He will be in charge of the marine insurance department, Seattle office, of Rollins, Burdick, Hunter Company, brokers of Chicago. Mr. Clark had been in the service of the Alaska Steamship Company for more than sixteen years.

An unusual blanket of fog on the Pacific Coast during August resulted in delays to several vessels and in one serious collision between the Matson liner Manoa and the Blue Funnel freighter Eurydamus August 11 in San Francisco Bay. The Eurydamus was more seriously damaged. The Manoa was libeled for $25,000.

The Matson liner Enterprise lost her four-bladed bronze propeller 160 miles from San Francisco August 7. She was picked up by the tug Tatoosh 192 miles from San Francisco, after the Matson liner Lurline had stood by for a few hours, and was towed into port. Repairs are estimated at $12,000.

DECLARED MISSING

The auxiliary schooner Zacarias Conde, formerly the Tomei Maru, which sailed from Acapulco for Manzanillo May 19 with passengers and a cargo of coffee, and which has not been heard of since, has been declared missing.

The steamship Centralia, which struck inside Umpqua Bar, sustained a broken keel aft, broken rudder post, split trunk, broken U-braces; the shoe was missing and the treenails in the bottom were started. She was taken to Barnes & Tibbitts, Oakland, for repairs.

Due to the fact that congestion in Yokohama has forced many vessels to discharge outside the breakwater, underwriters agreed on an additional premium of one-eighth of 1 per cent, according to advices from Japan.

The San Francisco Chamber of Commerce has joined with shipping interests of the Pacific Coast in a petition to the commissioner of lighthouses that a fog signal and lighthouse be established at Point Lookout on the Oregon Coast.

NOTES

THE Metal & Thermit Corporation, New York, New York, has made arrangements to secure life insurance for all its employes who have served the company for at least six months. The amount of protection is graded according to the length of service, ranging from $700 for six months' service up to $3000 for twenty years' service. The company bears the entire expense of this insurance, which is in addition to any compensation to which its employes might be entitled under the present state compensation laws. The insurance will be paid in monthly payments during the first year after death.

Sold for Claims—The schooner Blaatind was sold by order of the United States District Court, Seattle, in August to the Scandinavian-American Bank for $100,000. The bank had filed the heaviest claim, $143,879, of the total of $173,419. The Blaatind was built in Seattle for the American Motor Schooner Company of New York, but was prevented by the filing of claims from leaving the harbor.

Writes Baggage Insurance — The Toyo Kisen Kaisha has opened a baggage insurance department from August 19. Policies will be issued in United States Lloyds and the Tokio Marine & Fire Insurance Company, at rates ranging from 30 cents a hundred dollars for one month to $1.50 for twelve months, minimum fee to be $1.50. Insurance is against loss by land or sea.

May Change Oil-Burners—Steamship operators apparently are not unanimous in their views as to the continued use of fuel oil. While the conversion of old coal-burning vessels and the construction of new oil-burners continues without a check, some companies are giving serious consideration to their situation. The annual report of the Java-China-Japan Line, for example, says that the scarcity of oil may force it to change its vessels to coal-burners, much as this step would be regretted because a call at a Japanese port for bunkers would be necessitated. In isolated cases oil-burners have been converted to coal burners, but these changes probably have been due more to immediate difficulty in obtaining oil than to the situation in general. The recent flurry over fuel oil for the Shipping Board has passed with the signing of a contract with the Standard Oil Company of New Jersey for approximately 15,825,000 barrels at prices ranging from $1.90 to $2.70, depending upon port of delivery. Contracts also have been signed with the Atlantic Refining Company, Gulf Refining Company and Midco Mexico Company for a total of 10,125,000 barrels.

(Section continued from page 102)

information as to the profits that would be made by the operators under the proposed agreement. The data thus obtained will be submitted to the board. Advices received on the Pacific Coast are that there is no prospect of the agreement being approved until the new members of the board are appointed by President Wilson. Whether the board will grant the full recompense asked also is uncertain.

Hollywood Officers Appointed—Captain J. W. Jory, agent of the Sea Service Bureau, Shipping Board, has announced the following appointments of officers of the steamship Hollywood, which will be used as a training ship, plying between San Francisco, Seattle and Honolulu: Captain Omar Beaton, formerly of the Brookdale, master; William Thatcher, executive officer; William H. Stroud, first officer; J. F. Elb, second officer; L. J. Weld, third officer; E. F. Reilly, chief engineer; Albert Anderson, first assistant; J. P. Keating, second assistant; S. Dunney, third assistant; Charles Deveson, chief steward. An advanced school for marine engineers will be established by the Shipping Board at the University of Washington, Seattle, in charge of Professor E. O. Eastwood.

Panama Canal Business—During the fiscal year ending June 30, 2478 vessels of a total tonnage of 8,545,000 passed through the Panama Canal, paying $8,800,000 in tolls. The surplus, after expenses of operation and maintenance are paid, will be about $2,150,000, or five times the largest previous surplus. Of the 2478 vessels that passed through the canal 1180 were from the Atlantic to the Pacific and 1298 from the Pacific to the Atlantic; they carried 9,374,499 long tons, of which 4,092,516 was from the Atlantic to the Pacific and 5,281,983 from the Pacific to the Atlantic. Besides the commercial vessels, the canal was used by 266 government craft, practically all of which were of the army and navy.

New Intercoastal Service — An intercoastal service between Baltimore, Philadelphia, Mobile and Los Angeles and San Francisco has been opened by the Atlantic, Gulf and Pacific Steamship Corporation with vessels purchased from the Shipping Board. There will be semi-monthly sailings. Calls at the Atlantic and Gulf ports named will be as cargo offers; and on the Pacific the line may be extended to Seattle if conditions favor. W. Bernard Duke, of Baltimore, is president of the company, which has behind it ample financial backing. The steamship Cape Romain sailed from Baltimore early in August, and she was followed by the Cape Henry and West Apaum. Steaming time between Baltimore and San Francisco will be about twenty-five days. San Francisco offices have been opened in the Rolph Navigation & Coal Building, 60 California street, in charge of T. J. Wade, general freight agent. S. L. Kreider has been appointed Los Angeles agent.

Pineapple Movement Large—The island of Maui, Hawaii, is coming rapidly to the fore in the raising and packing of pineapples. This year more than 600,000 cases of canned pines have been shipped from Maui and the 1921 pack should exceed 800,000 cases. The pineapple raisers express their confidence that with 1922 the production will run above a million cases. Maui's present sugar season has closed. There will be no more sugar ground until the last week in September. With more than 10,000 cane workers back on the job on the plantations of Oahu, following the strike of the Japanese and Filipinos, the Oahu mills are producing about 400 tons of sugar a day. It is expected that Oahu will fall about 20 per cent short of its regular sugar production, but the output of the entire territory will go well over 550,000 tons for the year.

Pacific Mail Buys Tanker—Two tankers that were to be constructed for builders' account by the New York Shipbuilding Corporation have been sold to the Pacific Mail Steamship Company and the United Fruit Company. The uncertainties surrounding the fuel-oil supply impelled the two steamship companies to buy the tankers as a measure calculated to protect themselves. Between what ports the Pacific Mail tanker will ply has not been decided definitely. Approval of the plans of the vessel has been requested of the Shipping Board under the provisions of the Merchant Marine Act that exempt from excess profits and war profits taxes earnings of vessels engaged in foreign trade, provided that he invest the amount of such exemption in new vessels of types approved by the board. Approval of vessels has been requested by other companies, among which is W. R. Grace & Company, which has a 10,000-ton tanker on order from the New York Shipbuilding Corporation.

General Steamship Changes—F. C. Devine, formerly of W. C. Dawson & Company, Seattle, has been appointed manager of the Portland office of the General Steamship Corporation. E. M. McConalogue, northwestern traffic manager of the General Steamship Corporation, has been appointed traffic manager of the South American line, succeeding R. S. Silva, resigned. The Shipping Board has assigned the freighter Derblay, built by the Hanlon Drydock & Shipbuilding Company, Oakland, to the General Steamship Corporation for the South American service, replacing the steamship Lake Filbert, the draft of which was too great for West Coast harbors and which will be turned back to the Shipping Board. The Derblay will load early in September. The General Steamship Corporation is operating ten Shipping Board vessels at the present time, six to South America and four to Australasia.

Iris Is Bought — The steamship Iris, bought by Swayne & Hoyt, San Francisco, from the Shipping Board, has been sent to the Long Beach Shipbuilding Company's yard for overhauling, which will consist largely of removing quarters used by recruits when the Iris was a training vessel. This purchase puts an end to efforts by individuals and foreign trade organizations to obtain the Iris for use as an exhibition steamer, which would visit Asiatic ports with displays of American merchandise. The Iris was built by A. Leslie & Company, Newcastle, in 1885; she is an iron vessel of 2858 tons gross, 1996 net, 310 feet 6 inches in length, 38 feet 8 inches breadth and 27 feet depth of hold. The price paid by Swayne & Hoyt was $96,100. The Iris will be used in the New Orleans service.

Northwest Lumber Shipments—During the first six months of 1920 lumber shipments from the North Pacific totaled 849,285,524 feet, a gain of 304,856,013 feet over the first half of 1919. California, as usual, took more than half the total. Shipments, domestic and foreign included, were: British Columbia, 55,346,494 feet; Puget Sound, 264,026,983; Grays Harbor, 139,250,573; Willapa Harbor, 46,192,272; Columbia River, 223,528,046; Coos Bay, 120,941,156. The tabulation is by the Pacific Coast Lumber Inspection Bureau, Seattle. Of the gain of this year over last, Oregon led with 152,244,210 feet.

Pacific Fares Raised—After refusing to permit its subsidized lines to increase trans-Pacific passenger fares, on the ground that the companies should reduce their overhead costs before asking for greater revenues, the Japanese government has receded from that position and has granted permission for increases of 20 per cent in both first and second cabin fares, eastbound and westbound. The non-Japanese lines were in no position to increase their rates unless the Japanese did likewise, so that the Japanese government had prevented any increases being made. The lines affected are the T. K. K., O. S. K., N. Y. K., Pacific Mail, China Mail and Canadian Pacific. The new rates, effective September 15, will be as follows: between San Francisco and Yokohama, either direction, $300; Kobe, $311; Shanghai, $346; Manila, $375; Hongkong, $375; and all fares of the Manila-East India line have been increased $63. Honolulu fares are unchanged. Fares paid in full not later than September 15 will be at the old rates up to sailings of December 31, but no later; bookings for 1921 sailings, that is, will be at the increased rates, regardless of when paid. The Toyo Kisen Kaisha has increased westbound steerage fares from $51 to $55, but no increase has been made in eastbound rates. The China Mail will follow the lead of the T. K. K.

New Construction, Repairs and Port Development on the Pacific Coast

British Columbia

New C. P. R. Steamer—It has been definitely announced by the Canadian Pacific Railway that they have closed a contract with the Wallace Yard in North Vancouver for the construction of a fine excursion steamer for the Vancouver-Skagway route to take the place of the ill-fated Princess Sophia. The new vessel will be 232 feet long and will have a speed of seventeen knots. The approximate cost is one and a half million dollars.

Motorship in Harbor—A great deal of interest has been evinced by local shipbuilders and shipping men in the fine Swedish motorship Pacific, which recently visited Vancouver with 1000 tons of sugar and a light cargo of general merchandise. The motorship is one of the Burmeister & Wain engined boats of the Johnson Line of Stockholm, Sweden. After visiting her engine room and inspecting her log, local marine engineers were of the opinion that Canadian shipbuilders must prepare to build motorships if they are to stay in the shipbuilding game.

Vancouver Pier—The Canadian government has purchased from the Great Northern Railroad 500 feet of waterfront property in Vancouver on which a pier will be built at an estimated cost of $5,000,000. Dredging is under way.

Coughlan Keel Laid — J. Coughlan & Sons, Vancouver, B. C., have laid the keel of the fifth steamer building for their own account. Of three completed vessels, two were sold and one is operated by a Coughlan subsidiary company, the Canada Western Steamship, Ltd. All the vessels are 8800-tonners. Delay in the receipt of steel has held up the beginning of construction of vessels for the Canadian government.

Puget Sound

Port Earns $37,000—Net profits of the Seattle port commission properties for the first six months of this year totaled $37,667.39, after allowing for all expenses, including bond interest, overhead charges and depreciation. Expenses aggregated $658,911.95 and the revenues $696,579.34.

Seattle Plans Work—The Seattle port commission is in favor of establishing in the bed of the Duwamnish Slough between Lake Washington and Bothell a public waterway, approximately 300 feet wide and twenty feet deep, which is estimated to cost $1,750,000, for dredging, bulkheading and filling the adjoining property.

Greatest Pier Opened—Pier B. Smith Cove Terminal, Seattle, was opened August 5, when the Mitsui steamship Horaisan Maru was berthed. Pier B is the largest cargo pier of the world, 2580 feet long and 367 feet wide, with an area of 946,860 square feet. No less than eleven vessels of the Horaisan Maru class could berth at the pier at the same time. Piers A and B make up the new terminal. The new transit shed and passenger accommodations of the latter cost about $233,000. Trans-Pacific passenger vessels of the Pacific Steamship Company, allotted by the Shipping Board, will berth at Pier B.

Sub-Chasers Bought—Three submarine chasers, bought by the Seattle Fisheries Association, have been altered by the West Seattle Boat & Engine Company for service as deep-sea trawlers. The center engine and propeller of each vessel were removed, leaving two propellers, with which, however, a speed of fourteen and a half knots can be made.

$144 a Deadweight Ton — Skinner & Eddy, Seattle, have sold two vessels, the Robin Hood and the Robin Adair, to the United States Steel Corporation at $144 a deadweight ton. The two vessels, both of which are 10,400-tonners, brought $3,000,000. They were two of the last four vessels built by Skinner & Eddy, all of which were for their own account and which have been operated by the Robin Steamship Company, a subsidiary corporation. Two of the vessels are retained.

Barge of Ferris Hull—First of the Ferris-type wooden hulls to be converted into a barge is theGriffson, which was launched by the Winslow Marine Railway & Shipbuilding Company August 4. The Griffson was building at the Nilson & Kelez yard when the Shipping Board cancelled contracts. She was launched incomplete, with only a few strakes of planking in place, and was towed to the Winslow yard to be finished as a barge. Her capacity is 4000 tons. She is owned by James Griffiths & Sons, Seattle.

Duthie Work—J. F. Duthie & Company, Seattle, launched the 12,500-ton steamship Griffco for James Griffiths & Sons, Seattle, August 18.

Propellers from Doran—In addition to making $500,000 worth of propellers for Shipping Board vessels building at Hog Island and Bristol, the Doran Brass Foundry Company, Seattle, recently has closed contracts with Pacific Coast yards for propellers, among which are four for the Union Construction Company, Oakland, and three for the G. M. Standifer Construction Corporation. All are of manganese bronze.

Pyro in Commission—The United States Navy ammunition vessel Pyro, built with her sistership, the Nitro, at the Bremerton Navy Yard, was placed in commission August 12. The two vessels were launched this year.

David Rodgers Disincorporates — Disincorporation of the David Rodgers Shipbuilding & Drydock Company was granted in Seattle August 11, after a hearing before Superior Judge King Dykeman. Dissolution was decided upon by a vote of more than two-thirds of the stockholders in June.

Columbia River

The Port Elevator—It is estimated that approximately 5,000,000 bushels of wheat will be handled during the coming season through the elevators of the Astoria Port Commission, and the construction of an elevating slip has been authorized at the outer end of Pier 1 to accommodate river steamers.

Construction Work, Pier 3—The Foundation Company is making good headway on the construction of Pier 3 and the warehouse thereon, notwithstanding the delay caused by intermittent strikes. The roof is on for the outer unit of the big warehouse, and the cement floor is laid therein. It is entirely possible that the outer unit of the warehouse may be filled up with cargo before the pier is completed. The warehouse is to be 1500 feet in length by 160 feet wide and is being built in three units. The dredge Natoma is rapidly completing the fill for the pier, and it is expected that this work will be completed before the middle of September. Space is allowed on Pier 3 for a second warehouse equal in size to the first, but until the demand for covered storage warrants the erection, the space to be occupied by warehouse No. 2 will be used as open storage.

Channel Dredged—Dredging a channel to accommodate the large freighters of the Isthmian Line has been done by the Northwest Bridge & Iron Company, Portland, so that steel transported by water from the Atlantic may be discharged at the plant. Slow deliveries of steel shipped by rail forced the company to employ vessels. The Northwest Bridge & Iron will require thousands of tons of steel for the seven tankers to be built for the Swiftsure Oil Company.

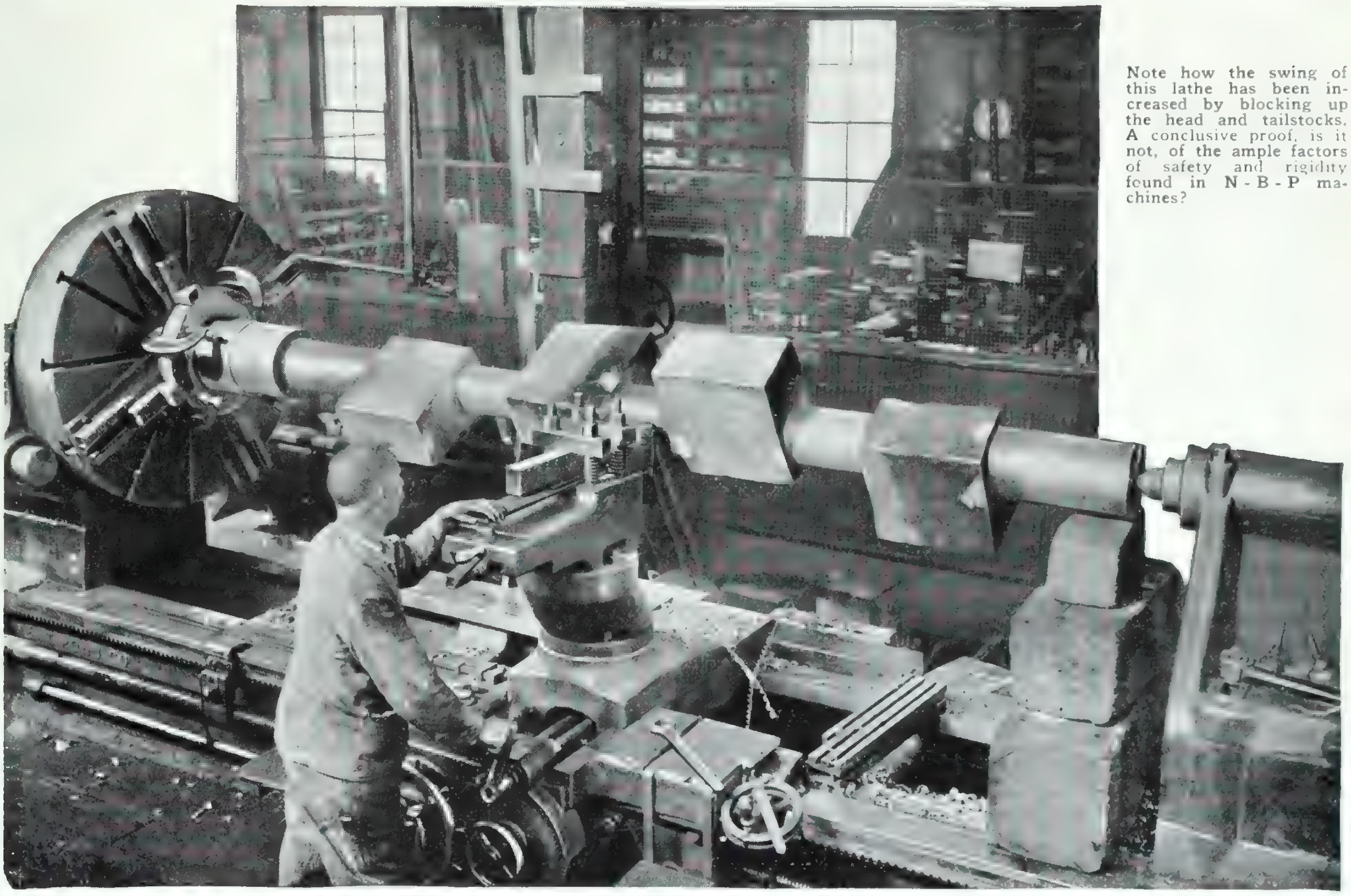
Willamette Boilers—On August 19 three Scotch marine boilers were loaded into the hold of the steam schooner Daisy Freeman for delivery to the Bethlehem Shipbuilding Corporation at San Francisco.

Seattle Visits Portland—About the middle of August a number of members of the Port Commission of Seattle, including the president, spent two days in Portland and Astoria inspecting the terminal facilities and the grain elevators. Rene Clark, secretary of the Public Dock Commission of New Orleans, was also a member of the party.

(Continued on page 122)

SHIPBUILDING SHOPS—II

This page is the second of a series devoted to the application of NILES-BEMENT-POND MACHINE TOOLS and allied products to marine engineering practice in every department and shop that the modern shipyard comprises.



Note how the swing of this lathe has been increased by blocking up the head and tailstocks. A conclusive proof, is it not, of the ample factors of safety and rigidity found in N-B-P machines?

IN THE MACHINE SHOP

ON this page is shown one of the N-B-P specialties, the Heavy Engine Lathe, used extensively for crank shafts, line shafts, thrust shafts, tail shafts and similar work. A lathe handling this work must withstand the severe strains put upon it, taking, as it does, the initial cut on rough forgings just as they come from the forge shop. The proof that N-B-P Lathes fill the bill in this respect lies in an unbroken record in the long established ship and engine works on both coasts. The installation shown on this page is doing duty in the Skandia Pacific Oil Engine Company's works at Oakland, California.

IN marine engine and machine shops, big work is the rule. The day's work includes crank shafts, rudder posts, rudder stocks and the large castings that make up the completed engine, comprising beds, cylinders, connecting rods, guides and valve gear. These units require heavy, well-designed machine tools. N-B-P Lathes, Planers and Boring and Turning Mills have always been designed with the purpose in view of having ease of operation just as pronounced in heavy models of the machines as in the lighter ones.

NILES-BEMENT-POND CO.

GENERAL OFFICES, 111 BROADWAY, NEW YORK

(Section continued from page 120)

Standifer Gets Contracts—Contracts for two 12,000-ton tankers have been awarded by the Imperial Oil Company to the G. M. Standifer Construction Corporation, Vancouver, Washington.

To Survey Harbor—A survey of the harbor of Vancouver, Washington, will be made by Edward M. Cousin, of Portland, to be used in connection with the proposed establishment of a thirty-foot channel from Vancouver to the mouth of the Willamette River.

Building Steam Schooner—The steam schooner Quinalt, being built at the Peninsula Shipbuilding Company's yard, Portland, for the Hart-Wood Lumber Company, will be launched in October. She will have a carrying capacity of 1,200,000 feet of lumber.

San Francisco Bay

Draft Safety Rules—The Industrial Accident Commission of California and representatives of the shipyards and workmen are engaged in drafting rules to govern shipyard work in the state. After a tentative draft has been completed a public hearing will be held and the rules, as finally amended, will become effective for all the fourteen California plants.

Charlie Watson Launched—The Union Construction Company, Oakland, launched the tanker Charlie Watson, building for the Standard Oil Company of California, August 14. The Charlie Watson will have Diesel engines, built by the Skandia Pacific Oil Engine Company, Oakland. She is named for an old employe of the Standard Oil. The Union Construction launched the last vessel for the Shipping Board, the steamship Heber, August 7.

Namasket Launched—The Pacific Coast Shipbuilding Company launched the steel freighter Namasket for the Shipping Board at the Bay Point yard August 3.

Captain Gleason Resigns—Captain H. M. Gleason, construction corps, United States Navy, stationed at the Mare Island Navy Yard, has resigned to enter private business. Captain Gleason was graduated from the Naval Academy in 1899, after which he took post-graduate courses in naval architecture and marine engineering abroad. He had been in charge of construction at Mare Island for ten years, during which several naval vessels were built, among which were the collier Jupiter and the dreadnought California.

Herzog Makes Record—The Herzog Electric & Engineering Company, San Francisco, repaired the Shipping Board steamship Eastern Glade with unusual dispatch in August. The contract called for the job to be completed within five days, but the work was done in four days and fourteen hours, although other bids had been for completion in seven, eight and nine days. The work consisted of making patterns, casting and machining the parts and installing them, raising the crankshaft for relining, raising bearings, making general engine-rooms repairs, painting the hull, outside and inside, and repairing the winches. Inasmuch as the Eastern Glade was built in Japan, all machinery was of Japanese design, and no patterns or parts were available, which necessitated fast work by the Herzog company. Dick Chisholm, superintending engineer, is in charge of all marine work of the Herzog company.

Repairs at Hanlon — Orders are being placed by the Hanlon Drydock & Shipbuilding Company, Oakland, for material to be used in the construction of an additional marine railway. Plans and specifications for a floating drydock are in course of preparation. Repair work is progressing at the Hanlon yard on the tanker Asuncion, owned by George W. McNear, Inc., the boilers of which have been removed and will be practically rebuilt, and which will receive much engine and pipe work; and on the steam schooner Washington, owned by the Little River Lumber Company, which will be fitted with new boilers, a new keelson, two new fuel tanks and new woodwork. The Johanna Smith, owned by the Coos Bay Lumber Company, was given two new propellers and shafts, the work being completed in August. Recent launchings at the Hanlon yard have been those of the steamships Jeptha and Medon. The steamship Del Rosa was delivered in July; the Depere in August; and the Derblay will be delivered in September.

Moore Awarded Contracts — Contracts have been awarded by the Vacuum Oil Company to the Moore Shipbuilding Company, Oakland, for the construction of two 10,000-ton tankers, which will be sisters to the Vacuum, launched May 1 and delivered May 29. The Moore Shipbuilding Company's estimate is that the vessels will be launched February 16 and March 15 and completed March 15 and May 15, 1921. They will be 425 feet 6 inches long, 57 feet wide and 33 feet deep, and of 3300 horsepower. In building and delivering the Vacuum in 114 working days a new record for vessels of her size was established. Upon arriving at New York from Richmond, California, the Vacuum was inspected by officials of the oil company, who were greatly pleased with her and wrote as follows to Joseph A. Moore, vice-president and general superintendent of the Moore Shipbuilding Company: "The Vacuum looks like a yacht. Her equipment is fine; superior to any other ship we have had in many months." Mr. Moore personally supervised the construction of the Vacuum, after he had assured the Vacuum Oil Company that his yard would build the vessel in less time than the Sparrows Point yard could build a sister. Although Sparrows Point had had a lead of seven days in the laying of the keel, the Moore yard won by twenty-four hours.

Matson Keels Laid—Keels of two 14,400-ton freighters for the Matson Navigation Company were laid at the plant of the Moore Shipbuilding Company, Oakland, during August, on ways 9 and 10, which had been lengthened for these large vessels. The Moore schedule is for launching of the steamers in January, 1921, and delivery in February and March. The steamers will be 480 feet long, 62 feet wide and 41 feet 10 inches deep, and of 5500 horsepower. The status of other new work at the Moore yard is as follows: three 10,000-ton tankers for the Standard Oil Company of New Jersey, 425 by 57 by 33, 3300 horsepower, all on the ways, estimated dates of launchings October 9, October 21, December 11, estimated dates of delivery November 12, December 30, January 24, names of vessels S. C. T. Dodd, M. F. Elliott, Thomas H. Wheeler; one 5375-ton tanker for the Standard Oil Company of California, 330 by 46 by 19 feet 10 inches, estimated date of keel-laying September 15, launching December 19, delivery January 10, name of vessel F. H. Hillman; one 16,340-ton tanker for the Southern Pacific Company, 520 by 71 by 39, estimated date of keel-laying December 14, launching May 15, delivery July 10, 1921; six 9400-ton freighters for the United States Shipping Board, 402 feet 6 inches by 53 by 34 feet 6 inches, September, October, November and December delivery; five 10,000-ton tankers for the United States Shipping Board, 425 feet 6 inches by 57 by 33, August, September, April, May and June delivery. One of these tankers, the Mevania, had her trial run August 12. She was launched June 28. The tanker Sapulpa, launched December 20, 1919, was delivered July 28, after an unusually successful trial trip, on which even minor adjustments were negligible. This vessel is not included in the five listed above.

Southern California

Drydock Finished—The new floating dry dock of the Los Angeles Shipbuilding & Drydock Company has been completed. The company recently installed an electrolytic plant for the reduction of water into oxygen and hydrogen, which will be used in the yard.

Service Manager—W. R. Wood, formerly of the Mare Island Navy Yard, has been appointed service manager of the Los Angeles Shipbuilding & Drydocking Company, succeeding H. L. Davies, resigned.

(Section continued on page 124)

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New Dry Dock Now in Operation

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REBUILDING AND REFITTING—S. S. *Kroonland*, S. S. *Finland*, S. S. *Minnesota*, Ferryboat *Chatham*, Mr. J. Pierpont Morgan's S. Y. *Corsair*

(Section continued from page 122)

Los Angeles Launching—Hull 27 of the Los Angeles Shipbuilding & Drydock Company, christened Culbertson, was launched in July, and the keel of an 11,500 tonner was laid immediately thereafter. Three 8800-ton vessels remain to be launched. The West Kedron, of this class, had her trial trip and was delivered to the Shipping Board.

Casco in Water—The steamship Casco, built for the California Steamship Company, was launched at the yard of the Long Beach Shipbuilding Company on August 5.

Plan Yacht Basin—Plans are being made by the Los Angeles Yacht Club for the construction of a yacht harbor 2750 feet long and about 1750 feet wide off Terminal Island. The harbor commission has approved the plans.

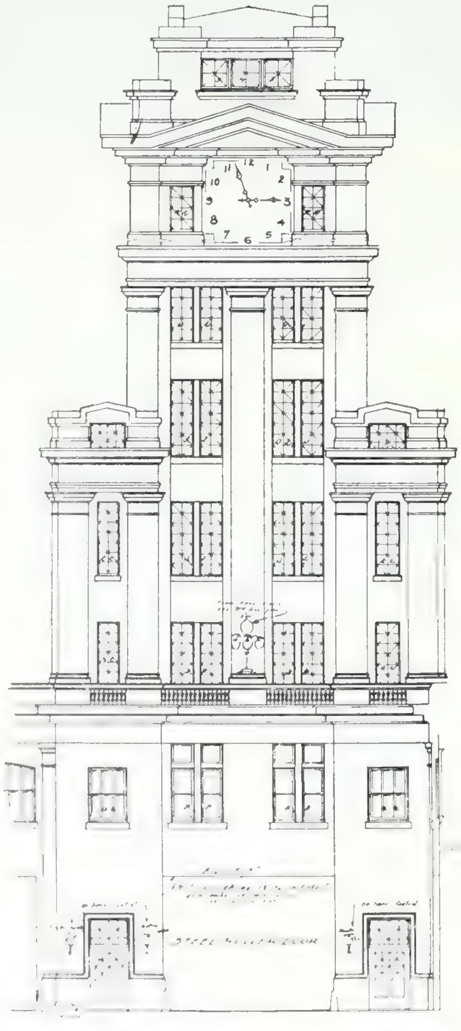
Navy Work at San Diego—At an election August 4 the gift of several pieces of land by the city council of San Diego to the Navy Department was ratified. The Navy will build a hospital, training station, repair base and warehouse. About $6,000,000 will be expended this year.

Honolulu

Honolulu Work—An extension of Pier 15, Honolulu, now used exclusively by the Matson Navigation Company, is planned by the harbor commissioners. It is estimated that for about $45,000 the pier can be lengthened 160 feet and shedded, providing docking facilities for lumber schooners and small freighters. Although the money is not now available it is anticipated that it will be realized from the next sale of territorial bonds. In conjunction with this proposed extension of Pier 15, the harbor commissioners hope to have the Kewalo basin project completed by the end of the year in order that the sampans which congest the shore end of the slip between Piers 15 and 16 may be removed to their new landing place. The Hawaiian Dredging Company is now completing the contract for the widening and deepening of the channel into the Kewalo basin and when this is finished not only the sampans, but also lumber schooners and nitrate vessels, will have dock space there. The channel, cutting through the reef about a mile east of the entrance to Honolulu harbor proper, will be 150 feet wide and 15 feet in depth. The ultimate plan is to deepen the channel and the basin to twenty-seven feet.

Inter-Island Steamer—A new and larger steamer on the run between Honolulu and Hilo is planned by the Inter-Island Steam Navigation Company, according to an announcement made by C. P. Morse, vice-president and assistant manager of the company. The new vessel will be 50 per cent larger than the Mauna Kea, which is now the regular steamer on the Hilo run. The Mauna Kea has fifty staterooms and when booked to capacity will carry 100 passengers. On special excursions and other occasions the steamer has transported 150 persons between the two ports. It is planned to construct the proposed new steamer with a comfortable capacity of 200 passengers. Nothing definite as to the time when the new steamer will be acquired has been announced, but Mr. Morse has said that it probably will be built on the coast within the next twelve months.

Tower for Honolulu — When present plans of the board of harbor commissioners of the Territory of Hawaii are consummated in concrete and steel, the vista down Fort Street in Honolulu will be similar to that on Market Street in San Francisco, although the clock tower, which is to be a part of the improvement project on Piers 8, 9 and 10, will be somewhat smaller than that of the Ferry Building. Honolulu's clock tower forms a part of the plans and specifications for the freight sheds and warehouses on the three concrete piers completed by the Territory under contract two years ago. It is estimated that the construction of the sheds and tower will cost about $350,000, and this is the amount available for the contract. In the event that the bids exceed this amount the harbor commissioners plan to erect only the sheds on Piers 8 and 9 and use the present old Oceanic warehouse on Pier 10 until an additional appropriation can be secured. The tower will be erected at the outer intersection of Piers 9 and 10 and will stand almost in the exact center of the line of Fort Street running down from the business section of the city. It will be 120 feet high from the base to the top of the pilots' lookout station above the clock. On the four floors below the clock will be the offices of the pilots and the harbor master. The construction will be of reinforced concrete and structural steel. The sheds along the three piers will be of structural steel frame with tar and gravel roofing. The outer walls will be of hollow tile and reinforced concrete. Bids for the contract to construct the sheds and clock tower will be opened by the harbor commissioners September 22.



Architect's Drawing Showing Elevation of the New Honolulu Harbor Clock Tower

Shipbuilding in Year—A survey by the Bureau of Navigation for the last fiscal year says that the American merchant marine on June 30 numbered 28,150 vessels of a total gross tonnage of 16,350,000. Seagoing ships of more than 1000 gross tons are 2839, their total tonnage being 10,846,102. Of these vessels, 2065 are steel steamers of 9,270,418 gross tons, and 377 are wooden steamers of 933,424 tons. Motor vessels are included in the steamer list. During the fiscal year the total of new construction in American yards, including some for foreign owners, was 2241 vessels of 3,860,484 gross tons, compared with 2158 vessels of 3,734,741 tons during the fiscal year ending June 30, 1919. The peak of production was from September, 1919, to February, 1920, during which period the output was at the rate of 4,250,000 tons a year. Since June 30, 1917, the government has expended about $3,000,000,000 for shipping. The seagoing tonnage was distributed as follows on June 30: registered for foreign trade, 2541 vessels, 9,531,190 gross tons; enrolled for coasting trade, 863 vessels, 1,747,551 gross tons. Tonnage now under construction shows a steady decline, according to a compilation of the Atlantic Coast Shipbuilders' Association. Although the Shipping Board's program had been decreasing from month to month, vessels building for private account increased until June, when they decreased. On June 30 Great Britain led the United States in tonnage building, according to Lloyd's Register, with 3,578,153 gross tons as against 2,105,956. During the quarter, March 31-June 30, Great Britain gained 183,728 in new work, while the United States lost 476,342.

(Section continued on page 126)

THE GENIE OF THE BOTTLE

LIKE the Genie from the "Arabian Nights", Prest-O-Lite is a wonderful force confined in a small cylinder.

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Kohl Building, San Francisco
In Canada: Prest-O-Lite Co. of Canada, Limited, Toronto

PW-505

THE MERCO NORDSTROM PLUG VALVE

THE taper plug valve, when properly constructed, is undoubtedly the most efficient form of valve for universal use when it works. When, on the other hand, it sticks and binds in its seat, it becomes one of the most "onery" pieces of mechanism that it is possible to imagine, and has probably spoiled the tempers of more good mechanics than any other one cause. Numerous attempts have been made by mechanical engineers and inventors to produce an efficient lubrication of the seat of this form of valve, and there are on the books at Washington some fifty or more patents for various styles of lubricated plugs.

Mr. S. J. Nordstrom, a mechanical engineer engaged at Mexico City in the design, construction and operation of cyanide plants, frequently had called to his attention and was impressed with the obvious defects and shortcomings of valves in handling cyanide solutions and slimes in the concentrating plants and mills of Mexican mining centers. Mr. Nordstrom, after study, saw that the difficulty with all forms of patent lubricated plug valves was that, given a perfect fit between the valve and its seat, there was no possibility of forcing grease into a space which did not exist, namely, that there was no clearance between the valve and its seat. He saw then that it was necessary to design a valve in such a way that the lubricant itself could be used to lift the valve off its seat so as to allow clearance and a consequent spreading of the film of lubricant over the surface of the valve seat. Having arrived at this conclusion, the present design of this valve soon worked itself out as a closed plug cock with chamber at the bottom of the valve seat, a receptacle for grease in the shank of the plug connected by drilled ducts with channels in the taper sides of the plug, which channels continued to the bottom of plug, thereby connecting with the chamber when the plug was seated in the valve.

Starting on that basis, Mr. Nordstrom began manufacturing these valves in a small way for distribution in the mines. The valve immediately demonstrated its superiority over all the forms of plug and gate valves which had been in use, and the demand was soon so great that Mr. Nordstrom was unable with the limited facilities at hand to manufacture enough to supply the needs of the Mexican mines. Arrangements were therefore made for the manufacture of these valves in the United States and subsequently in Sweden, and arrangements are now going on for their manufacture in Great Britain and in Canada. The valve has demonstrated its superiority to such an extent that calls for it are coming from not only the mining field but practically all fields where valves are used to any extent.

Reference to our illustration will show very clearly the working principles of this valve. The phantom view showing the plug exposed indicates the action of the grease. Considering that the grease chamber at the bottom, the grease channels, the grease duct, and the cylindrical space underneath the end of the lubrication screw are entirely filled with lubricant, and considering also a perfect fit between the plug and its seat, it is evident that a slight turn of the lubrication screw will exert a tremendous hydraulic pressure upward on the bottom of the valve plug. It will be noted that the cap which is held down by bolts at either side (not shown in the illustration) forms a tight joint through an elastic packing washer. The valve plug is so machined that when seated in the valve its faced shoulder is slightly lower than the facing on the edge of the valve cage. When, therefore, the cap is clamped down tightly, it makes first a tight joint on the edge of the valve cage and the elastic packing is lightly pressed against the antifriction washer on top of the plug facing, leaving sufficient elasticity in the packing so that the hydraulic pressure mentioned above raises the plug by an infinitesimal (but sufficient) amount to allow clearance for a film of grease between the plug and the seat. It is in this hydraulic lifting action that this valve is differentiated from all other lubricating plug valves, and it is right here that its success lies.

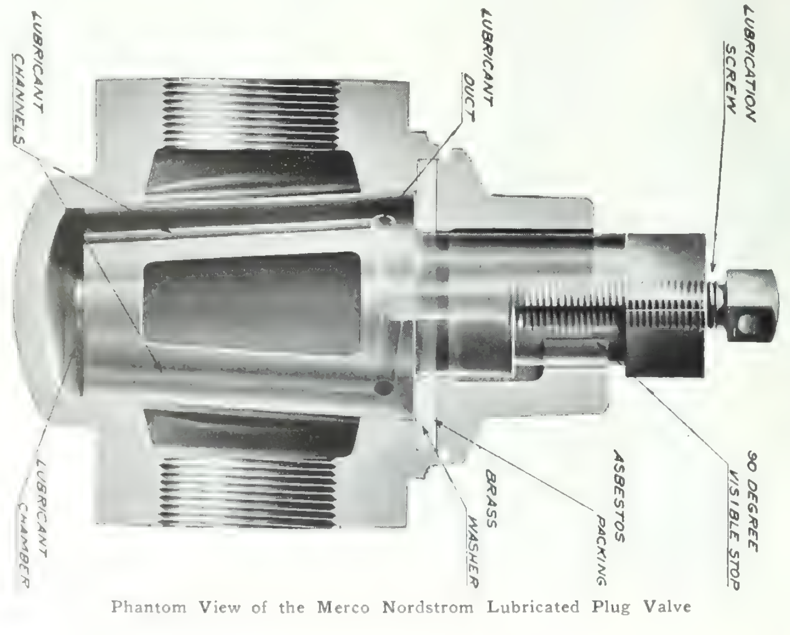
Iron valves of this type have been tried out in a sal ammoniac solution, closed for two months so that they were practically rusted solid, and one turn of the lubrication screw was sufficient to allow very easy turning of the plug.

A ninety degree stop is arranged between the shank of the plug and the valve cap, and this stop has an extension above the valve cap so that the operator can see at a glance just how the valve should be turned and when it is open and shut. This stop is so positioned that the grease channels on the sides of the plug can never be open to the action of the liquid which is being handled.

Both Mr. Nordstrom and The Merrill Company, who are distributing this device, are determined that the valve shall not be exploited for any particular service until it has been demonstrated to their entire satisfaction through tests in their elaboratories and in actual service that the valve and its packings and its lubricant are particularly adapted to that service. All plugs are lapped into their seats very carefully, the various sizes of valve designed so that the plug opening has fully 100 per cent capacity of the pipe line. All orders are filled with the valves packed with standard lubricant, and along with each order is sent a box or two of lubricant plugs especially prepared for the particular service on which the valves are to be used. Many careful experiments have been carried out to determine the application of the various lubricants in particular services. Some lines of valve service have been successfully attempted by the Merco Nordstrom valve which were given up as hopeless by practically every other form of valve, and The Merrill Company is ready at any time to help solve valve problems.

This valve should have a large application in the marine field. Its present form is decidedly applicable to all salt water services, and the additional expense necessary in installing such valves would be entirely warranted by their assured 100 per cent efficiency at all times. The increased expense may also be largely offset by the fact that the thorough lubrication and constant maintenance of the lubricating film make possible the use of cast-iron in many instances where otherwise more expensive materials should be necessary.

(Section continued on page 128)



Phantom View of the Merco Nordstrom Lubricated Plug Valve

Lifting an 8800-Tonner On Marine Railway

The 8800 deadweight ton steamship Orani, docking weight 5000 tons, on the Moore Shipbuilding Company's drydock No. 2, Oakland. Great though this weight is, it does not tax the Moore marine railways, which were built to take vessels even larger than the Orani.

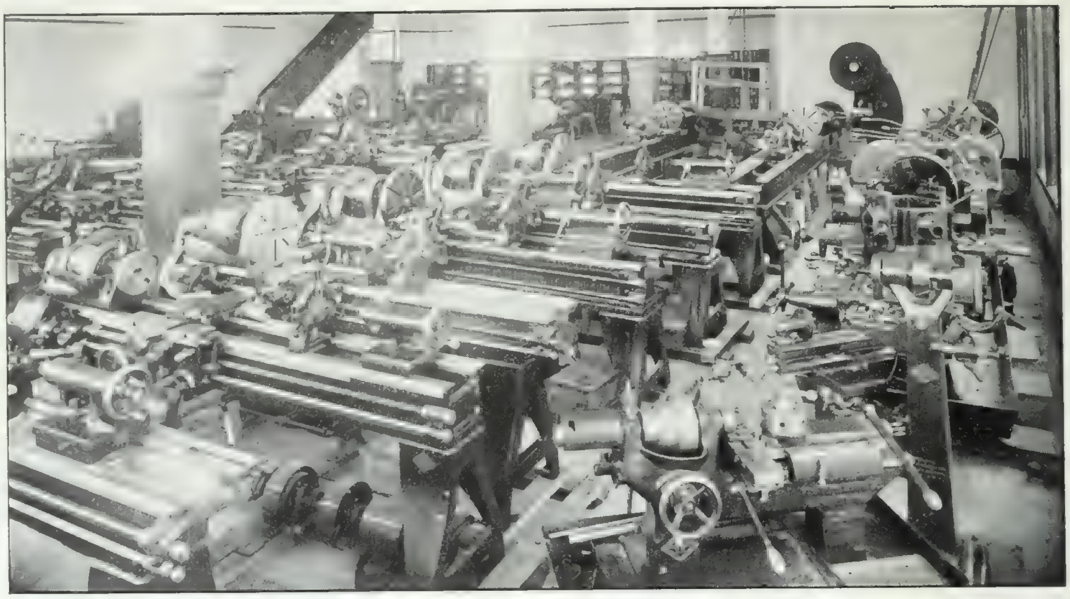
The Leland S. Rosener engineering organization designed this marine railway for the Moore Shipbuilding Company, one of the premier yards of the United States. Other work designed by the Leland S. Rosener engineers for the Moore Shipbuilding Company includes the shipyard cranes, boiler shop and plate and angle shops.

Civil, electrical and mechanical engineers, experienced in the design of complete industrial plants, production efficiency and the newest harbor improvements, are on the Leland S. Rosener staff.

Write, wire or telephone. We await your inquiry

LELAND S. ROSENER
Consulting Engineer
INSURANCE EXCHANGE BUILDING SAN FRANCISCO

HERBERTS MACHINERY & SUPPLY



Interior—Herberts Machinery & Supply Company

THE biggest recent event in the machine tool business is the removal of the Herberts Machinery & Supply Company to their new building at 140 First street from their location on Second street.

The building was erected especially for the Herberts Machinery & Supply Company and has all of the best facilities for handling machine tools conveniently and rapidly. With their 12,500 square feet of floor space and an exceptionally large stock of equipment on hand to select from, this aggressive company is now better able than ever to handle the trade and extend the regular Herberts service.

From a small store at 168 Second street, where the San Francisco Herberts Machinery & Supply Company opened eighteen months ago, they have enlarged and forged ahead until they are now occupying the largest modern machine tool building in the city. Furthermore, they have added materially to their high-grade lines of machine tools and now represent exclusively in the state of California the following companies:

Hamilton Machine Tool Company heavy duty production lathes.

Cincinnati Shaper Company heavy duty shapers.

Cincinnati Gear Cutting Machine Company gear cutters and hobbers.

Foster Machine Company screw machines and turret lathes.

The Minster Machine Tool Company Hi-Duty drilling machines.

Modern Tool Company cylindrical grinders.

Monarch Machine Tool Company engine lathes, sizes 10 to 30 inches; Quick Change lathes 10 to 30 inches.

Mueller Machine Tool Company radial drills.

Rahn-Larmon Company Quick Change lathes.

Rockford Drilling Machine Company upright drill presses.

Rockford Milling Machine Company Universal and plain millers.

Rockford Lathe & Drill Company Economy lathes.

United States Machine Tool Company hand millers.

Whipp Shaper Company 16-inch and 20-inch medium duty shapers.

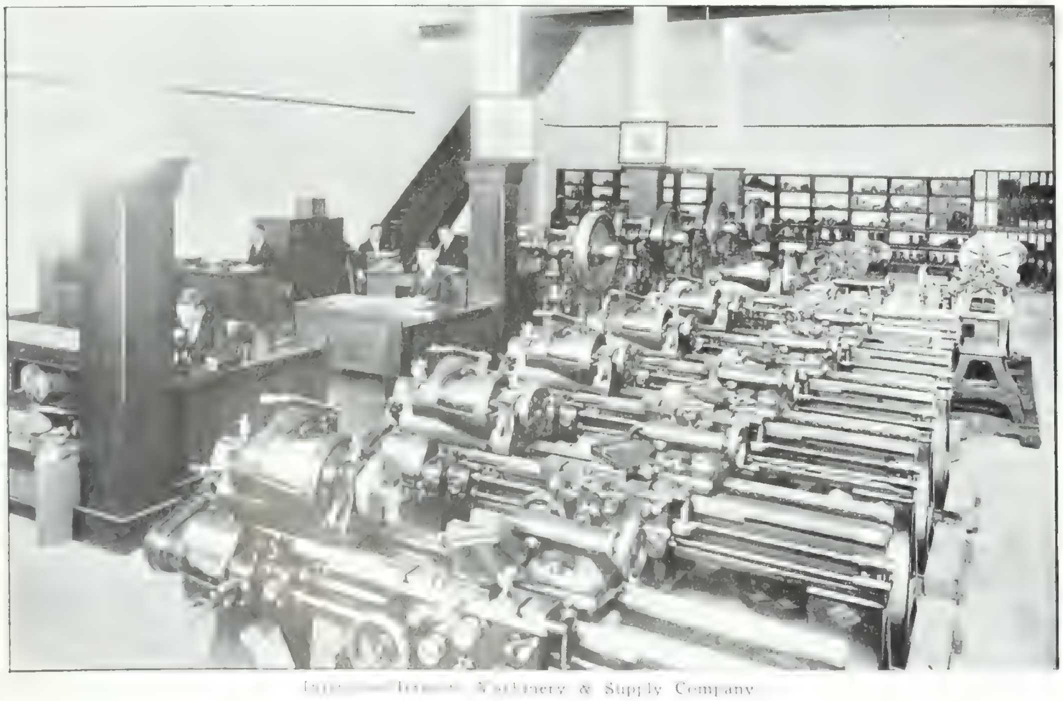
Wilmarth & Morman Company grinding machinery.

Mr. C. A. Herberts is president of the company and takes an active part in the management as well as sales end of the business, making his headquarters at Los Angeles, the main office. His experience in the machine tool business, as well as in the practical end of the work, has made him exceedingly well liked and well known in this state. Considering the short number of years that Mr. Herberts has been established in business himself, he has, indeed, made a wonderful reputation in macahinery circles; attracting state-wide attention and drawing the most desirable agencies for exclusive representation.

The management of the local store is assumed by Mr. B. J. Flanagan, who opened this end of their business in January, 1919. The results obtained in this territory under his management speak well of his ability and energy, for they broke into a field where all competitors had years behind them.

An outstanding feature of this house is that their entire sales-force consists of practical men, with a result that engineering or mechanical problems of customers can be settled right at their offices without going East for the information. Mr. Vernon C. Wear, the latest addition to the sales-force of Herberts Machinery & Supply Company, has had fifteen years practical experience in the Foster Machine Company's plant; furthermore, he has had estimating and engineering experience that is proving invaluable to the local trade.

A call at the new store will result in acquaintance with a live machine tool house and the inspection of the latest practice in engines, lathes, milling machines, turrets, screw machines, radials, shapers, boring mills, planers, drill presses, etc., etc.



Interior—Herberts Machinery & Supply Company

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And General Machine Shop Work

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Supplies and equipment kept in stock.

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Mining Machinery ***Boiler Work***
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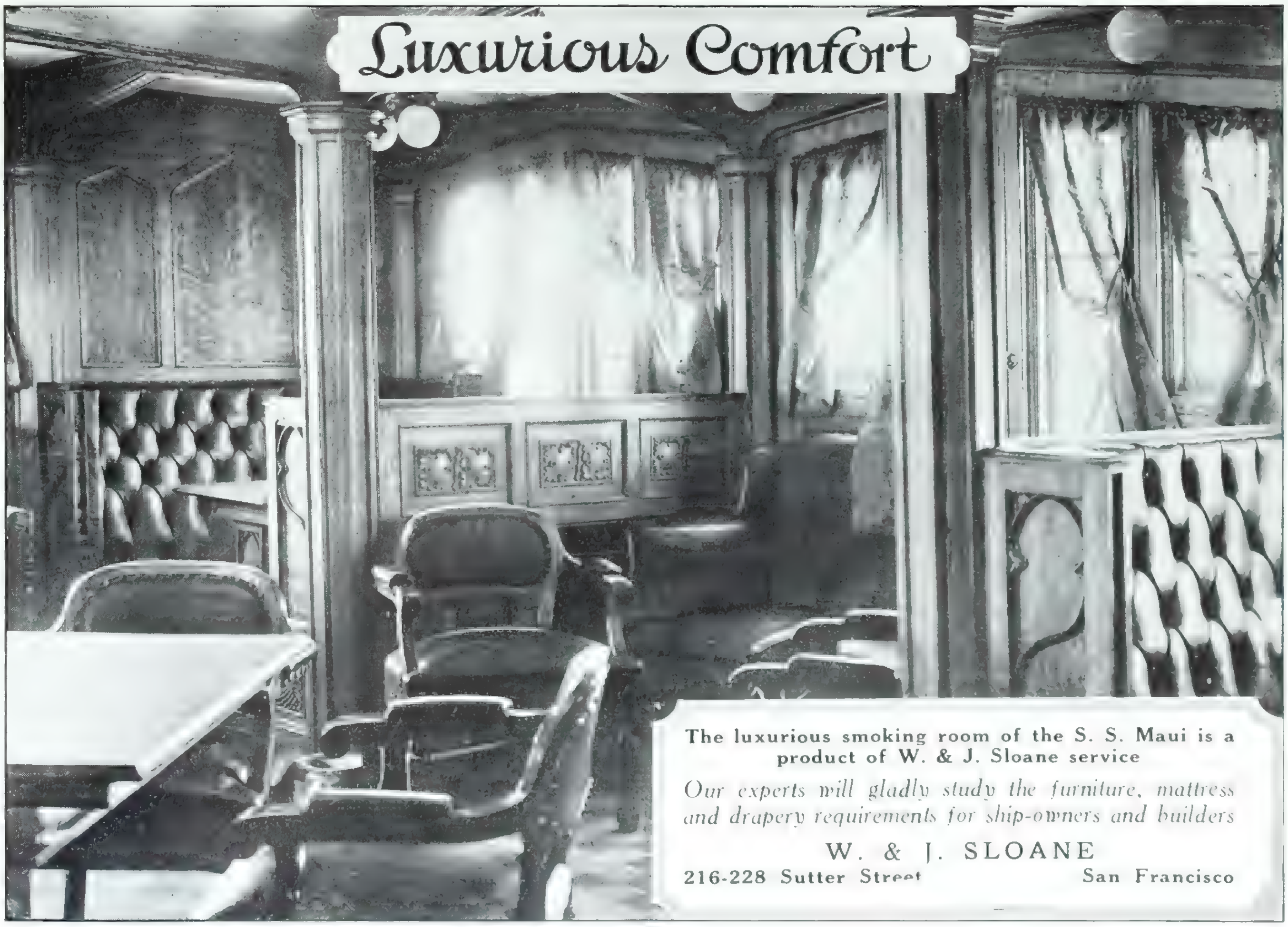
Pacific Coast Engineering Co.

General Offices 811 R. R. Ave. S., SEATTLE



The luxurious smoking room of the S. S. Maui is a product of W. & J. Sloane service

Our experts will gladly study the furniture, mattress and drapery requirements for ship-owners and builders

W. & J. SLOANE
216-228 Sutter Street San Francisco

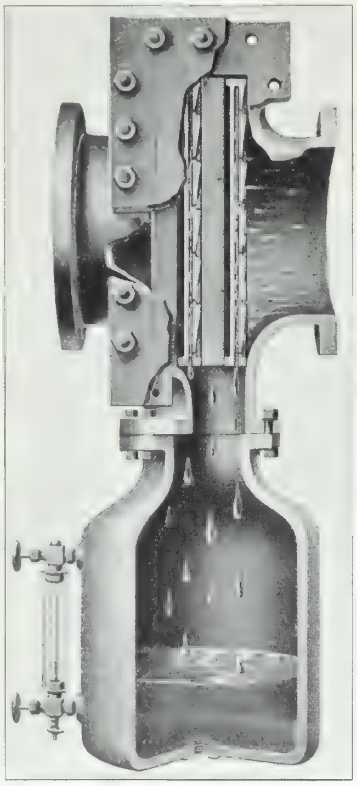
BUNDY OIL SEPARATOR STILL AT IT

THE Bundy oil separator is known to engineers throughout the world, and it is a remarkable fact that, in spite of the years which have elapsed since this apparatus was designed, it has held its own and is today recognized as a leader in its line.

The accompanying cut shows clearly the construction of this separator. Shell and baffle plates are of cast iron. These multiple baffle plates are of special staggered grid construction and are so designed as to insure the removal of all oil from the exhaust steam before it leaves the separator. The oil, after being deposited on the saw-tooth grids, enters a duct inside of the grid bars and flows through this duct to the large receiver reservoir at the bottom. This feature prevents steam from picking up the oil again after it has been deposited on the baffle plate.

This separator fulfills one of the most important requirements of an efficient oil separator. It is apparent that if an oil separator is efficient the separation cannot be accomplished without the baffle plate surfaces becoming gummed with oil and grease and also that this coating reduces the separating efficiency. It is, therefore, essential that an oil separator be so constructed as to be easily cleaned. The baffle plates in the Bundy separator are removable through an opening provided and may be taken out and cleaned in a lye solution and returned to the separator ready for another period of efficient service.

The Bundy oil separator is manufactured by the Griscom-Russell Company, 90 West St., New York, and is described in their new bulletin No. 1130.



Bundy Oil Separator

New San Francisco Home of Herberts Machinery & Supply Co.
See Article on Page 128

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WITH A WORTH WHILE GUARANTEE

We are the largest dealers in USED MACHINERY in the West. Our line embraces MACHINERY of every description and all sold on the GUARANTEE plan.

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TURRET LATHES
GRINDERS
MILLING MACHINES
KEYSEATERS
GEAR CUTTERS
RADIAL DRILLS
DRILL PRESSES
EMERY HEADS
HACK SAWS
COLD SAWS
PUNCH PRESSES
BAND SAWS
SAW TABLES
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MORTISERS
BAND RESAWS
42″ TILTING FRAME BAND SAW

10′ Columbia Power Brake
54″ Hilles & Jones Power Punch—1⅛″ x 1″ Capacity
48″ Rock River Power Punch—1″ x 1″ Capacity
48″ Whiting Power Punch—1¼″ x 1″ Capacity
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All direct connected to 2 phase 440 volt Motors

80 hp. Hamilton Corliss Steam Engine
25 hp. Atlas 8 x 12 Automatic Steam Engine
16 hp. Peerless Slide Valve Steam Engine

CALIFORNIA MACHINERY COMPANY
125 BEALE STREET
SAN FRANCISCO, CALIFORNIA

Who Uses—

PARISH SAFE LOAD TACKLE BLOCKS?

Moore Shipbuilding Co.

Oakland, California

On December 20, 1919, the Moore Shipbuilding Company launched six ships on one tide, adding 57,200 tons deadweight to the American Merchant Marine and establishing a new world's record in shipbuilding.

The rigging equipment of the freighter hulls included in the launching contain Parish Safe Load Tackle Blocks exclusively. Contract for the six hulls Nos. 2233-2238 inclusive was placed with us July 24th, deliveries made as specified, and the blocks inspected and accepted without a single rejection.

In actual use Parish Blocks have a record for performance and endurance which has won the approval of ship owners and operators alike. The tested materials and accurate machine work which enter their construction have produced strong, sturdy blocks which minimize rope wear and which run smoothly and easily at the determined working loads. The ample margin of safety has proved sufficient for all unusual strains and jerks, and the Safe Working Load has been a check against overloading and a guarantee of safety.

This Safe Working Load is an exclusive feature of Parish Blocks and has been made possible only after an exhaustive series of tests and experiments which occupied the engineers in our employ the greater part of a year. The result of this investigation and research, however, has been the production of a scientifically designed tackle block built for a definite working load, and stamped with this load in clear, distinct figures. Every Parish Safe Load Tackle Block will carry much more than its rated capacity, but the tonnage marked on it gives a good margin within which there is absolute safety.

There is a Parish Safe Load Tackle Block for every working condition

Data Sheets of Safe Loads and Catalogue upon request

PARISH SUPPLY & MFG. CO.

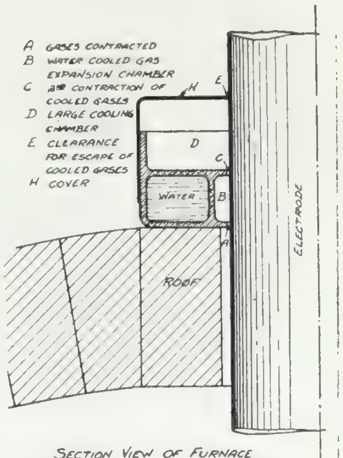
2860 Quinn Street CHICAGO

ELECTRODE ECONOMIZERS

THE gases generated in an electric furnace during operations are only combustible at high temperatures, and nearly all the present-day cooling rings have for their principal object the cooling of the electrode and the cooling of the port holes of the roof, which means that if these gases escape to the atmosphere they are hot enough to burn, and in doing so, burn up part of the electrode itself, and also have a very objectionable effect on the electrode holder.

The cooling ring designed by the Electric Furnace Construction Company obtains the desirable feature of keeping the roof port holes cool, keeping the electrode reasonably cool, and in addition cools down the gases as they leave the furnace to a temperature at which they will no longer burn when they meet the oxygen of the atmosphere.

While these gases are inside the furnace, they are under reducing conditions, and have, therefore, only their own sensible heat and no heat generated by the oxidation of combustible constituents. These gases pass, first of all, in between the electrode and the port hole of the roof, and then pass through a clearance in the cooling ring and into a relatively larger chamber, which causes the expansion of the gases and thereby giving up a large amount of sensible heat in the gases. This heat is absorbed by the water in the cooling ring. From this chamber they are once more contracted through a small clearance, and then pass to a very large chamber for a second and much larger expansion. This chamber is surrounded, in the case of graphite electrodes, by a thin enclosed cover, which, in actual practice, has been found quite sufficient to dissipate the heat given up by these gases, and when they finally pass through the last clearance, they are no longer at a temperature sufficiently high to cause them to burn in the atmosphere.


A GASES CONTRACTED
B WATER COOLED GAS EXPANSION CHAMBER
C 2nd CONTRACTION OF COOLED GASES
D LARGE COOLING CHAMBER
E CLEARANCE FOR ESCAPE OF COOLED GASES
H COVER
H
E
D
C
WATER
B
A
ROOF
ELECTRODE

SECTION VIEW OF FURNACE ROOF AND ELECTRODE ECONOMIZER

The fact that graphite electrodes can be machined allows the use of a very small clearance, which in turn allows a much larger relative expansion into the chambers, and at the Dodge Steel Company, where these cooling rings have been under close supervision, it has been found that even during the periods when carbon is being thrown on to the slag for the purpose of deoxidization, there is not the slightest sign of flames being emitted, and the electrodes themselves do not show the slightest trace of reduction in diameter.

When such economizers are to be used on amorphous carbon electrodes, and especially of the larger sizes and of the makes where the diameters do not run to any regularity, a change is made in the second chamber of the economizer. The gases there, instead of being all allowed to pass through the clearance, pass through perforated plates on the outer wall of the cover, and by keeping these perforations as small as practical, the plates will act on the principle of the metallic gauze used in the Davy miner's lamp, in which it is well known that the heated gases of combustion from the lamp are cooled to such an extent that the lampt can be very safely used in the dangerous explosive gases of coal mines.

The use of this electrode economizer considerably decreases the amount of electrode consumption, and on three and six ton furnaces the electrode consumption, using graphite electrodes, has been reduced to ten to fifteen pounds of electrode per ton of steel, against twenty-five to thirty-five pounds before the economizers were fitted. The bull's eyes in the roof also appear to stand up very much better. This is probably due to the blanketing effect, and to the fact that the flames do not rush out through the roof. We have also noticed that there is a much less tendency of the electrodes to taper off, and they burn square right down to the point of the arc.

In cases where economizers are not used, the air coming in through the furnace doors strikes the white hot electrode and the roof openings act as a chimney, the electrode burning away and penciling off. When the tip of the electrode is thus reduced, it has often to carry very much more current than it has been designed for, and the consequences are that the electrode heats up unduly throughout its length and breakages of electrodes and connecting nipples frequently occur.

Experience has been that this is very largely prevented by the use of these economizers. The saving in wear and tear of the copper cables, electrode arms, electrode holders, and generally the overhead gear of the furnace, is very considerable.

In connection with the use of these economizers, it is recommended that the bottom sills of the furnace and doors should be sealed as far as possible to prevent air entering the furnace. The gases generated in the furnace will easily escape through the tops of the doors, but it will be found that not nearly so much gas is generated in the furnace when the roof and bottom of the doors are sealed.

The standard form of the electrode economizer will have the bottom flat, but in cases where the roof is arched, they can be made to conform to the curvature of the roof.

THERMIT PIPE WELDING PAMPHLET

THE Metal & Thermit Corporation, New York, New York, has just issued and will distribute on request the third edition of its Thermit Pipe Welding Pamphlet No. 16. In this new edition the subject of thermit pipe welding has been revised and brought up to date. The new pamphlet describes and illustrates in detail how thermit pipe welds are made and contains reports on successful tensile strength and vibration tests of thermit pipe welds conducted by Stevens Institute. One of the features of the new pamphlet not previously published in former editions is a chart showing the comparatively low cost of a thermit welded pipe as compared with the cost of installing compression flanges with bolts and gaskets, and of installing elbows with flanged connections. The new edition also contains for the first time an account of a ten-year pipe test at West Albany, New York, during which 700 feet of 4-inch extra heavy thermit welded pipe, which connected a power-house of the New York Central lines with a boiler-house, was constantly subjected to a hydraulic pressure of 1500 pounds to the square inch without being affected in the least, although some valves were put out of commission.

FOR SALE
Just completed and now ready for immediate delivery at attractive prices two vertical compound Marine Engines, 18"—38 x 26" Stroke.
Inspected and passed by the American Bureau of Shipping.
DODGE MANUFACTURING COMPANY
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Gas Tender **"WOTOC"**—65′ x 11′ x 5′. Heavy oak construction—cabin aft, large hatch; heavy mast and boom; 2 sails; 50 H. P. 4-cyl. gas engine. Price **$7,500.**

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Large Donkey Boiler, Cargo Winches,
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FOR SALE

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Write or wire.

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Care Pacific Marine Review,
576 Sacramento Street,
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CHAMPION ENGINEERING COMPANY

THE greatly increased foreign and domestic demand for electric traveling cranes brought about by the critical labor shortage has made it necessary for the Champion Engineering Company, builders of Champion cranes, to commence a series of extensive additions and improvements to their already large plants at Kenton, Ohio, and upon the completion of the building program, present production will be trebled, and the Champion Engineering Company the largest exclusive manufacturers of traveling electric cranes in the world.

The principal improvements will be extensions to the foundry, new structural steel fabricating shops, enclosed storage and modern up-to-date raw material storage. Every building will be equipped with traveling electric cranes to enable rapid and economic handling. A tool and jig manufacturing plant entirely independent from the production department will be constructed, and also a pattern vault and steel foundry to take some of the burden away from the present gray iron foundry equipment.

A new power plant will be built, of sufficient capacity to take care of present as well as future power requirements. The present power plant will be maintained for emergency, in case the power of the contemplated plant should at any time be interrupted.

Possibly the most significant, though, of all the improvements are the steps the company is taking to further the welfare of its corps of employes. The Champion Company has from its earliest beginnings realized that in order to have a proper pride of workmanship an employe must not only be satisfied with working, but with living conditions, as well. And provision is made in the new improvements for the construction of a house building program, designed for the benefit of the employes of the company. Fifty substantial and commodious homes will be constructed immediately, and as circumstances warrant it, more will be added to this number. These homes, which will contain every modern improvement, will be laid out on a plot which is located in the middle of the grounds.

The well known liberal policies of the company have always made it well favored by the employes, who have found the company quick to recognize initiative and ability. As fast as a man shows his capabilities he is advanced both in salary and responsibility. The home building is transferring the company's interest in its employes in another direction, and is to protect them from the rent profiteer, and also to make it possible for a man to own his own house by paying a small percentage of its value in rent each month.

In close proximity to the new homes will be built a company hotel, which will also form a civic center. Approaches to both hotel and the homes will be by way of picturesque gardens, parkways, terraces, etc.

This hotel will for the present accommodate fifty people, but will be provided with an auditorium 30 by 100 feet, suitable for business meetings, lectures, picture shows and banquets—all at the disposal of Champion employes. The basement of the hotel will resemble a rich man's club, with its club room and baths, gymnasium, billiard and pool tables, and bowling alleys. The lucky employes of the Champion Engineering Company will have all the comforts and luxuries of big city club life at their elbow, with little of the expense. However, the company feels that nothing can be too good for its employes.

The policy of taking the workmen into its confidence will be continued by the officers of the company, for despite the growth in numbers which the improvement will necessitate it will be the aim of the company to maintain its interest in every employe, feeling this policy will result in a community of interests bound to be of mutual benefit.

Champion cranes have helped the great industrial machine to keep in high gear, enabling it to reap and hold the benefits of today's possibilities. The economy and rapidity of movement of this type of crane have appealed not only to this country, but to the other countries as well, and from all corners of the world comes a cry for traveling electric cranes to make good the shortage of man power.

In summing up the great success of the Champion Engineering Company, a success which has made them the largest exclusive traveling electric crane manufacturers in the world, Mr. R. W. Valls, vice-president and general manager, said: "I believe our success has been accomplished because our engineers do not merely sell electric traveling cranes, but the **accomplishment** to be achieved by those cranes. Results, and nothing else in the world, count, and cranes delivering the best in engineering efficiency, in economy, in safety, and meeting the most exacting requirements at minimum operating expense, with power under instant control, and equipped with mechanism simple and accessible, are bound to make good wherever installed."

INDEPENDENT WIRELESS

REALIZING the needs for an independent wireless service, about one year ago certain officials of the Mallory Industries having their headquarters at Port Chester, New York, organized the Independent Wireless Telegraph Company, Inc. Offices were established at 42 Broadway, New York City, and branch offices opened at Boston, Philadelphia, Baltimore, Norfolk, Savannah, Jacksonville, New Orleans, Galveston, Port Arthur, Los Angeles, San Francisco, Portland, Seattle, Honolulu. Contracts were entered into between this company and some of the principal steamship companies, to maintain and operate the entire wireless service on board their ships.

The success of the venture was so rapid that offices were established in London, with branch offices throughout continental Europe. Arrangements were also made in other parts of the world for inspectors to take care of the wireless apparatus under the jurisdiction of the Independent Wireless Company.

Within one year's time the business of this organization had reached nearly the one thousand mark in ships. Feeling the need of direct communication with these ships in New York, some of the steamship companies prevailed upon the Company to erect a wireless station at New York for this service. Accordingly, a station was located at Babylon, Long Island, connected by telegraph and telephone with the Independent office in New York.

The work of this station has been pleasing to all concerned, in that excellent service is given to shipowners.

Among the steamship companies employing the services of the company are the following:

General Petroleum Corp.
General Steamship Corp.
Green Star Line.
American Line.
Red Star Line.
A. H. Bull & Co.
Merchants & Miners.
Clyde Line.
Moore & McCormack.
Texas Co.
Gulf Refining Co.
Panama Railroad Co.
Atlantic Transport.
U. S. Transport Co.
N. Y. & Porto Rico S. S. Co.
N. Y. & Cuba Mail S. S. Co.
Mallory Line.
Pioneer Steamship Co.
State Steamship Co.
American-Hawaiian S. S. Co.
Victor H. Fox & Co.

The company also has a factory at Port Chester, New York, for the building of wireless apparatus. One of their creations is a one kilowatt standard ship set which has won favor with steamship companies to such an extent that it is almost impossible for the factory to keep up with the orders.

The operating department of the company is located at 18 Murray street, New York City. Pacific Coast headquarters are at 110 Market street, San Francisco, Cal.

The officers of the company are: P. R. Mallory, president; C. J. Pannill, vice-president and general manager; F. E. Seeley, treasurer; Harry Shoemaker, consulting engineer; D. V. Applegate, contract manager.

*The five-masted barkentine Russell Haviside.
Designed, rigged and completely outfitted by
the Haviside Company*

SHIP CHANDLERS
SAIL MAKERS
SHIP RIGGERS

COMPLETELY EQUIPPED
To Outfit Vessels in Every Particular from the Decks Up

HAVISIDE COMPANY

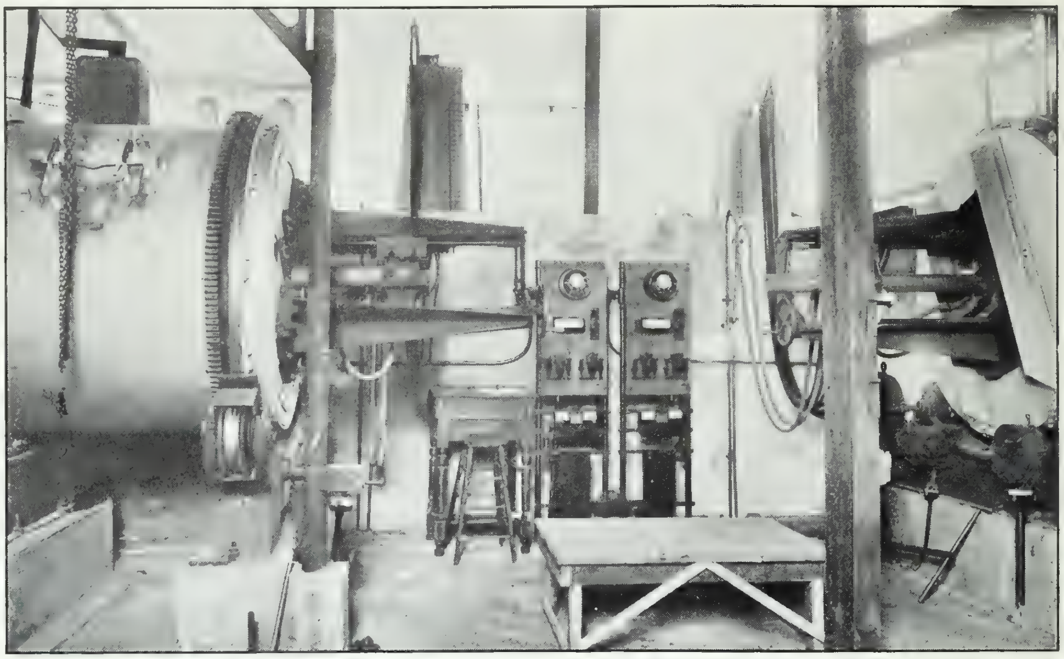
ESTABLISHED 1879

56-72 STEUART ST. SAN FRANCISCO

BRONZE PROPELLERS PRODUCED WITH ELECTRIC FURNACES

ONE of the important products of the Oregon Brass Works is manganese bronze propellers and propeller blades. The Oregon Brass Works have found after many years of experience in producing manganese bronze propellers that with the use of electric furnaces a better product is made. The electric furnace makes possible the exact control of the temperature at which the casting should be poured, and the rocking feature of these furnaces thoroughly mixes the various metals, thus insuring the desired uniformity.

Figures compiled by H. W. Gillett of the Bureau of Mines, for the year 1914, showed that in approximately 3600 plants throughout this country $200,000,000 worth of brass was melted with the value of metal lost beyond recovery not less than $6,000,000.



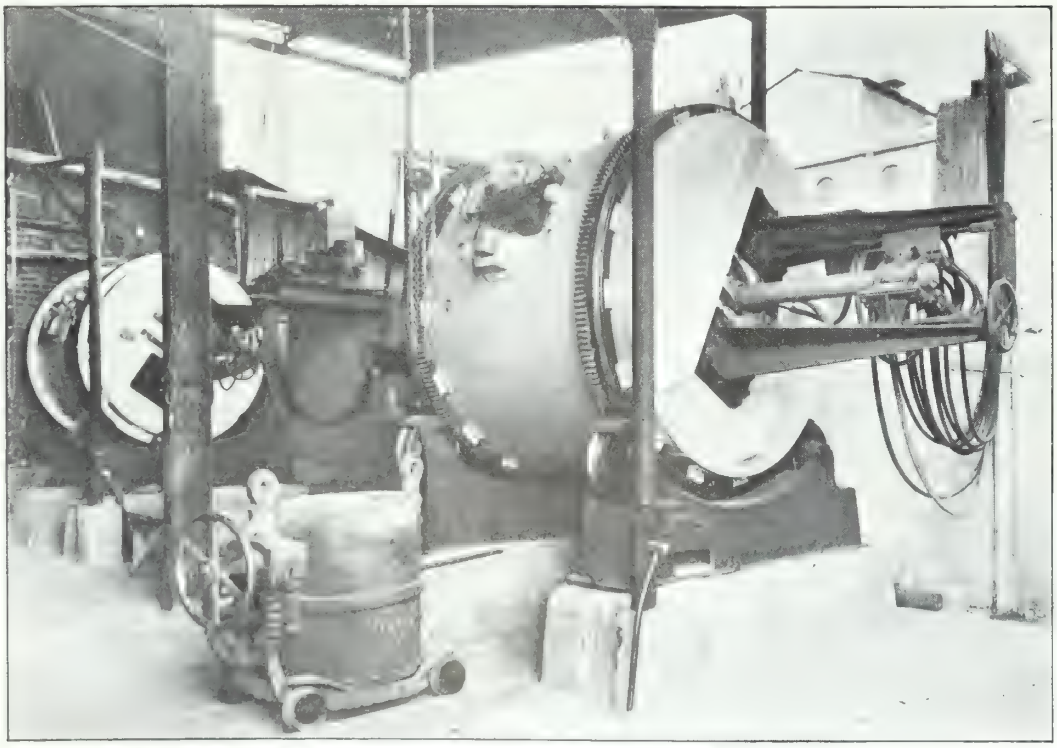
Switchboard Control of Detroit Electric Brass Melting Furnaces at Plant of Oregon Brass Works, Portland

During the war the military uses of brass and bronze expanded these totals enormously, and it was this, more than any other factor, which gave the electric process the truly remarkable impulse which characterizes its growth during 1918. Although the annual production of articles manufactured from copper alloys is unquestionably less now than during the last year or two of hostilities, it is in all probability considerably higher than the figures named by Gillett for 1914. Also it must be remembered that all metal prices are higher now, which increases the magnitude of all metal values dissipated by fuel-fired furnaces.

It has long been known that it was theoretically possible to eliminate much of this loss by the use of the electric furnace, particularly in the case of yellow brass and other alloys containing a high percentage of zinc. Previous to the war the electric furnace did not seem feasible except in cases where a large metal saving helped to counterbalance the higher cost and poor quality of crucibles, the high cost and shortage of important metals, high cost and scarcity of labor and the insistent demand for a high rate of production at any cost. These factors, when combined, make electric melting profitable. Since the close of the war some of these favorable conditions have persisted to a rather unexpected degree, and there is no apparent reason to suppose that conditions will ever be materially less favorable to electric melting than they are now.

Since installing two Detroit electric furnaces, the Oregon Brass Works of Portland have found the special advantages which result from electric melting are improved quality of metal as a result of the greatly reduced loss of volatile metals and the elimination of contaminating combustion gases. Molten metal is poured cleaner, free from metallic drosses and without the use of charcoal or flux of any kind, and exact temperature control which produces castings or billets free from defects such as blisters, blowholes, etc.

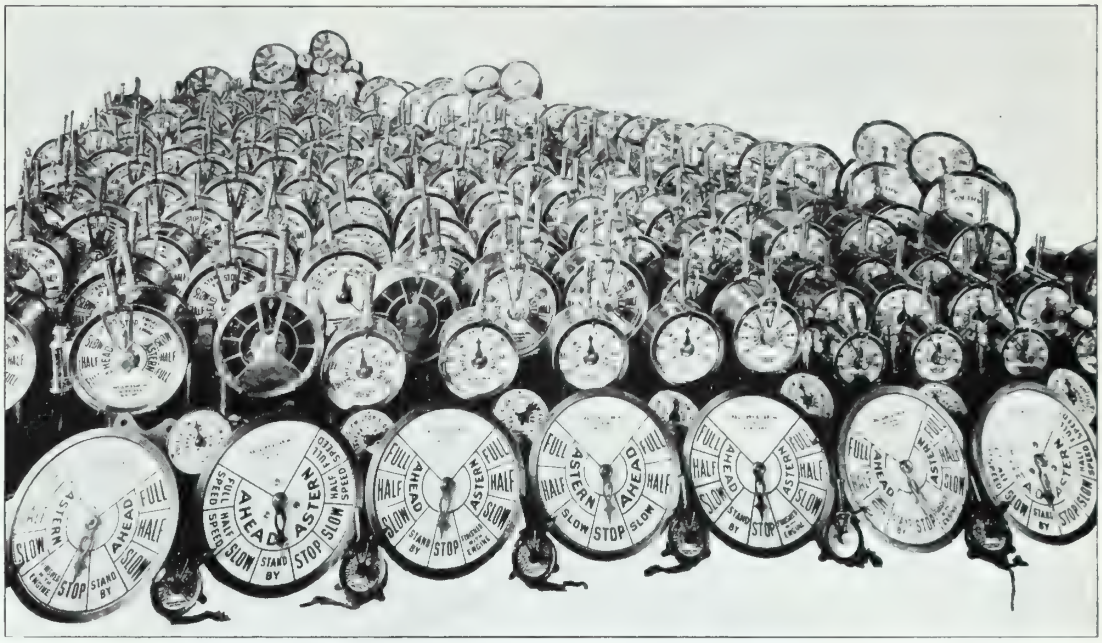
Manganese bronze has long been recognized as the logical metal for ship propellers and when properly made manganese possesses a very high tensile strength as well as a high elastic limit. It is, practically, impervious to the galvanic action of sea water. Although higher in initial cost, the distinctive advantages of manganese bronze make it the most economical metal for ship propellers. The Oregon Brass Works, during the last two years, have produced nearly 1000 bronze propeller blades weighing on an average of 3800 pounds each.



Detroit Electric Brass Melting Furnaces at Oregon Brass Works, Portland

SAFETY

By J. S. JONES



A Few of the Mechanical Telegraphs Manufactured by Chas. Cory & Son, Inc., of New York for American Merchant Ships

SHIPBUILDERS of the world today, more than at any previous time, are recognizing the necessity of securing the most reliable devices obtainable for their ships. In this connection, too much consideration cannot be given to the type of ships' telegraphs, as we know of many instances where ships which were not equipped with engine telegraphs for telegraphing the orders from the bridge to the engine room have damaged other ships and wharves, due to misunderstanding engine signals.

Mechanical telegraphs from motorboat size to that suitable for the largest ships have been highly developed today, and equipped with audible and visible signals for repeating the orders. If these telegraphs are properly installed, danger from collisions and misunderstanding of engine signals are all but eliminated.

There are many new types of telegraphs offered from time to time, but before selecting telegraphs for an installation where the lives of numerous people may be endangered, as well as involving the valuable ship, too great care cannot be exercised, and only the most reliable and time-tested appa- from bridge to engine room for transmitting engine room signals, docking telegraphs, steer- ratus obtainable should be used.

The photograph appearing shows the various kinds and sizes of mechanical telegraphs which are demanded today by the exacting shipbuilder, including engine telegraphs for use ing telegraphs, and other types too numerous to mention.

The telegraphs shown in this picture represent a single shipment of machines which are destined for points all over the United States and Canada, and were manufactured by a firm which has been a pioneer and leader for many years in mechanical telegraph work in this country.

During the recent dark days when the demand for "Ships and More Ships" came forth from every quarter of the globe, there was also the demand for "Telegraphs and More Telegraphs" for these ships. It is believed that many serious accidents were avoided when ships were zig-zagging in convoy, as the result of having installed upon them the most reliable and efficient ship's telegraph equipments obtainable.

Now that the war has been successfully concluded, and the demand for "Ships and More Ships" is still apparent, in order that the peace-time pursuits of the world at large may be carried on efficiently, the demand for "Telegraphs and More Telegraphs" is still insistent, as is evidenced by the vast quantity of telegraphs to be seen in the accompanying photograph.

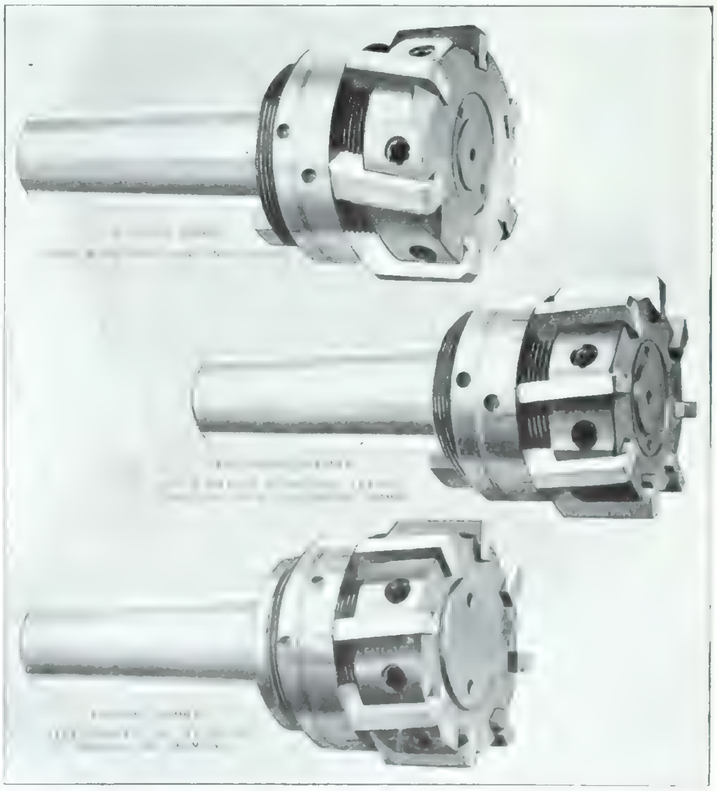
NEW WETMORE CYLINDER REAMING SETS

A NEW cylinder reaming set, in which are embodied a number of important features, has been added to the Wetmore reamer line by the Wetmore Reamer Company of Milwaukee. The set consists of three tools: a roughing reamer, a semi-finishing reamer, and a floating finishing reamer, for producing round, straight and smooth holes.

The roughing reamer is of heavy construction to withstand the initial reaming operation with adjustable and replacable blades set at a right-hand angle.

The semi-finishing tool has left-hand angle blades, like the standard Wetmore floating reamer, to eliminate liability of "digging in" and "chattering" and producing a free, round hole that is not scored when backing out, leaving an ideal condition for finishing. A modification of this reamer is designed for line and pilot reaming.

The floating finishing reamer of the set has a distinct design feature in that the float is in the head of the tool directly under the strain, a feature which eliminates all tendency to get out of parallel or cramp. The float is an improved Oldham type, having rollers instead of sliding contact to reduce friction. The float mechanism is protected from dust or grit by a cap covering the front and a washer protecting the back. The reaming job produced by this new reamer set gives a cylinder wall surface which the makers say will wear better than a lapped or ground cylinder. The blades of this reamer are set at a left-hand angle and staggered.



The New Wetmore Cylinder Reaming Set

"AMERICAN—THE RELIABLE ROPE"

"It Gives More Value in Every Way"

240 FATHOM COIL 11″ CIRCUMFERENCE

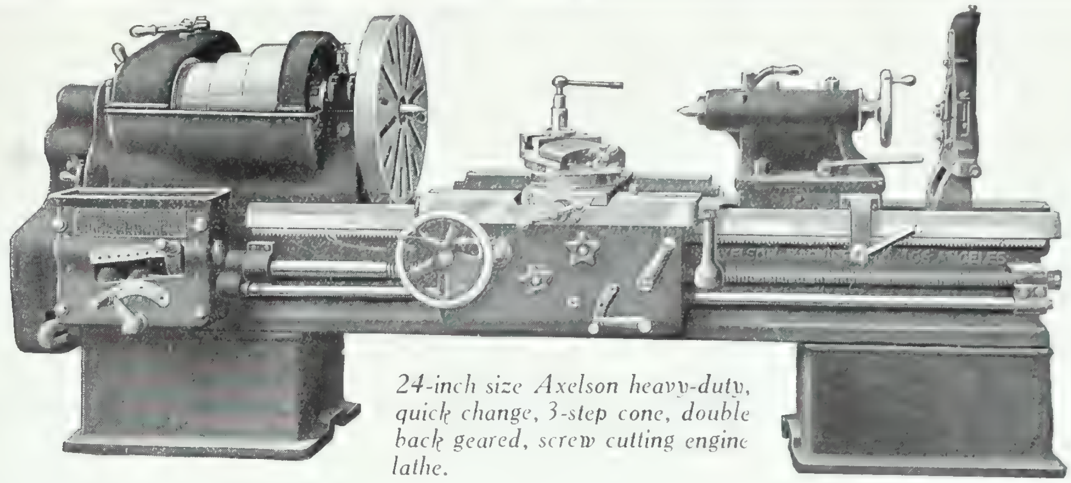
"AMERICAN" BRAND MANILA ROPE

FOR PRICES AND SAMPLES ADDRESS DEPT. P.

American Manufacturing Company

NOBLE AND WEST STREETS, BROOKLYN, NEW YORK CITY

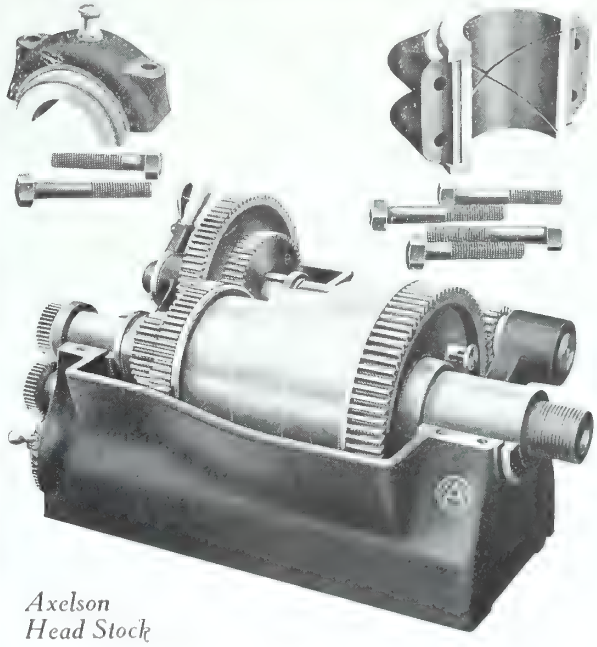
Western Branch:—ST. LOUIS CORDAGE MILLS, ST. LOUIS, MO.



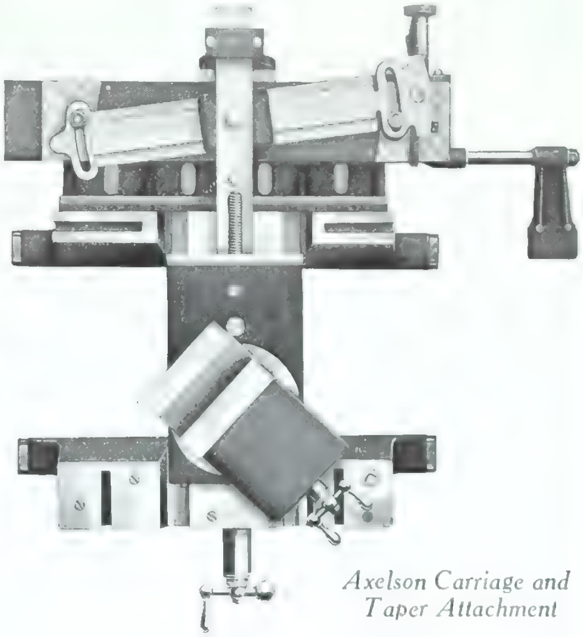
24-inch size Axelson heavy-duty, quick change, 3-step cone, double back geared, screw cutting engine lathe.

The high price of labor makes the selection of good lathes imperative.

No matter how skilled a lathe man may be, his production efficiency can be no better than the efficiency of the lathe he uses. With the wage scale at the highest level in the World's history and with **efficiency** the watchword of every progressive shop, it behooves you to select the most dependable lathes. A few dollars saved in buying less than the best may result in hundreds of dollars lost annually in under-maximum production... Your employees' time is valuable. Provide them with **Axelson Lathes**—machines built for speedy production, accuracy in cutting, sustained durability—in short, Axelson Lathes are the incentive for your employees to produce more work, better work and cleaner work.



Axelson Head Stock



Axelson Carriage and Taper Attachment

AXELSON LATHES
Cut Labor Costs

Send for Circular No. 104

Axelson Machine Co.
LOS ANGELES, CALIF.

CONSOLIDATION OF DROP FORGING PLANTS

On April 2 the stockholders of J. H. Williams & Company, manufacturers of drop-forgings and drop-forged tools at Brooklyn and Buffalo, New York, and of the Whitman & Barnes Manufacturing Company, makers of twist drills, reamers, wrenches and drop-forgings at Akron, Chicago and St. Catharines, Ontario, ratified the agreement providing for the consolidation of the wrench and drop-forging plants and business of Whitman & Barnes at Chicago and St. Catharines with J. H. Williams & Company. The Whitman & Barnes Manufacturing Company retain their twist drill and reamer business and will continue, as an entirely separate organization and on an extended scale, the manufacture of these tools at Akron, Ohio.

History of the Company

J. H. Williams & Company have long been known as the largest manufacturers of drop-forgings and drop-forged tools in the world and were one of the first to enter this field commercially. The business was founded in Flushing, Long Island, as a partnership in 1882 by James H. Williams and Matthew Diamond under the style of Williams & Diamond, later Williams & Brock. It located in Brooklyn in 1884, assumed its present name in 1887, and was incorporated in New York State in 1895.

The company is widely and favorably known, not only for its special drop-forgings made to order, but also for the quality of its catalog product: drop forged wrenches, Vulcan chain pipe wrenches and vises, lathe dogs, clamps and numerous other standard lines of drop-forged tools. Many of these were originated and patented by the company. At the successive World's Fairs at Chicago, 1893; Paris, 1900; St. Louis, 1904, and San Francisco, 1915, the company's products, in each case, received the highest award in their field.

The Brooklyn works employ about 750 persons, occupy two adjoining square blocks of city property, including the street between, which is closed, and contain about 197,000 square feet of floor space. In 1914 the Buffalo works, an entirely new plant, began operation; they now employ over 1000 persons and comprise forty-seven acres with about 233,000 square feet of floor space.

The Whitman & Barnes Manufacturing Company was founded as a partnership in 1846 by Augustus Whitman and Alfred G. Page under the title Page, Whitman & Company. In 1868 the Akron factory was built, and, in 1877, the business was combined with that of George Barnes & Company of Syracuse, New York, the enlarged concern assuming its present name, the Whitman & Barnes Manufacturing Company. The St. Catharines plant was acquired in 1882 and eleven years later the Chicago works were built. They now consist of 45 acres of land, with 320,000 square feet of floor space and are connected by private trackage with four railroads. They employ about 800 people.

The St. Catharines works, manufacturing special drop-forgings to order and standard lines of drop-forged wrenches, pipe wrenches, adjustable wrenches of various styles, pliers, hammers, hatchets, swedges, etc., are located on the Welland Canal and obtain power therefrom. They occupy about 2½ acres with floor space of 35,000 square feet. The company owns some six acres of additional property, which may be utilized in the near future for the erection of larger and improved facilities to care for the Canadian trade. This business has the distinction of having every jobbing house in the Dominion on its books. About 200 persons are now employed.

Two of the works, that at Buffalo and the new forge shop, 500 by 100 feet, and 3000 horsepower powerhouse at Chicago, are the most up-to-date forging plants in the world, while those at Brooklyn and St. Catharines are admirably adapted to the tool-making end of the business.

Through this consolidation of the four plants—Brooklyn, Buffalo, Chicago and St. Catharines—the ultimate geographical ideal for the service of customers has been attained. The merger also emphasizes the leading position of the company in the manufacture of drop-forgings and drop-forged tools.

Relations With Employes

The company has been particularly fortunate in its relations with its men. Operating throughout its history on the principle of the highest wages in the industry for the most efficient work, supplemented—but not substituted—by expenses liberally incurred to provide the best possible working conditions, it has succeeded in establishing a relation of mutual confidence that has frequently been the subject of comment in the industrial and social press; in 1912 this was the cause of an unsolicited visit from Theodore Roosevelt, followed by a special article by him in "The Outlook" on the subject.

The Brooklyn factory in 1893 had the distinction of being the first factory in this country to provide shower baths for its workmen, and again in 1914 of leading its industry in the establishment of separate pension and life insurance system for the direct benefit of its employes, and, of course, for the indirect benefit and satisfaction of its stockholders.

Future Prospects

The sales for the first five months of 1920 indicate that this will be the largest year in the company's history. All of the factories are far behind their orders in spite of increased production and permanent night shifts have been organized to help meet the demands of the trade.

Management

The business will continue to be operated by those who have been continuously identified heretofore with the business of J. H. Williams & Company and with the Chicago and St. Catharines plants of the Whitman & Barnes Manufacturing Company, the organization being as follows:

President and managing director—J. Harvey Williams.

Vice-president—A. D. Armitage.

Secretary and treasurer—W. A. Watson.

Controller—R. S. Baldwin.

General sales manager—F. W. Trabold.

Eastern district sales manager—A. S. Maxwell.

Western district sales manager—W. E. Rowell.

Buffalo district sales manager—J. C. Cotter.

Detroit district sales agent—A. M. Thompson.

Publicity manager—Hugh Aikman.

General works manager—Captain W. N. McMunn.

Chief engineer—Willard Doud.

Superintendent Brooklyn division—R. J. Smith.

Superintendent Buffalo division—T. F. Du Puy.

Superintendent Chicago division—Barney Nelson.

General purchasing agent—J. C. Scanlon.

General traffic manager—J. B. Payne.

Canadian manager—W. J. Elliott.

NEW CONDULETS

To meet the demand for a condulet having an unusually long cover opening and big wiring chamber, the Crouse-Hinds Company of Syracuse, New York, have designed a new series known as the new Mogul Series of Condulets, which are shown in their bulletin No. 1000-N.

These condulets are designed to avoid kinking heavy wires or cables when pulling in or feeding through a conduit system, and to afford ample space for making splices or taps.

Mogul condulets, though liberal in their proportions, do not materially affect the general outline of the conduit system. Their hubs have integral bushings and tapered threads. Fastening screw holes are located at the ends of the cover openings.

Mogul condulets are made in eight types, each type in eight conduit sizes ranging from one to four inches.

There are four sizes of composition and cast iron covers, each size being common to two sizes of Mogul condulet bodies. The composition covers are made with from one to nine wire holes; also blank, which can be drilled by the user as required.

The cast iron covers are made in two types; with gasket, or without gasket. The gasket is made of round rubber, cemented into a groove in the cover. The cover fastening screws are furnished with and secured to the cover.

Pacific Marine Review

October
920

S. S. Hollywood, built by
Southwestern Shipbuilding Co.

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PIONEERS

There was no Industrial Oxygen before Linde

DAY BY DAY the oxy-acetylene torch plays an increasingly important part in industrial development.

Almost everywhere the welding and cutting flames are speeding production and lightening labor, cutting costs and saving time.

This tremendous boon to industry was made possible by The Linde Company who first produced pure oxygen in commercial volume.

The increasing usefulness of the oxy-acetylene process is made possible by the great Linde organization which not only rigidly maintains the highest standards of purity in oxygen but adequately meets every demand of an ever-growing market.

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THE LARGEST PRODUCERS OF OXYGEN IN THE WORLD
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KOHL BUILDING, SAN FRANCISCO

Pacific Marine Review

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Pacific Marine Review

The National Magazine of Shipping

October, 1920

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PACIFIC LOAD LINE DATA

By J. C. ROHLFS

THE July and August editions of Pacific Marine Review presented a history of the load line and a list of Pacific Coast owned vessels lost during the past ten years. In this issue the Pacific Coast sub-committee on load lines presents a comparison of weather conditions on the Atlantic and the Pacific, compiled by its secretary, T. M. Potts, U. S. N.

A careful study of the data submitted leads to the conclusion that deeper loading should be permitted on the Pacific than on the Atlantic on many trade routes and that future legislation should take this matter into consideration. The tables submitted should also prove of value to shipowners as a reference on weather conditions which may be encountered on any trade route during any month of the year.

The British Board of Trade, after many years of careful analysis and investigation of weather conditions all over the world, issued a table of freeboard for all types, sizes and classes of vessels. These tables give the freeboard of all types of vessels operating during the winter months, October 1 to March 31, or what is generally known as the "winter load line."

Additions or subtractions are made from this winter load line for vessels of certain classes operating in the North Atlantic during the winter months, for vessels operating during the summer months, and, also, a special reduction for vessels operating between Suez and Singapore in the fine season. The reduction in freeboard for vessels operating during the summer months which is applied to the winter freeboard is given in a separate table. Double this reduction of freeboard for the summer months is allowed for vessels operating between Suez and Singapore in the fine season.

An additional freeboard of two inches is required for all vessels up to and including 330 feet in length when entering the North Atlantic, when sailing to or from the Mediterranean or any British or European port, or which may sail to or from or call at ports in British North American or eastern ports in the United States north of Hatteras during the winter months.

In the following tables an attempt has been made to compare average weather conditions in the Atlantic and the Pacific to determine, if possible, what modifications may be made in these tabulated freeboard tables for vessels operating in the Pacific Ocean. Pilot charts and sailing directions of both oceans, issued by the Hydrographic Office, Navy Department, Washington, D. C., have been carefully examined and tables prepared showing the percentage of gales, the percentage of calms and general weather conditions in lanes extending from coast to coast between every five degrees of latitude in both oceans.

Another table has been prepared showing the average weather conditions along the routes of coast steamers in the Pacific, and the comparison of this weather and that prevailing in the Indian Ocean during the fine season.

The terms as applied to freeboard—namely, North Atlantic Winter, Summer and Indian Summer—or freeboard required for vessels operating between Suez and Singapore during the fine season, are those commonly accepted by all nations and laid down by the British Board of Trade.

Comparison of Average Weather Conditions Prevailing in North Atlantic and North Pacific Oceans Over Usual Trade Routes

PACIFIC

January: The percentage of gales is high over most of the ocean between the 35th and 45th parallels and longitudes 145 E. to 140 W. Over most of the region of the prevailing westerlies, the wind system is frequently interrupted by cyclonic storms accompanied by southeast changing to northwest gales. The gales during this month often sweep the coast from San Francisco northward. Typhoons are infrequent in the Western Pacific. On the Great Circle route from the Puget Sound district to Yokohama the percentage of gales varies between 8 and 15 per cent, the greatest being in the Western Pacific in the vicinity of Yokohama and the Middle Pacific south of the Aleutian Islands. The percentage of calms over this route is very small and, generally speaking, the winds are strong and variable. Over the Great Circle route between San Francisco and the Hawaiian Islands, the percentage of gales is small and the percentage of calms is greater than over the northern route. Winds during this month on this route are variable and moderate in force. Vessels proceeding to the Orient over the Great Circle route between the Hawaiian Islands and Japan and Northern China will have a percentage of gales, being highest west of the 180th meridian, the maximum being about 28 per cent.

Over the Great Circle route between the Hawaiian Islands and the Philippines much better weather prevails, the percentage of gales being small and the percentage of calms much greater than over the northern route. Winds are generally from the northeast quadrant and are generally moderate in force. Over the usual sailing route from San Francisco to Panama, the percentage of gales is very small and the percentage of calms high, reaching 40 per cent along the Central American Coast.

NORTH ATLANTIC

January: North of the 40th parallel westerly winds 4 to 6 and over predominate from coast to coast. Between the 40th and 35th parallels the westerly winds prevail from the American coast to the Azores. Over this entire region the percentage of southwesterly to northwesterly gales has increased in the approach of midwinter, reaching their greatest development during this month. The highest percentages, 30 to 39, occur west of Scotland. Frequent snow squalls, with winds that sometimes attain hurricane force accompanying, occur along the northern trans-Atlantic routes. The average percentage of calms during this month over the northern route is two.

The prevailing winds are generally in the northeast and northwest quadrants and are generally light.

Over the Great Circle route between San Francisco and Australia the percentage of gales to the equator is small, the prevailing winds being moderate and usually from the northeast quadrant.

February: The percentage of gales is high over an irregular area occupying the western part of the ocean, south and southwest of the Aleutian Islands between the 50th and 30th parallels and from longitude 145 to 155 W. The number of typhoons occurring in Asiatic waters during February is less than during any other month of the year.

Over the northern Great Circle route between San Francisco or Puget Sound and Yokohama, the percentage of gales averages about 12 per cent, the maximum being reached between the parallels of 150 E. and 170 W. The prevailing winds over this route during this month are variable with practically no calms and are generally strong. The Great Circle route from San Francisco to the Hawaiian Islands during this month is practically the same as during the month of January. This also applies to the Great Circle route from the Hawaiian Islands to the Philippines.

Over the Great Circle route between the Hawaiian Islands and Japan and Northern China, the percentage of gales reaches a maximum of about 16 per cent between the meridian of Yokohama and 180 degrees. (Winter freeboard.) Over the Great Circle route from San Francisco to Australia, the weather is practically the same as during the month of January as far as the equator. Over the usual steamer route between San Francisco and Panama the weather is generally good with light wind and a very high percentage of calms, especially along the Mexican and Central American Coasts. (Summer freeboard.)

Over the usual routes between San Francisco and Callao and Cape Horn, the weather is generally good with moderate winds and with a low percentage of gales during this month as far as the equator.

March: The winds on the American coast during this month are generally moderate. Percentage of calms is high in the Gulf of California south to the equator. Percentage of gales is high in the Middle Pacific between latitudes 35 to 40 N. and also in the neighborhood of the Aleutian Islands. Typhoons in the Western Pacific are infrequent.

Over the Great Circle route between Puget Sound or San Francisco and Japan, the percentage of gales reaches its maximum of about 13 per cent between the meridians of Yokohama and 180 degrees. Winds are usually strong over this route during the month of March and the percentage of calms is very, very small. The weather over the Great Circle route between San Francisco and the Hawaiian Islands is generally good with moderate winds and with a low percentage of gales and a moderate percentage of calms.

Over the Great Circle route between the Hawaiian Islands and Japan, weather conditions are better than during the two preceding months. A much lower percentage of gales and the average strength of the wind is moderate. Over the Great Circle route between the Hawaiian Islands and the Philippines, the percentage of gales is very small. From Honolulu to the vicinity of the Mariana Islands, the average percentage of gales is zero with a slight increase of about 4 per cent from the Marianas to the Philippines. The percentage of calms between Honolulu and the Marianas is about 12 per cent.

The weather over the usual coast route from San Francisco to Panama is good, the prevailing winds light in force and a very high percentage of calms on the Mexican and Central American coasts. Over the Great Circle route between San Francisco and Australia the percentage of gales during this month is practically nil except in the neighborhood of San Francisco, where the percentage is only 3 to 4 per cent. The same remarks apply to the usual sailing route from San Francisco to the west coast of South America as far as the equator.

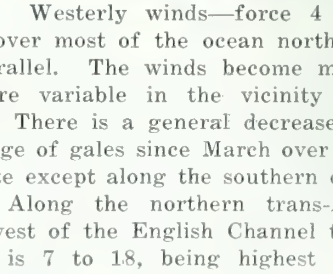
April: Weather conditions generally good and wind variable during this month, especially on the American coast. Percentage of calms is high along the American coast from San Francisco to the equator. Percentage of gales is small on the American coast, but is generally high over the region between the parallels 50 to 55 N. and longitudes 140 to 160 W. Percentage of typhoons in the Western Pacific this month is small.

The weather over the northern route from San Francisco to Japan and Northern China is much better during this month than over the last three months. The percentage of gales is much smaller and the percentage of calms increases. The percentage of typhoons in the Western Pacific is greater during this month than during the previous three.

The weather over the Great Circle route between San Francisco and Hawaii is practically the same as during the preceding months with an increase in the percentage of calms and a decrease in the average wind force. The weather over the

February: Westerly winds—force 5 to 6—prevail over the ocean north of the 35th parallel. The percentage of gales has fallen somewhat north of the 45th parallel. Frequent snow squalls with winds that sometimes attain hurricane force occur along the northern trans-Atlantic routes. The percentage of calms over the northern trans-Atlantic routes is about three.

March: The percentage of westerly winds is high north of the 40th parallel. The percentage of gales over the region of westerly winds is moderate to high being 11 to 22 per cent along the northern trans-Atlantic routes and slightly higher north of the 55th parallel. There has been a general decrease in the percentage of gales since February over most of the ocean north of the 35th parallel and a slight increase over most of the region south of it. The percentage of calms over the northern trans-Atlantic routes during this month is about the same as of February.



April: Westerly winds—force 4 to 6—prevail over most of the ocean north of the 35th parallel. The winds become moderate and more variable in the vicinity of the Azores. There is a general decrease in the percentage of gales since March over the entire route except along the southern coast of Spain. Along the northern trans-Atlantic routes west of the English Channel the percentage is 7 to 18, being highest in mid-ocean and lowest near the coast.

Comparatively few gales occur outside of the region of westerly winds. The percentage of calms over the northern trans-Atlantic route during this month is about 5.

Great Circle route between the Hawaiian Islands and Yokohama is much better during this month than in the previous three. The percentage of gales is small and the percentage of calms increases. The danger of typhoons in approaching the Japanese Islands is greater than during the preceding months. The weather over the Great Circle route between the Hawaiian Islands and the Philippines is generally good. The percentage of gales is practically nil except in the vicinity of the Philippine Islands, where typhoons may be met, although they are infrequent.

The weather over the coast route to Panama is practically the same as during the preceding three months. The weather over the Great Circle route to Australia is practically the same with a slight increase in the percentage of gales as far as the equator. The weather over the usual sailing route to the west coast of South America as far as the equator is generally good with a low percentage of gales but with a decreased percentage of calms. The wind force is somewhat greater than in the previous months, although moderate in character.

May: Weather generally good. Calms frequent along the American coast south of the 25th parallel. Percentage of gales is small and typhoons are infrequent during this month in the Western Pacific.

Weather over the Great Circle route from Puget Sound and San Francisco continues to improve with a higher percentage of calms and a lower percentage of gales. Typhoons may be met in the vicinity of the Japanese Islands. The weather over the Great Circle route between San Francisco and Honolulu shows a much higher percentage of calms and no gales. Over the Great Circle route between the Hawaiian Islands and Japan, the percentage of calms is largely increased and the percentage of gales very small, except the typhoons which may be met in the vicinity of the Japanese Islands. The same remarks apply to the Great Circle route between Honolulu and the Philippines. The weather over the Great Circle route between San Francisco and Australia during this month shows an increase in the percentage of calms and the percentage of gales is practically nil. The weather over the usual coast route between San Francisco and Panama shows a decided increase in the percentage of calms and a decrease in the percentage of gales, which, during this month, is practically nil.

The weather over the Great Circle route from San Francisco to the west coast of South America during this month shows a higher percentage of calms and practically no gales as far as the equator.

June: Weather conditions during this month are generally good with a large percentage of calms throughout the entire coast extending to Alaskan waters. The percentage of gales is very small over the entire ocean. The highest percentage, about three, confined to the area between the 40th and 50th parallel and in east longitude. June is the typhoon month and typhoons occur in the Western Pacific, generally in the neighborhood of the Philippines, although they occasionally originate about the longitude of the Caroline Islands.

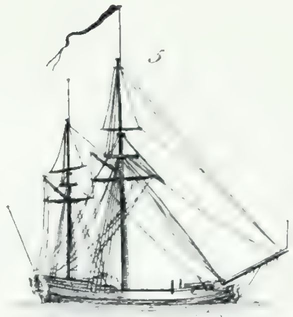
The weather over the northern route between Puget Sound and San Francisco and Japan shows a very small percentage of gales and a much larger percentage of calms. The Great Circle route between San Francisco and Honolulu shows a decided increase in the percentage of calms.

Over the Great Circle route between the Hawaiian Islands, and Japan, the weather shows a decided improvement with practically no gales except in the vicinity of the Japanese Islands, where typhoons are more frequent during this month. Over the Great Circle route between Honolulu and the Philippines, weather conditions are the same as during the month of May except that the frequency of typhoons in the neighborhood of the islands is increasing. The weather over the Great Circle route between San Francisco and Australia is the same as during the month of May. The weather over the usual coast route between San Francisco and Panama is the same as during the month of May. The weather over the usual sailing route between San Francisco and the west coast of South America as far as the equator is the same as during the month of May.

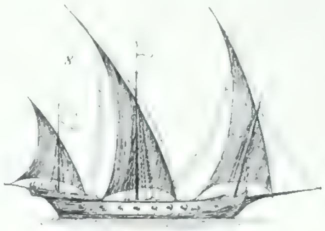
July: The weather over the entire North Pacific ocean during this month is generally good. The percentage of gales is very small and is generally confined to the Western Pacific. Calms cover an extensive area extending from Panama to Cape San Lucas. Typhoons occur in the Western Pacific, generally in the neighborhood of the Philippines.

The weather conditions over the northern route improving. The percentage of calms increasing and the percentage of gales being very small.

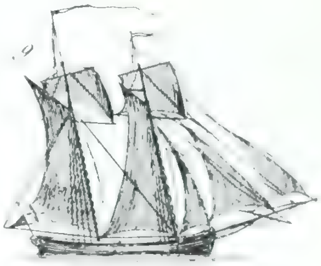
The weather over the Great Circle routes between San Francisco and the Hawaiian Islands and the Hawaiian Islands and Japan, and the Hawaiian Islands and the Philippines shows the percentage of calms is greatly increased. The frequency of typhoons during this month in the Western Pacific is greatly increased. The weather over the Great Circle route between San Francisco and Australia and San Francisco and the west coast of South America is the same as the month of June. Same applies to the coast route between San Francisco and Panama.



May: North of the 35th parallel westerly winds prevail—force 4-5. Gales have decreased in number since midwinter although cyclones and anti-cyclones continue to cross the ocean in succession in northern latitudes between the 40th and 50th parallels. The highest percentages of gales—8 to 13—occur near midocean. Northward the percentage decreases between the 50th and 55th parallels. Gales are rare south of latitude 30 degrees N. The percentage of calms over the northern trans-Atlantic routes is about five.



June: North of the 35th parallel the largest percentage of the wind is from a westerly direction. Gales have decreased in percentage and occur only 5 to 7 per cent of the time over the stormiest portion of the northern steamship route. The percentage of calms over the northern steamship route has increased to about 8.



July: Westerly winds—force 4—prevail north of the 35th parallel except east of the Azores. There has been a continued decrease in the number of gales and the highest percentage — 4-6 — occurs in midocean north of the 45th parallel. Gales seldom occur south of the 35th parallel. West Indian hurricanes may be expected during this month in the vicinity of the West Indies and the American coast as far north as Cape Hatteras, although their frequency is not very great.

August: The weather during this month is generally good with a large percentage of calms and a low percentage of gales except in the western Pacific west of longitude 180 where the percentage is considerably greater. The typhoon season in Asiatic waters is at its height and from 4 to 6 per cent of the tropical storms is likely to occur during this month.

The weather over the northern route good. Percentage of gales very small. Percentage of calms increasing. Remarks as to weather conditions over this route in July apply to this month.

September: Frequency of gales over the Great Circle route to Yokohama increasing. The percentage of calms decreases. The frequency of typhoons in the western Pacific highest during this month. Weather conditions over other trade routes practically the same as during July.

The percentage of calms is high along the American coast between the 5th and 40th parallels. The percentage of gales is generally high between the 45th and 60th parallels west of longitude 140 W. It is notably high in the Kodiak Islands and in the region immediately east of Kamchatka. The percentage of typhoons in western Pacific waters is at its height during the months of August and September and an average of from 4 to 6 per cent of these tropical storms is likely to occur in each of these months.

October: The percentage of calms is high along the American coast north of the 5th parallel. The percentage of gales is moderately high north of the 35th parallel. South of this region, gales are comparatively few. Typhoons in the western Pacific are likely to prove dangerous during the month of October with a slight increase in percentage over November.

Northern route between San Francisco and Japan shows an increasing percentage in gales and decreasing percentage in calms. Winds generally stronger than during the summer months. Weather over other trade routes practically the same. Trade routes between San Francisco and Australia show a high percentage of calms during this month.

November: The percentage of calms is high along the greater part of the American and Asiatic coasts; also, over the region west of longitude 170 E. and south of the 10th parallel. Southeast to northwest gales occur frequently north of the 35th parallel but their number decreases along the coast. Typhoons are likely to prove most dangerous in the neighborhood of the Philippine Islands during the month of November.

Increasing percentage of gales over the northern route. Maximum about 19 per cent. Percentage of calms practically nil. Frequency of typhoons in the western Pacific decreasing. Weather over the Great Circle route between San Francisco and the Hawaiian Islands shows slightly higher percentage of gales. Percentage of gales over the Great Circle route between the Hawaiian Islands and Japan increasing. Frequency of typhoons decreasing. Weather over the Great Circle route between San Francisco and Australia shows a slightly increased percentage in gales in the vicinity of San Francisco as far west as 140 degrees.

Weather over the usual sailing routes between San Francisco and Panama shows a marked decrease in the percentage of calms with practically no increase in the percentage of gales. Wind somewhat stronger but usually of moderate force.

Weather over the usual trade routes from San Francisco to west coast of South America as far as the equator shows a higher percentage of calms especially in the neighborhood of the equator.

December: The percentage of calms is high along the American coast south of the 40th parallel, particularly between the 20th and the 5th parallels; also, over the region in the vicinity of Japan, Korea and over most of the Philippine waters. The percentage of gales is high over most of the ocean between the 35th and 55th parallels except in the vicinity of San Francisco and the Farallon Islands. Gales are also frequent in the vicinity of Yokohama. The percentage of typhoons in the western Pacific is small.

Percentage of gales over the northern route about the same as in November with a somewhat increased percentage of calms. Less danger of typhoons in the western Pacific. Weather over the other trade routes is practically the same as during November. A marked increase in the percentage of calms occurs over the usual sailing route between San Francisco and Panama especially on the Central American Coast.

August: Westerly winds still prevail over the north Atlantic north of the 35th parallel but they are only moderate in force. Gales in the north Atlantic occur less frequently during July and August. The region of greatest percentage—4 to 6—is between the 15th and 40th meridians north of the 45th parallel. Very few gales occur south of latitude 30. West Indian hurricanes are more frequent in August than in July and are usually met in the vicinity of the West Indies and along the southern coast of the United States as far north as Hatteras.

September: Westerly winds—force 4-6—prevail north of the 30th parallel. The percentage of gales has increased over most of the ocean since August and the highest percentage—9 to 16—occurs in midocean north of the 45th parallel. Gales are seldom recorded south of the 20th parallel. West Indian hurricanes are the most frequent during the latter part of September and the first part of October. They are usually found in the vicinity of the West Indies and along the Atlantic coast of the United States as far north as Hatteras.

October: North of the 40th parallel the winds are fresh, the greatest percentage from westerly quadrants. With the advance of autumn there has been a decided increase in the percentage of gales. Over the northern trans-Atlantic routes the percentage of gales is twice as much as during September. The percentage of calms is small, averaging from 2 to 3 per cent. More hurricanes form in the neighborhood of the West Indies in October than during any other month of the year.

November: North of the 35th parallel the winds are fresh, the greatest percentage from the western quadrant. With the approach of winter there has been a moderate increase in the percentage of gales north of the 35th parallel. Gales are infrequent south of latitude 35 N. West Indian hurricanes during this month are infrequent. The percentage of calms over the northern trans-Atlantic routes is about 2.

December: Westerly winds predominate north of the 35th parallel over the eastern part of the ocean and north of the 30th parallel west of the 40th meridian. The percentage of gales has increased as a rule over the entire route and is high north of the 40th parallel east of the 40th meridian and north of the 35th parallel. The highest percentages, 27 to 33, occur in midocean west of the British Isles. Gales continue infrequent south of the 30th parallel. The percentage of calms over the northern trans-Atlantic routes is about 2.

Comparative Weather Conditions—North Atlantic and North Pacific

TABLE 1-A

Table Showing the Percentage of Gales (Bold Face) and Percentage of Calms (Light Face) in Areas Extending from Coast to Coast in Both Oceans and Between Every Five Degree Parallels of Latitude.

LATITUDES

MONTHS	60 NA	55 NP	55 NA	50 NP	50 NA	45 NP	45 NA	40 NP	40 NA	35 NP	35 NA	30 NP	30 NA	25 NP	25 NA	20 NP	20 NA	15 NP	15 NA	10 NP	10 NA	5 NP	5 NA	0 NP
January	**29** 2	**0** 0	**23** 2	**9** 7	**21** 3	**11** 5	**18** 4	**16** 4	**13** 4	**15** 6	**8** 7	**7** 8	**3** 7	**4** 8	**1** 8	**1** 11	**0** 7	**0** 10	**0** 4	**1** 8	**0** 10	**0** 9	**0** 10	**0** 13
February	**24** 2	**0** 0	**18** 2	**10** 3	**20** 4	**11** 3	**20** 4	**14** 5	**16** 5	**13** 5	**8** 7	**8** 7	**2** 13	**4** 8	**2** 10	**1** 10	**1** 7	**0** 8	**0** 4	**0** 8	**0** 7	**0** 10	**0** 10	**0** 13
March	**18** 2	**0** 0	**19** 3	**9** 6	**15** 4	**10** 5	**15** 5	**8** 6	**12** 4	**8** 8	**8** 8	**5** 9	**2** 10	**8** 9	**1** 7	**2** 11	**1** 9	**0** 11	**0** 4	**0** 6	**0** 5	**0** 8	**0** 10	**0** 15
April	**15** 4	**0** 9	**11** 4	**8** 7	**10** 4	**8** 5	**10** 5	**6** 7	**8** 6	**3** 9	**5** 7	**3** 11	**2** 8	**0** 11	**1** 6	**0** 9	**0** 6	**0** 8	**0** 3	**0** 15	**0** 7	**0** 14	**0** 12	**0** 20
May	**7** 8	**2** 15	**5** 5	**5** 10	**7** 7	**5** 6	**5** 7	**6** 9	**4** 5	**3** 9	**2** 11	**1** 15	**0** 13	**0** 12	**0** 8	**0** 12	**0** 6	**0** 8	**0** 4	**0** 12	**0** 9	**0** 20	**0** 13	**0** 21
June	**4** 7	**1** 20	**4** 6	**2** 12	**4** 7	**3** 11	**4** 8	**3** 11	**2** 10	**2** 12	**1** 13	**1** 14	**0** 17	**0** 14	**0** 7	**0** 12	**0** 3	**0** 10	**0** 6	**0** 10	**0** 23	**0** 21	**0** 7	**0** 14
July	**4** 6	**0** 21	**3** 7	**1** 11	**3** 9	**1** 12	**2** 10	**1** 14	**1** 12	**0** 16	**0** 15	**0** 15	**0** 11	**0** 16	**0** 4	**1** 16	**0** 4	**1** 10	**0** 8	**1** 15	**0** 15	**0** 22	**0** 2	**0** 11
August	**4** 6	**2** 12	**4** 5	**2** 11	**3** 7	**2** 11	**2** 10	**2** 14	**1** 10	**1** 17	**0** 15	**1** 17	**0** 10	**1** 10	**0** 4	**1** 10	**0** 6	**1** 8	**0** 11	**1** 16	**0** 12	**0** 18	**0** 3	**0** 12
September	**11** 4	**8** 12	**10** 4	**6** 7	**7** 5	**7** 9	**5** 6	**4** 10	**4** 7	**2** 10	**2** 12	**1** 14	**2** 13	**0** 11	**2** 6	**1** 7	**1** 7	**1** 8	**1** 13	**0** 16	**0** 15	**0** 16	**0** 3	**0** 10
October	**17** 4	**7** 0	**15** 2	**8** 6	**10** 4	**9** 6	**10** 7	**9** 6	**8** 7	**6** 9	**4** 9	**1** 9	**2** 10	**0** 12	**0** 10	**1** 10	**0** 8	**1** 10	**0** 10	**0** 15	**0** 18	**0** 20	**0** 4	**0** 11
November	**20** 2	**0** 0	**15** 3	**12** 2	**13** 3	**16** 4	**10** 5	**16** 4	**8** 5	**9** 6	**4** 7	**4** 8	**2** 8	**1** 8	**1** 8	**1** 8	**1** 9	**1** 4	**0** 6	**0** 7	**0** 15	**0** 10	**0** 6	**0** 10
December	**27** 2	**0** 0	**25** 2	**16** 4	**20** 3	**16** 4	**17** 3	**15** 5	**12** 4	**14** 7	**7** 6	**5** 10	**3** 10	**2** 10	**2** 7	**1** 10	**2** 6	**1** 9	**1** 4	**0** 9	**1** 11	**0** 9	**0** 15	**0** 6

NOTE.—The percentage of gales in the North Pacific for the months of November, December, January, February and March, latitudes 55-60 is not given. Weather conditions, however, are bad; gales frequent and very severe.

N. A.=North Atlantic; N. P.=North Pacific. Percentage gales or calms=days out of every hundred.

TABLE 1-B

Table Showing the Percentage of Gales (Bold Face) and Percentage of Calms (Light Face) in Areas Extending from Coast to Coast in Both Oceans and Between Every Five Degree Parallels of Latitude.

LATITUDES

MONTHS	0 SA	5 SP	5 SA	10 SP	10 SA	15 SP	15 SA	20 SP	20 SA	25 SP	25 SA	30 SP	30 SA	35 SP	35 SA	40 SP	40 SA	45 SP	45 SA	50 SP	50 SA	55 SP	55 SA	60 SP
January	**0** 5	**0** 6	**0** 2	**0** 4	**0** 3	**0** 8	**0** 2	**0** 7	**0** 8	**1** 8	**1** 10	**1** 10	**2** 9	**2** 9	**5** 5	**2** 8	**7** 4	**5** 5	**11** 5	**8** 3	**10** 4	**13** 2	**8** 4	**10** 3
February	**0** 5	**0** 6	**0** 2	**0** 4	**0** 3	**0** 8	**0** 2	**0** 7	**0** 8	**1** 8	**1** 10	**1** 10	**2** 9	**2** 9	**5** 5	**2** 8	**7** 4	**5** 5	**11** 5	**8** 3	**10** 4	**13** 2	**8** 4	**10** 3
March	**0** 11	**0** 10	**0** 4	**0** 13	**0** 4	**1** 8	**1** 7	**0** 8	**1** 10	**2** 10	**3** 10	**4** 16	**5** 9	**6** 9	**9** 7	**9** 6	**13** 6	**10** 7	**13** 4	**13** 6	**13** 5	**17** 4	**17** 5	**23** 4
April	**0** 11	**0** 10	**0** 4	**0** 13	**0** 4	**1** 8	**1** 7	**0** 8	**1** 10	**2** 10	**3** 10	**4** 16	**5** 9	**6** 9	**9** 7	**9** 6	**13** 6	**10** 7	**13** 4	**13** 6	**13** 5	**17** 4	**17** 5	**23** 4
May	**0** 11	**0** 10	**0** 4	**0** 13	**0** 4	**1** 8	**1** 7	**0** 8	**1** 10	**2** 10	**3** 10	**4** 16	**5** 9	**6** 9	**9** 7	**9** 6	**13** 6	**10** 7	**13** 4	**13** 6	**13** 5	**17** 4	**17** 5	**23** 4
June	**0** 2	**0** 6	**0** 1	**0** 3	**0** 1	**0** 5	**0** 5	**1** 8	**1** 7	**2** 10	**2** 7	**4** 7	**6** 7	**9** 5	**14** 6	**12** 6	**17** 4	**17** 4	**19** 4	**19** 4	**15** 5	**24** 4	**18** 5	**26** 5
July	**0** 2	**0** 6	**0** 1	**0** 3	**0** 1	**0** 5	**0** 5	**1** 8	**1** 7	**2** 10	**2** 7	**4** 7	**6** 7	**9** 5	**14** 6	**12** 6	**17** 4	**17** 4	**19** 1	**19** 4	**15** 5	**24** 4	**18** 5	**26** 5
August	**0** 2	**0** 6	**0** 1	**0** 3	**0** 1	**0** 5	**0** 5	**1** 8	**1** 7	**2** 10	**2** 7	**4** 7	**6** 7	**9** 5	**14** 6	**12** 6	**17** 1	**17** 1	**19** 4	**19** 4	**15** 5	**24** 4	**18** 5	**26** 5
September	**0** 1	**0** 6	**0** 1	**0** 6	**0** 1	**0** 5	**0** 3	**1** 6	**1** 5	**1** 9	**1** 4	**2** 5	**3** 4	**4** 7	**8** 5	**7** 6	**9** 4	**16** 5	**6** 3	**19** 4	**13** 3	**19** 3	**23** 2	**22** 3

NOTE.—S. A.=South Atlantic. S. P.=South Pacific.

Comparative Weather Conditions—North Atlantic and North Pacific

October	**0** 1	**0** 6	**0** 1	**0** 6	**0** 1	**0** 6	**0** 3	**1** 6	**1** 5	**1** 9	**1** 4	**2** 5	**3** 4	**4** 7	**8** 5	**7** 6	**9** 4	**16** 5	**6** 3	**19** 4	**13** 3	**19** 3	**23** 2	**22** 3
November	**0** 1	**0** 6	**0** 1	**0** 6	**0** 1	**0** 6	**0** 3	**1** 6	**1** 5	**1** 9	**1** 4	**2** 5	**3** 4	**4** 7	**8** 5	**7** 6	**9** 4	**16** 5	**6** 3	**19** 4	**13** 3	**19** 3	**23** 2	**22** 3
December	**0** 5	**0** 6	**0** 2	**0** 4	**0** 3	**0** 8	**0** 2	**0** 7	**0** 8	**1** 8	**1** 10	**1** 10	**2** 9	**2** 9	**5** 5	**2** 8	**7** 4	**5** 5	**11** 5	**8** 3	**10** 4	**13** 2	**8** 4	**10** 3

TABLE 1-C

Percentages of Gales (Bold Face) and Calms (Light Face) in the North Atlantic (North of Hatteras) and between Same Latitudes in the Pacific Ocean.

LATITUDES

MONTHS	55 to 60		50 to 55		45 to 50		40 to 45		35 to 40		REMARKS
	NA	NP	NA	NP	NA	NP	NA	NP	NA	NP	
October .	**17** 4	**0** 0	**15** 2	**8** 6	**10** 4	**9** 6	**10** 7	**9** 6	**8** 7	**6** 9	No percentage of gales covering the North Pacific Lane between 55 and 60 degrees is available. The weather, however, is given in the Sailing Directions as being stormy with heavy gales. As Winter—North Atlantic Freeboard applies only to vessel entering U. S. Ports North of Hatteras, comparisons in the weather of the two oceans is only carried out from 35 to 60 degrees north.
November	**20** 2	**0** 0	**15** 3	**12** 2	**13** 3	**15** 4	**10** 5	**16** 4	**8** 5	**9** 6	
December ...	**27** 2	**0** 0	**25** 2	**16** 4	**20** 3	**16** 4	**17** 3	**15** 5	**12** 1	**14** 7	
January...............	**29** 2	**0** 0	**23** 2	**9** 6	**21** 2	**11** 5	**18** 4	**16** 4	**13** 4	**15** 6	
February ...	**24** 2	**0** 0	**18** 2	**10** 3	**20** 4	**11** 3	**20** 4	**14** 5	**16** 5	**13** 5	
March ..	**18** 2	**0** 0	**19** 3	**9** 6	**15** 4	**10** 5	**15** 5	**8** 6	**12** 4	**8** 8	

TABLE 2

Weather Conditions Over Usual Coast Route in Pacific from San Francisco to San Diego and Panama as Compared to Weather in Indian Seas During Fine Season.

(Gales Bold Face, Calms Light Face)

MONTHS	40–35	35–30	30–25	25–20	20–15	15–10	10–5	5–0	REMARKS
January	**6** 13	**2** 17	**1** 18	**0** 25	**0** 13	**1** 40	**0** 33	**0** 20	**Weather Conditions During "Fine Weather" in the Indian Ocean on the Route between Suez and Singapore.** During the fine season which is the change in the monsoon (the months of April and May) the percentage of gales is practically nil, while the average percentage of calms is about twenty over this route. The northeasterly or the winter monsoon is modified by the increasing continental warmth during April and May and tends to become light and variable. Calms increase over this entire region. The winds are easterly in the Gulf of Aden; thence along the coast to the head of the Bay of Bengal they follow the general contour of the land. The southwest monsoon gradually develops during May but the full strength does not occur until June.
February	**5** 13	**1** 20	**2** 14	**0** 13	**1** 23	**0** 30	**0** 35	**0** 27	
March	**3** 15	**1** 25	**1** 12	**0** 21	**0** 36	**1** 31	**0** 36	**0** 45	
April	**2** 15	**1** 20	**2** 8	**0** 10	**0** 33	**0** 35	**0** 46	**0** 20	
May	**2** 13	**1** 30	**0** 11	**0** 9	**0** 29	**0** 41	**0** 32	**0** 21	
June	**3** 8	**0** 20	**0** 10	**0** 12	**0** 28	**0** 34	**0** 37	**0** 2	
July	**1** 8	**0** 13	**0** 16	**0** 21	**1** 25	**1** 31	**0** 22	**0** 0	
August	**1** 15	**0** 22	**0** 10	**0** 17	**0** 28	**0** 30	**0** 30	**0** 0	
September	**1** 15	**0** 21	**0** 11	**1** 22	**3** 24	**0** 33	**0** 18	**0** 4	
October	**2** 13	**2** 18	**0** 14	**1** 17	**2** 20	**1** 33	**0** 18	**0** 0	
November	**2** 15	**1** 13	**1** 15	**0** 15	**0** 20	**0** 13	**0** 6	**0** 1	
December	**2** 25	**1** 25	**1** 20	**1** 20	**1** 22	**1** 50	**0** 32	**0** 7	

CORPORATION CITIZENSHIP

An Analysis of Section 38 of the Jones Bill

By HAROLD M. SAWYER

SINCE the foundation of this government the privilege of documenting ships under our laws has been confined exclusively to citizens of the United States. In 1792 Congress passed the first ship registry act requiring registration of all domestically owned ships engaged in foreign commerce, and in the following year required enrollment or license of all vessels operated in the coastwise trade or in the fisheries. But the systems of registry for foreign commerce and of enrollment or license for coastwise trade were designed for citizens of the United States only.

As long as business was generally conducted by individuals and partnerships, there was little trouble in determining the citizenship of operators, but with the modern growth and development of the private corporation as an instrumentality of business, the problem of determining corporate citizenship began to present both legal and practical difficulties.

As a matter of law the corporation is a distinct entity or individual, entirely separate from its stockholders, officers and directors. It is an artificial creation brought into existence by sovereign power expressed through law. Hence the universally accepted view has been that it is purely a creature of the sovereign, and consequently the sole test of corporate citizenship is one of locality. It becomes a citizen of the state under whose law it was created.

Under this rule no attention is paid to the citizenship of the stockholders. Any corporation organized under the laws of either the United States or of any state thereof has heretofore been conclusively presumed to be a citizen of the United States and of the particular state of its origin.

This is the rule which was in effect adopted by Congress in 1825, when it was provided that certificates of registration, enrollment and license of ships owned by an incorporated company should be issued in the name of its president or secretary and that upon any change in the personnel of these officers new certificates should be issued. That there might be no doubt of its intention, Congress specifically provided that registration, enrollment and license should not be vacated or affected by any sale of shares of stock in such company.

Consequently, ships owned by any domestic corporation could, if otherwise eligible, be registered, enrolled or licensed, regardless of the citizenship of any of its stockholders. In fact, in 1911 the Attorney General of the United States gave an opinion that a vessel belonging to a domestic corporation is entitled to registry or enrollment even though some of its stock be owned by aliens.

Such was the law until the Shipping Act of 1916 was passed. In section 2 of this act Congress for the first time gave thought to the citizenship of stockholders as an additional test of corporate citizenship. The idea was somewhat crudely expressed in section 2, but since then the section has been twice amended: once in 1918 and again by section 38 of the Merchant Marine Act of 1920 (Jones bill). With each successive amendment the citizenship of stockholders has been increasingly emphasized until, by a process of somewhat rapid evolution culminating in section 38, it has become the factor of paramount importance in determining the citizenship of a corporation.

This section provides that "within the meaning of this act (i. e., Shipping Act of 1916) no corporation operating any vessel in the coastwise trade shall be deemed a citizen of the United States unless 75 per centum of the interest therein is owned by citizens of the United States and the corporation itself is organized under the laws of the United States, or a state, territory, district or possession thereof." Then, in order to preclude the possibility of colorable ownership of stock, the following paragraph was inserted in the section: "Seventy-five per centum of the interest in a corporation shall not be deemed to be owned by citizens of the United States (a) if the title to 75 per centum of its stock is not vested in such citizens free from any trust or fiduciary obligation in favor of any person not a citizen of the United States; or (b) if 75 per centum of the voting power in such corporation is not vested in citizens of the United States; or (c) if, through any contract or understanding, it is so arranged that more than 25 per centum of the voting power in such corporation may be exercised, directly or indirectly, in behalf of any person who is not a citizen of the United States; or (d) if by any other means whatsoever control of any interest in the corporation in excess of 25 per centum is conferred upon or permitted to be exercised by any person who is not a citizen of the United States."

And lastly, for the purpose of closing any loop-hole that might remain, it is declared that the provisions of the act shall apply to receivers and trustees of all persons to whom the act applies, and to the successors or assignees of such persons.

In short, if, through any of the methods suggested in section 38, the interest owned by citizens of the United States in any domestic corporation ever falls below 75 per cent, that corporation automatically ceases to be a citizen of the United States if engaged in operating ships in the coastwise trade.

The consequences resulting from such loss of citizenship are extremely serious. Section 18 of the Merchant Marine Act, operating as an amendment to section 9 of the Shipping Act of 1916, provides that Shipping Board vessels sold, leased or chartered by the board to any citizen of the United States, may engage in the coastwise trade while owned, leased or chartered by such citizen. This language constitutes a conditional authorization to engage in the coastwise trade **so long and only so long** as the citizenship of the operator is retained.

Although this conditional authorization has reference to Shipping Board boats only, the right to operate any vessel in the coastwise trade must likewise be conditional, for it is the exclusive privilege of citizens of the United States. With the loss of citizenship there must inevitably be a cessation of the privilege no matter what the character of the ship. This is clearly the intention expressed in section 38, which in terms makes the test of stock ownership applicable to a corporation operating **any ship** in the coastwise trade. In effect, loss of citizenship by the introduction of alien stock in excess of the prohibited percentage, invalidates the enrollment or license of the ship. Apparently the section operates as a repeal of the act of 1825, which specifically negatived such a result. In any event it is obvious that the operation of any ship in this trade, after loss of corporate citizenship, is a distinct violation of the law.

Prior to the passage of sections 18 and 38 of the Merchant Marine Act, a ship operating in the coastwise trade with invalid documents was probably subject to forfeiture. In some cases the master and in others the owner was subject also to fine, depending upon the character of the offense. But the fines were small and in most instances the statute fixed five hundred dollars as the maximum amount.

The penalties prescribed by section 18, however, include not only forfeiture of the ship, but also punishment of guilty operators by fine not to exceed five thousand dollars or imprisonment not to exceed five years, or both. In addition, section 27 provides that no cargo shall be transported in violation of the coastwise trade law on penalty of forfeiture, though this provision is merely a re-enactment of prior law.

It is submitted there is an important distinction with respect to penalties depending on the character of the offending ship. The heavy fine and imprisonment prescribed by section 18 attach, so far as this discussion is concerned, only in case of violation of the coastwise provision of the section by Shipping Board boats, for they are the only ships to which the conditional authorization applies. Other ships, even though operated unlawfully, are not operated in violation of this section, and hence the peculiar penalties of the section should not be acted. The same argument can be advanced with regard to forfeiture. Even though Shipping Board boats operated coastwise in violation of the section are forfeited, the unlawful operation of other vessels in this trade constitute no violation of section 18, and should not lead to forfeiture unless they would have been forfeited independently of the section. This distinction may well be of considerable practical importance in resisting enforcement of the penalties of the section.

However, loss of corporate citizenship is in any case unquestionably a serious matter not only to any corporation engaged in operating ships in the coastwise trade, but to its shippers as well. If the consequences, severe though they be, fell only upon consciously guilty violators of the law, there would be no warrant for attacking its validity, even though its wisdom might be open to question. Unfortunately, however, this section, unless its teeth be drawn by judicial construction, bids fair to be productive of wholesale and shocking injustice, for its penalties are visited not only upon the guilty few, but also upon the innocent and wholly unsuspecting many.

The most casual reading of section 38 cannot help but disclose the perilous position of innocent stockholders and shippers, as well as the many opportunities for fraud afforded to the unscrupulous.

Suppose, for example, 75 per cent of the stock of a domestic corporation operating ships in the coastwise trade is owned in good faith by citizens of the United States, and the remaining 25 per cent by aliens, likewise acting in good faith. Then suppose one of the majority holders innocently sells one or more of his shares to an alien. Just as soon as that sale is consummated, less than 75 per cent of the stock of that corporation is owned by citizens of the United States, and the corporation itself has ceased to be a citizen within the meaning of the act. Its ships, which were yesterday lawfully engaged in coastwise trade, are today violating the law and forfeited to the government, together with their cargo. Its officers, who were yesterday law-abiding citizens, are today subject to heavy fine and long imprisonment. There was no conscious intent or desire to violate the law by any one, yet all concerned are ruined by an innocent act which could not have been prevented nor even discovered until it was too late.

If such disastrous consequences may flow from the sale of a single share made innocently and in good faith, how simple it becomes for an unscrupulous competitor to acquire a stock interest of insignificant value and dispose of it to an alien, for the purpose of producing the same results and thereby wrecking his corporate rival.

Furthermore, the identical consequences can be accomplished without the sale of a single share. The section provides that 75 per cent of the stock must not only be vested in citizens of the United States, but the ownership must be free from any trust or fiduciary obligation in favor of a non-citizen. Trusts and fiduciary obligations are easily created and are often secret. No one could discover the existence of a secret trust in favor of an alien until it was brought to light either innocently or maliciously, but when discovered the results are precisely the same as if the stock had been sold to an alien.

The act is also presumably applicable to mortgages designed to secure an issue of corporate bonds. If the mortgage contains any of the customary provisions giving to bondholders any right to assume control and direct the policies of the corporation upon default, and if these rights should be asserted by alien bondholders owning more than 25 per cent of the issue, it is difficult to see why such provisions do not constitute a "contract, understanding or means" whereby control of an interest in the corporation in excess of 25 per cent is conferred upon or permitted to be exercised by non-citizens. The plain language of the act would seem to support the conclusion that under such circumstances the mortgagor corporation would immediately lose its United States citizenship.

Additional illustrations of the workings of the act when applied to constantly recurring business situations can be duplicated indefinitely. The moment there is a transfer to an alien of such amount of the stock as reduces the holdings of citizens therein to less than 75 per cent, the corporation has lost its citizenship and must suffer the attendant consequences. The transfer may be accomplished either through the act of the living or as a result of death, may be voluntary or involuntary, and may have been the result of ignorance, accident or fraudulent purpose, but however brought about it operates with precisely the same effect in every case. Any coastwise steamship company can be wrecked, innocently by its stockholders, fraudulently by its competitors; and at a cost which may be only nominal and can rarely exceed approximately a quarter of the value of the assets.

Doubtless the courts will endeavor to construe the section in such fashion as to preclude the possibility of such disaster. Yet it is difficult to see how the perils of the act can be eliminated by construction without reducing it to a nullity. The section is wholly penal in operation, for it neither prohibits nor invalidates the transfer of stock to aliens. All that can be accomplished by construction is to declare the penalties inoperative, and thus in effect sanction free transfer without any penalty at all.

The disasters which flow from the section as drawn are inherent consequences of any attempt to determine the citizenship of a corporation by reference to that of any number or proportion of its stockholders. Stock of a private corporation passes from hand to hand with almost the same freedom as money. Ownership of stock possesses none of the elements of stability and permanence which should characterize a criterion for the determination of corporate citizenship. In a word, the new test prescribed in section 38 is totally unsuited to the circumstances of modern corporate organization and practice. The vice of the section lies far deeper than the language in which it is clothed and cannot be reached by resort to legitimate construction. The fundamental theory upon which it is based cannot be applied to modern business without producing most mischievous consequences.

This discussion has been confined to that portion of section 38 which deals with the citizenship of corporations engaged in the coastwise trade. It should be noted, however, that the section purports to apply a similar test of stock ownership, differing from the coastwise requirement only in percentage, to all domestic corporations operating ships in any trade. The inherent vice of the stock ownership test permeates the entire section, but the evil results produced by its application fall most heavily upon operators in the coastwise trade.

Unless emasculated by construction, the application of the section to corporations engaged in this trade is of doubtful validity. It must inevitably give birth to consequences repugnant to all principles of natural justice, and in practical operation it will apparently deprive such corporations of their property without due process of law. It therefore seems clear that the section is in conflict with the Fifth Amendment and hence unconstitutional.

If, however, the courts refuse either to render it inoperative by forced construction of its language or to declare it void, the section subjects these corporations to very serious risks and hazards which can neither be foreseen nor prevented.

NOTES FROM THE EAST

By AMERICUS

"WATCHFUL WAITING" is again in evidence in this country. This time it is the maritime world that is doing the "watching" and "waiting" for the new Shipping Board to make its bow. Authorized on June 5, it is now just three months at this writing that we have all been in a state of suspense as to who is to administer the Jones bill. However, as the two remaining members of the old board have been doing some real functioning as a board, why worry, especially as both these gentlemen are carrying out the requirements of the Merchant Marine Act of 1920 in a truly American spirit.

Of course, the sales policy has attracted the most attention, as that is the most far-reaching in importance of all the many provisions of the act. The first step has been taken toward the wholesale disposition of the government-owned fleet. Minimum rates per deadweight ton for the several classes of ships offered for sale were fixed, the proposed sale duly advertised for September 1, bids to be sealed and opened in the presence of the multitude of prospective purchasers. But—nary a bite, as our piscatorial friends might describe it. A few nibbles in the form of inquiries formed the net result of the first efforts to carry out the will of Congress toward putting the ships under private ownership. The answer is simple—the Shipping Board guessed too high as to the rates which purchasers would be willing to pay. The market for ships at this time will not listen to $160 per deadweight ton, the minimum fixed for the least desirable of the steel ships. The three principal factors—cost of new tonnage in this country, cost of the same abroad, and the remuneration from prevailing freight rates — evidently do not warrant purchasers in taking unto themselves ships which will have to carry such an overhead charge as the cost price proposed by the board. Interested parties are now watching anxiously for the next move on the part of the board. Under the authorization of Congress they are to exercise the judgment which a solvent business man would use if he did not have to dispose of his wares, but desired to sell them just the same. On that basis it would seem to be probable that the next step will be to weigh carefully all the prevailing conditions, try another sale at a lower minimum tonnage rate, and hope for better results. If that doesn't succeed, then try, try again, and we are all wondering what sale value will catch the purchasers.

The arrival of the veteran and astute shipowner, Captain Robert Dollar, from Europe just a fortnight before the date fixed for the sale and his widely heralded statement that he was offered new tonnage in the United Kingdom at about twenty pounds per ton, had somewhat of a bearish effect on the sale. It is rumored that the ships offered him at these cut rates were those which had been built for Scandinavian owners anxious to get out of what they considered a bad bargain at this time. The doughty captain, however, did spread some rays of hope for the American merchant marine, quite contrary to his usual pessimistic views, if only we can get rid of some of the pesky navigation laws which act as a millstone around the necks of American owners. Of this there is considerable hope, when the Shipping Board submits the re-codified navigation laws to Congress early next session.

Section 23, or the tax exemption clause of the Jones act, seems to be the most immediately useful phase of the new legislation. Already the board has approved types and plans of over thirty new vessels having a deadweight tonnage of 300,000 tons. The bulk of these, however, are tankers already commenced in private yards but not yet paid for, even in part. From present indications there will be many more new ships constructed under this arrangement, and it will be a boon to the shipbuilders as well as making welcome additions to our already large fleet of merchantmen. The board quite wisely stipulated that one of the conditions upon which new vessels, to secure the benefits of this exemption, would meet with its approval, is that they be classed with the American Bureau of Shipping. It might also and very consistently demand that such ships be insured in American companies, both of these conditions being wholly compatible with the spirit of the Jones bill, as announced in its preamble.

Among the largest ships contemplated to be built under the tax exemption clause are two, and possibly four, new intermediate passenger ships for the International Mercantile Marine. Reports have it that these ships are each to be 600 feet long and be propelled by electric drive machinery of about 20,000 horsepower. With these new ships, the re-conditioned German ships, and several of the 535-footers built for the Shipping Board, all engaged in the North Atlantic trade, it will not be nearly as difficult to go to Europe under the American flag as it has been heretofore. For a number of years to come, the transoceanic travel is expected to be very heavy. Americans like foreign travel, and ever since 1914 this privilege for purposes of pleasure has practically been denied them, owing to the war conditions. It is estimated that we will have not less than twenty-five American vessels engaged in this European passenger trade within the next three years, so we should be able to corral much of the passage money Americans have, in the past, been putting into the coffers of foreign shipowners.

The placing of new contracts for building has been very slow for the past two months, but the prospects now seem to be brighter. In addition to the tax exemption ships, there are renewed inquiries for oil tankers and motor-driven ships. The Pacific Coast has evidently scored in the much discussed contract for six new tankers for the Anglo-Saxon Petroleum Company, Ltd., of London. Those ships have been talked of for over six months now, and in fact their actual construction was begun several months ago in one of the Delaware River yards, only to be cancelled owing to difficulties in financing on the part of the builders. It was then rumored that the contract had been placed in a Seattle yard; this also fell through. Now it is very positively asserted that three of them are to be built by the Union Construction Company and the other three by the Southwestern Shipbuilding Company. They are ships of 8100 tons deadweight, and as contracts go these days will make a very desirable addition to the work in hand at these yards. Considering that a number of Eastern yards were in competition for these same ships, it is quite a noteworthy incident that the contracts were finally placed on the Pacific Coast, especially in view of the apprehension felt by some of the Pacific Coast builders themselves, that they could not compete with the Eastern yards when shipbuilding gets on an even keel. True, normal times have not yet arrived, but many Eastern yards can take on more contracts than they now have, so in any event the days of real competition are at hand.

More than usual interest has attended the recent speech of Senator Harding wherein he dwelt quite at length on our merchant marine problems. His attitude regarding adjustments in favor of American ships is a very commendable one, and probably his sentiments were best expressed when he stated that if we insist that our ships must have the unusual exactions of the Seaman's Act placed upon them we "should make some adjustment to meet the situation." This it must be understood is not the usual ante-election buncombe handed out by candidates for political preferment, for Senator Harding was one of the most ardent advocates of a broad, constructive policy toward our merchant marine while he served in the Senate. He was a member of the Committee on Commerce when it conducted its extensive hearing into our shipping needs at the last session, and was one of the most regular of the attendants. Consequently, he has had an unusual opportunity to become posted on maritime conditions. Governor Cox, the other candidate for the presidency, has not as yet expressed himself publicly as to his attitude, but there is little doubt but that his views are equally as liberal from the fact that his party, during the last eight years of responsibility for the administration of governmental affairs, initiated and sponsored the revival of our shipping. Fortunate indeed is it that the future of the merchant marine is not made an issue in the political dickering prior to this presidential election.

This day, September 3, is the end of the ninety-day period allotted by the Jones bill for the executive to give notice of the abrogation of certain treaties with foreign governments which would prevent the application of preferential treatment to the American ships in the matter of duties, etc. The State Department has advised that no troubles need be apprehended on account of such abrogations, as the twenty-seven treaties which will have to be scrapped are mostly antiquated and pertain to conditions which now no longer exist. It will be interesting to note the course of events in this connection.

The Merchant Marine Act of 1920, as before noted, is certainly filled with great possibilities for the benefit of all who are interested in American shipping, and that means, either directly or indirectly, everybody in the United States.

JAPANESE IMPRESSIONS AT GENOA

JAPAN acquiesces in the principle of a specified number of hours of work for seamen, but does not agree with the maximum of forty-eight hours a week, as proposed by British labor representatives at the International Seamen's Conference at Genoa; instead, Japan agrees to and on some ships is now allowing a forty-eight-hour week in port, but holds that a fifty-six-hour week, or eight hours a day for seven days a week at sea, should be decided upon by the members of the League of Nations. Although the proposal to limit the number of hours' work was defeated by one vote, the question should be considered again and decided. These statements summarize the conclusions of Kakichi Uchida, former vice-minister of communications of Japan and one of the two Japanese government delegates to the recent conference in Genoa, who passed through the United States on his way to Japan in September.

Three Questions Solved

Of four principal questions considered by the conference, said Mr. Uchida, three were solved. These were the codification of laws relating to seamen, which was recommended by the conference to the several governments; the employment of minors, as to which the conference decided that a minimum age of fourteen years should be fixed; and, finally, the conditions of service at sea. Only on the number of hours that men should work at sea was there hopeless disagreement; yet, as stated, one vote defeated the proposal, and this in spite of the fact that the government delegates of Great Britain, Portugal, Japan, Norway and Sweden voted against it. On the other hand, some of the inland states of Europe, which have no merchant marines and scarcely can be expected to develop any within the immediate future, favored the limitation.

France already prescribes a maximum of hours, said Mr. Uchida. Great Britain was not ready to accept the French system in toto; the discussion stumbled also upon the extension of the rules to the stewards; but, on the whole, the inability of the British shipowners and seamen to arrive on some common ground was a potent factor in defeating the plan. The United States, not being a member of the League of Nations, was not represented, of course, except informally by officers of the Seamen's Union, so that the decisions of the conference do not affect America directly.

Shipbuilding Is Slow

Like most foreigners who visit Europe at this time, Mr. Uchida returned with on the whole a gloomy impression. Italy, being the country in which the conference was held, naturally came under his observation to a greater degree than did any other state. In reply to a question as to the general situation in the peninsula, he replied by quoting Italians, who said to him that, if revolution did break out in Europe, Italy would be the first nation to crumble. Nor are ominous signs lacking; street-railway, railroad and even restaurant strikes were declared during his stay in Genoa, said Mr. Uchida, the railroad strike, in particular, virtually paralyzing the northern end of the country, so that some members of the Japanese delegation who had gone to Venice were compelled to cross the peninsula by automobile in order not to be late for the opening of the conference. Shipbuilding in Genoa was progressing very slowly, although there were many vessels in different stages of construction; and operation was not such as to warrant optimism. Because of the unfavorable conditions of operation, due to depressed rates and other untoward influences, Mr. Uchida was inclined to be doubtful of the success of the experiment of the Garibaldi Society, an organization of Italian seamen, which purchased and is operating four or five vessels. Mr. Uchida had an opportunity to learn of the details of the society's operations, which, he said, were those usually employed by any shipping corporation, with reserve for depreciation, etc., provided for, and the regular union scale of wages being paid; the profits, however, going to the union instead of to "capitalistic" stockholders. But the union members apparently are nothing less than stockholders; and Mr. Uchida saw no reason why the venture should not be a success in favorable circumstances.

British Costs High

Mr. Uchida was inclined to believe that British shipbuilding costs were at least as high as American, or perhaps higher, as other recent visitors to the United Kingdom have stated. British shipowners, he said, believed that they had the advantage of American operators because of their longer experience in operation; although the principal subject of discussion, as regards the States, was the Merchant Marine Act, which had aroused considerable spirited opposition.

Regarding a new trans-Pacific cable, which he proposed last year to a group of Japanese business men, Mr. Uchida had nothing positive to report. He did not believe that the United States would grant a license prior to the international conference on communications; and the Japanese government, on the other hand, has returned no definite reply to the request of the Commercial Pacific Cable Company for landing rights in Japan. Mr. Uchida indicated that an agreement might be sought with the Commercial line, but just what this would be is uncertain. No company has been incorporated in Japan for the laying of a new cable, although Mr. Uchida said that he expected to give this his attention upon his arrival. Whatever is done, the necessity of having cable manufactured in England, which already is rushed with work, will delay opening of a line for a few years, at least.

MARITIME MATTERS IN EUROPE

Some Observations by an American Shipbuilder

GEORGE A. ARMES, president of the Moore Shipbuilding Company, Oakland, Cal., returned in September from a trip of three months through England, France, Italy, Holland, Germany and Scandinavia, in the course of which he visited numerous shipyards and Diesel engine factories. As a result of this extended journey Mr. Armes has brought back to the States interesting views regarding shipbuilding and, secondarily, ship-operation in Europe, especially as they affect the United States.

British Costs Higher

For the immediate present, at least, shipbuilding costs in the United Kingdom are higher than they are in the United States, regardless of the low prices for tonnage being quoted by British owners. Three different factors of great weight at the present time tend to place England at a pronounced disadvantage, said Mr. Armes. British builders must pay more for steel than do the American yards; coal costs are greater; and, finally, the great advantage of the past has been lost, in that labor, despite lower wage-scales, actually is costing more in England than in the United States because of the go-slow attitude of the workmen.

So pronounced have been price-fluctuations and so perplexing the uncertainties under which British builders have been compelled to labor, that no yard will quote a contract price for a new vessel; instead, builders insist upon "time and lime," which corresponds roughly to the "cost plus" system in vogue during the war in America. In view of this policy, no one could say with certainty what are the current quotations for new tonnage; but, as Mr. Armes summarized the situation, outlined above, building costs necessarily are greater than they are in the United States because of the prices of steel and coal and the relatively expensive labor.

Some Vessels at Low Prices

Nevertheless, completed vessels have been offered at low prices. Mr. Armes heard of three at the equivalent of $94 a deadweight ton (current exchange). These vessels, however, had been laid down before or during the war; work had been suspended for one reason or another, with consequent deterioration of that portion of the hull already constructed; the builder, having received payments on account, was in a position to complete the vessels and dispose of them for prices much less than those he would demand for constructing new tonnage. Another element that must be weighed is the condition of the money market, which has led many Norwegians to cancel, or seek to cancel, contracts for vessels, and to dispose, at low prices, of vessels already built. To such a degree have owners carried this effort to escape from their contracts that one Norwegian offered a large sum, several hundred thousand dollars, in fact, for release; the proffer was declined by the builder, however, inasmuch as the ships had attained a stage that necessitated completion.

On the operating side, there is, as American observers have emphasized, little of a rosy nature. Mr. Armes did not visit the Clyde or Belfast; but at Newcastle on the Tyne some 2000 vessels were tied up, either awaiting repairs at the different yards or unable to sail because of lack of fuel.

With Mixed Emotions

The British attitude toward the American merchant marine is curiously mixed. Representative men speak of co-operation between America and Britain, as they have been speaking for months; but in the next breath they urge that America, as a great producing nation, may profit most by turning its attention to production, leaving to Britain the work of transporting our goods overseas. On the whole, however, Britain, in common with other maritime nations of Europe, is palpably worried by the unparalleled pnenomenon of an American merchant marine; yet, again, despite the industrial chaos from which the United Kingdom is suffering, the British, in Mr. Armes' opinion, remain most dangerous rivals, to compete with whom requires the best efforts of the United States, and most especially necessitates a widespread interest through the inland country in the merchant marine. There is one way, perhaps only one way, of creating and cultivating this necessary ship-mindedness: the investment, by the inland states, in shipping securities; which also would be demanded by the very magnitude of the financing required for the purchase of the Shipping Board fleets. No financial power, or groupings of power, could take over the vessels for private operation; hence, the imperative necessity of enlisting the general public, which naturally would be deeply concerned in the success of an American merchant marine once its money had been invested in ocean vessels.

American Competition Felt

American competition has been felt keenly by other nations of Europe. As an example of how the entrance of American vessels into European waters has disrupted trade routes, Mr. Armes cited a tale recounted by a shipowner whose vessels had been transporting cargoes from Italy to the United Kingdom for transshipment to the United States. Prior to the appearance of American vessels in Italian ports with cargoes from the States, good freights had been received for the freights destined to Britain and thence to America; but the competition of the Americans, who sought cargoes for the westbound voyage, had cut rates to the bone.

In Germany Mr. Armes saw great potentialities of recovery, once the people were convinced that the Allies had been brought to the best possible terms they would grant. Yet, for the present, shipbuilding is in a chaotic condition. The Bismarck, the world's largest steamship, of 56,000 gross tons, 1700 tons more than the Leviathan, building at Hamburg for the Hamburg-American Line when the war broke out, has been launched and her machinery has been installed; but she still lacks woodwork and finishing. Her contract price was 72,000,000 marks, approximately $18,000,000; but now the prodigious sum of 156,000,000 marks is demanded merely for her completion. Such a demand can be traced in large part, of course, to the depreciation of German currency.

Italy Worst Disorganized

Of the countries of Western Europe, Italy probably is the worst disorganized. In terms of necessities, wages are low, and the laborers are acting in a most radical manner, such as seizing factories and other industrial plants. And, in general, Europe is greatly disturbed, even Denmark showing marked signs of unrest.

Much of Mr. Armes' time was spent in Diesel engine shops, for a primary object of his visit to Europe was to conduct negotiations for the acquisition of license rights by the Moore Shipbuilding Company. Consideration still is being given to the Diesel engines, but, except that the Moore yard intends to construct Diesels, no statement of policy has been made.

ERRATA

ON page 80 of Pacific Marine Review for August the caption under the cut showing the motorship San Francisco was in error. The caption should have read "Motorship San Francisco of the Johnson Line of Stockholm."

Our attention has also been called to an error in the article in the July issue describing the electric furnace economizer. Figures given in this article attributed to this economizer a saving of ten to fifteen pounds per ton of steel in the use of graphite electrodes. These figures should have referred to amorphous carbon electrodes. The Electric Furnace Construction Company claim a saving of twenty per cent on graphite electrodes.

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J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor
[illegible] BRAY . . . . . . Pacific Coast Adv. Mgr.

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THE OUIJA BOARD

FOUR months ago, on June 5, the Merchant Marine Act, having been passed by both houses of Congress immediately prior to adjournment, was signed by President Wilson. Immediately a chorus of enthusiastic approval arose from all sections of the country, for the act was regarded as the first clean-cut, constructive measure in behalf of our merchant marine. Caustic criticism of some sections of the act followed hard upon the first favorable response; but, on the whole, the law, although admittedly not perfect, appeared to meet the general demand for proper legislative support of our shipping. Whether the Merchant Marine Act be good or bad will be determined by time, and by careful consideration; its weaknesses, if such be found to exist, can be remedied; but, whether the act be good or bad, strong or weak, ill-advised or no, the people of the United States, and especially the maritime interests, have the right, hitherto unquestioned, of expecting the executive department of the government to enforce laws passed by Congress.

"Authorized and Directed"

That the executive department has not done. In one monumental instance the President virtually has refused to obey the clear and unmistakable mandate of Congress. Section 34, after reciting that the judgment of Congress is that treaties restricting the right of the United States to impose discriminatory customs duties and tonnage dues on foreign or American vessels should be terminated, continues: "and the President is hereby authorized and directed within ninety days after this act becomes law" to notify foreign governments of the abrogation of such portions of treaties as restrict the power of the United States to impose those duties.

The ninetieth day after the approval of the act by President Wilson was Friday, September 3. Although he was "authorized and directed" by the act to give notice to other governments; although the language of the act certainly is mandatory; although he himself approved the bill, President Wilson did not move to comply with the law.

Not Altogether Unprepared

For this we were not unprepared. At first we read in the nawspapers that the Department of State doubted its ability to complete the study of the different treaties affected (twenty-two in all) within the ninety days allowed. Then Secretary of the Interior Payne, in a remarkable letter to the Chamber of Commerce of the United States, made public late in August, suggested that we might "confront the practical difficulty that we have no right to trade with other countries since our right in this behalf rests on the treaties affected"—a letter that, in the light of more recent developments, manifestly was an inspired utterance of the administration. September 3 came; September 3 passed; and the foreign governments concerned were not notified of abrogation of the treaties.

What laws Congress may pass in behalf of our merchant marine will mean nothing if the laws are not enforced; one almost might say that the policy adopted matters little in comparison with the manner of its enforcement, for certainly a faulty law enforced is preferable to the best possible act that is permitted to lie without use. But this truly amazing failure (refusal would be a juster word) of the executive to carry out the plain will of Congress is not the only glaring instance of the vacillation that characterizes the conduct of our policy.

Meant August, 1921

By the Merchant Marine Act the President was authorized to nominate a Shipping Board of seven members. The Associated Press, advised by one of the secretaries to the President, announced in July that action might be expected early in August. Perhaps the secretary meant August, 1921; at least, August, 1920, has passed, and we still have a board of two members.

That board of two members feels itself sufficiently empowered to formulate and enunciate a sales policy, under which, conceivably, the entire fleet of the Shipping Board might be sold; the board has approved that noteworthy agreement between the American Ship & Commerce Corporation and the Hamburg-American Line; the board, yet again, consistently delays in drafting a new operating agreement, despite the fact that the old agreement was abrogated as of March 1, as a result of which the operators are in complete ignorance of their status. Evidently (if reports received from different sources are correct) no agreement will be drafted until the new board is appointed, although much weightier problems are disposed of promptly; and apparently President Wilson has no intention of immediately nominating a board.

The Hog Island Yard

Let us consider the Hog Island yard. In August we read that Assistant Secretary of War Williams stated that "the government never really did intend to sell Hog Island." A few days later the Shipping Board offered the yard for sale; the receipt of bids was postponed, however; and today the probable disposition of the plant may be left to the ouija board. And there is the case of the Leviathan: that gigantic vessel has been lying at a Hoboken dock since September, 1920, at a cost, according to the well-informed New York Journal of Commerce, of $5000 a day. There she remains, the greatest white elephant the maritime world ever has seen, stall-fed at a cost of $1,800,000 a year.

While we thus back and fill the British sail on steadily. There is that demand made by the Indian government on the Pacific Mail for an accounting of profits made during the war by vessels operated by the company between San Francisco and India. That demand is based upon an act passed April 1, 1919, retroactive for one year, which imposed a discriminatory excess-profits tax on all vessels other than British touching at Indian ports. Such a model law might awaken our government to the necessity, even desirability, of doing something definite and doing it now.

Full Speed Astern

Full speed ahead, hard astarboard, full speed astern, hard aport, done with engines, drop both anchors, full speed ahead again, here we go, bound from San Francisco to Yokohama by way of Apia, Samarang, Aden, Callao and the North Pole. Who is to blame, the ouija board may declare. The spectacle may not make the angels weep, but it most certainly does arouse John Bull's laughter. When our government comprehends that thinking and acting in straight lines can be accomplished, even by government, our ship owners and operators will have a chance in the world struggle. They have no chance whatever without something approaching consistency in Washington: the best policy is worth less than a Soviet kopeck unless carried out promptly and harmoniously.

NATIONAL MARINE EXPOSITION

DURING the week of October 18-23, 1920, the National Marine League will hold a great national marine exposition in the Coliseum at Chicago, and it is hoped to make this exposition a greater success than that held in the spring in the Grand Central Palace, New York City. It is very fitting and proper that this second exposition should be held in a great shipping center of the Middle West because it is necessary that the attention of the voting population of this great section of America should be focused on the importance of America's merchant marine in its relation to the maintenance of inland prosperity. The exposition will also be of very great service to the lake and inland water transportation problems by impressing the public of the entire country with the seriousness and magnitude of those problems, and it will also be of great benefit in directing the attention of the entire country to the great new project for a deep waterway from Chicago to the sea.

Both of the great political parties, Republican and Democratic, are pledged to the development of inland waterways so that these problems, not being party issues, it is necessary for non-partisan bodies like the National Marine League to keep these issues alive in the minds of the people at this time and to so focus the attention of voters upon them that the party pledges which recognized the importance of connecting the Great Lakes with the sea, both by way of the Mississippi and its tributaries and by the St. Lawrence River, shall not be forgotten after election.

A great marine exhibition, properly staged and given adequate publicity, should draw to Chicago the farmers and the manufacturers of the entire Central West and should go far toward crystallizing the splendid marine sentiment which has grown up in that section during the war emergency shipbuilding period.

SHIP TURN-AROUND

IN an editorial under the above heading in the September issue of Pacific Marine Review we called attention to figures compiled by the Division of Operations of the United States Shipping Board, showing the delay to ships in American harbors. These figures covered eighty-six vessels, whose average tonnage was 6388 deadweight, and they indicated a thirty-five-day turn-around for these ships, this being the average of sixteen American ports. In contradistinction to these figures, we would draw our readers' attention to the favorable turn-around of vessels operating on regular schedules under private ownership not subject to government control.

The Matson Navigation Company, operating between San Francisco and Honolulu, with steamers carrying from two hundred and fifty to three hundred passengers and from 8500 to 10,000 tons of general cargo outbound from San Francisco and of raw sugar, molasses, canned pineapple, and miscellaneous cargo inbound to San Francisco, makes an average turn-around at each end of seven and one-half days, regular schedule, which, in cases of emergency, has been decreased to five and one-half days. These steamers regularly unload their passengers and baggage and from 1000 to 1500 tons of canned pineapple and miscellaneous freight on the San Francisco waterfront. They then proceed twenty-five miles up the bay to Crockett, where they unload the sugar. They drop down to Richmond and take on fuel oil; then over to the San Francisco waterfront and load from 8500 to 10,000 tons general freight, take on passengers and baggage, and accomplish all of this in the seven and one-half days aforesaid. Sometimes these vessels are delayed for a few hours by fogs in entering San Francisco Bay, but this time is made up without trouble and they are practically on schedule time within an hour or two at the dock in Honolulu; in fact they make much better schedule time on an average than transcontinental freight trains.

This turn-around is mainly due to efficient management and to the vessel's design, which lends itself to economic handling of cargo. The ships are liberally equipped with cargo-handling machinery, and the location and spacing of the hatches have been studied out very carefully, as has also the location of side ports, which are liberally provided and used to great advantage. The same turn-around is maintained at Honolulu, notwithstanding that neither at the Honolulu nor the San Francisco docks is there provided any special machinery for handling cargo, except that used for stowage purposes inside the wharf sheds.

This is no argument against the use of cargo-handling machinery, but is cited here to show that management is even more necessary. We may have our docks, wharves and quays equipped with machinery of every description capable of handling enormous quantities of merchandise, but if that management which brings the ship and the cargo together at the dock simultaneously be lacking, of what use is the machinery? Given the cargo on the dock and the ship alongside, the machinery may very materially reduce the cost of handling that cargo and also reduce the time required for stowing it properly in the ship's hold.

AMERICAN-HAWAIIAN RESUMES

ANNOUNCEMENT has been made by Williams, Dimond & Company, general agents for the Pacific Coast of the United American Lines, that the intercoastal service of the American-Hawaiian Steamship Company would be resumed with the sailing of the steamship Hawaiian from New York October 2. Sailings approximately every three weeks will be maintained with the American-Hawaiian steamships, but this service and that of the European-Pacific Line, operated by Williams, Dimond & Company with Shipping Board vessels, will be virtually one. The European-Pacific Line has about three sailings a month westbound, the number varying with the European ports of call of the vessels, which, as they are nearer or more remote, operate to increase or decrease return voyages to the Pacific. Of the pre-war fleet of twenty-six vessels, the American-Hawaiian has sixteen remaining, the other ten having been lost or sold.

Prior to the outbreak of the war, the American-Hawaiian, possessing at that time the largest fleet under the American flag, operated its fleet in the intercoastal trade and between the Hawaiian Islands and the East Coast, first via Magellan, thereafter via the Isthmus of Tehuantepec and the Panama Canal. During the first years of the war the company continued in the Hawaiian trade, transporting sugar from the islands to the East Coast via the Panama Canal, but also used some of its vessels in the trans-Atlantic service. When the Panama Canal was blocked by slides in 1915 and 1916, the company suspended the interoceanic service between Hawaii and New York and Philadelphia, but assigned two vessels to the Hawaii-San Francisco run, and thus transported sugar, consigned to Eastern refineries, to San Francisco for overland shipment by rail.

This service also was abandoned, and contracts were made between the Hawaiian Sugar Factors and Crockett and Western refineries for the sale of the entire crop of island sugars in San Francisco. These cargoes are being handled by the Matson Navigation Company. During the last few years the American-Hawaiian has been engaged in the trans-Atlantic trade, some of its larger vessels having been converted into army transports. Inasmuch as the entire Hawaiian sugar crop is being sold on the Pacific, the American-Hawaiian will not resume its island service, except that some vessels might be sent to Honolulu during the height of the canned pineapple movement; as to this, however, no definite decision has been made.

The United American Lines is the operating company of the Harriman group, and, so far as the American-Hawaiian is concerned, has succeeded Livermore, Dearborn & Company. Ports of call on the Pacific will be Los Angeles, where the agents are McCormick & McPherson; San Francisco, Williams, Dimond & Company; Portland, Columbia-Pacific Shipping Company, and Seattle, W. C. Dawson & Company.

Consideration also is being given by the United American Lines to the restoration of the Kosmos service of the Hamburg-American, which was suspended when the war drove German shipping from the seas. Formerly, the Kosmos steamships plied between Europe and the Pacific via the Straits of Magellan, although the line was preparing to use the Panama Canal upon its opening, but war intervened. The service, when restored, probably will be via Panama. The restoration of the Kosmos service would be by the provisions of the agreement recently executed between the

American Ship & Commerce Corporation and the Hamburg-American Line.

In addition to the restoration of the American-Hawaiian and the contemplated restoration of the Kosmos service, the United American Lines may open a New York-Panama-San Francisco-Oriental line.

A formal announcement issued by the United American Lines says: "The services heretofore conducted by Livermore, Dearborn & Company, Inc., from New York to Java and Straits Settlements, New York to North Africa, Egypt and the Levant, New York to West Coast of United States of America, will be continued and augmented. In addition, services will be established between United States ports and Germany, including a direct passenger line between New York and Hamburg. The executive and traffic departments will be temporarily located at 48 Front Street. The operating and accounting departments are at 8-10 Bridge Street (New York). Announcement of their removal to 39 Broadway, where all offices of the United American Lines, Inc., will eventually be housed, will follow shortly."

The return of the American-Hawaiian emphasizes the growing importance of the intercoastal service, to which the Luckenbach company has returned; and which has been entered also by the new lines of the North Atlantic & Western, Isthmian, Atlantic, Gulf & Pacific, Pacific-Caribbean-Gulf, Pacific Mail, European-Pacific, and also by the Robert Dollar Company. Besides all these, new Panama Canal services are being planned by other companies.

OUR MERCHANT MARINE

A Suggestion to Congress for Its Aid

By C. S. STANWORTH, U. S. Navy, Retired

WHAT is the present condition of the United States merchant marine, and what are the relations of the United States government to it? We have afloat and building about sixteen million tons of merchant ships, about twelve millions being owned by the government, and which by law the United States Shipping Board must finally sell to private owners.

The United States navigation laws, the La Follette act, the Jones bill, evidence the interest the government has in the merchant marine, and lay restrictions on private ship operators.

Is this interest on the part of the government justifiable?

Before 1914 the bulk of our foreign trade was carried in foreign bottoms, as these ship-owners could build and operate ships at less cost than American ship-owners. This seemed an economical and desirable arrangement.

But we were desirous of extending our foreign trade, and were in competition with manufacturing nations who carried the bulk of our exports, and various hampering restrictions sprang up, combinations of ship-owners raised freight rates. These, being gradual encroachments, escaped general notice.

In 1914 our export trade in foreign bottoms broke down, and the whole country realized it was not wise and economical to be entirely dependent on foreign shipping.

Another interest is equally apparent. The British Empire has spared no expense in maintaining the most powerful navy in the world, and her merchant marine in war is a vital necessity to bring food and supplies to her shores. Yet when war was declared England found it necessary to withdraw a large percentage of her merchant shipping from their supply trade, and use them as necessary adjuncts to her fleet.

No government can maintain a navy in peace fully equipped for war, without depending upon her merchant shipping for necessary supply ships if war comes, and the navy is called into action.

If no merchant fleet exists, money appropriated for a navy is an idle expenditure, for while merchant vessels can be bought, American crews cannot.

Equally necessary with the ships is that they must be officered and manned by United States citizens, and the government must see that this is done.

Our government requires of ship operators a wage and food scale for the crew that is more expensive than obtains on foreign ships.

The country is fully awake to the necessity for American shipping.

Ship operators must meet foreign competition handicapped by government requirements of higher wages and better food. Since this handicap is of government origin, and because the full value to the country of a merchant marine can only be realized when the ships are manned by Americans, the government should pay the extra costs for the employment of American sailors, and the ship operator should only pay the same wage and food costs that foreign ships in any line of trade pay.

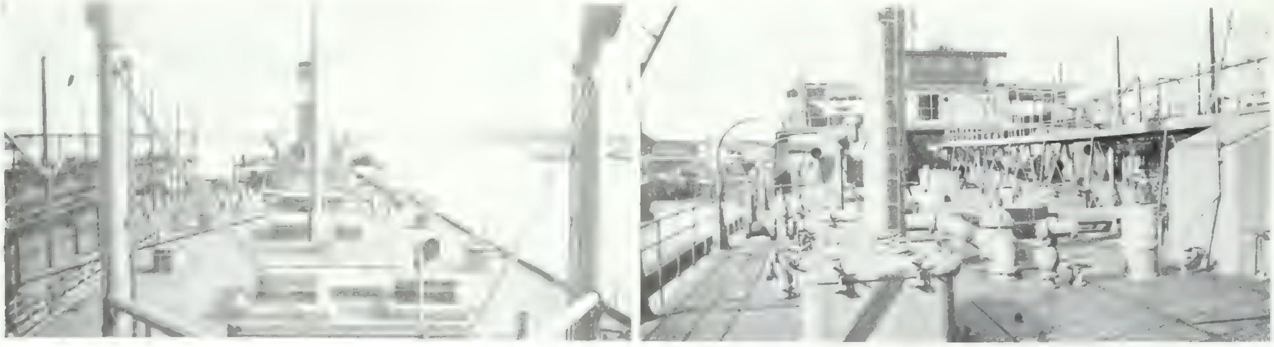
This is not a bounty or subsidy, but is a subvention, as the government gets full value received, as it is paying only a percentage of the wage and food costs of a necessary branch of the navy, where it has to pay all costs.

The government aid is based upon American flesh and blood, improving in value with every voyage, not on insensate steel and wood, constantly deteriorating, and this policy dates from the first land bounties and homestead laws.

This subvention would cost less than forty million dollars, which compares most favorably with the annual appropriations for the navy.

How should this fund be provided, it being desirable that an annual appropriation be avoided?

The value of our imports brought in on merchant ships is over two billion dollars a year. A ship duty tax of 2 per cent on all imports, covered into the treasury as a separate fund for ship maintenance, provides the necessary money, and the ships that bring in the imports, whether foreign or American, are helping to provide the fund for maintenance of American shipping. There is no discrimination between American and foreign shipping, and it will not be necessary to modify existing treaties.



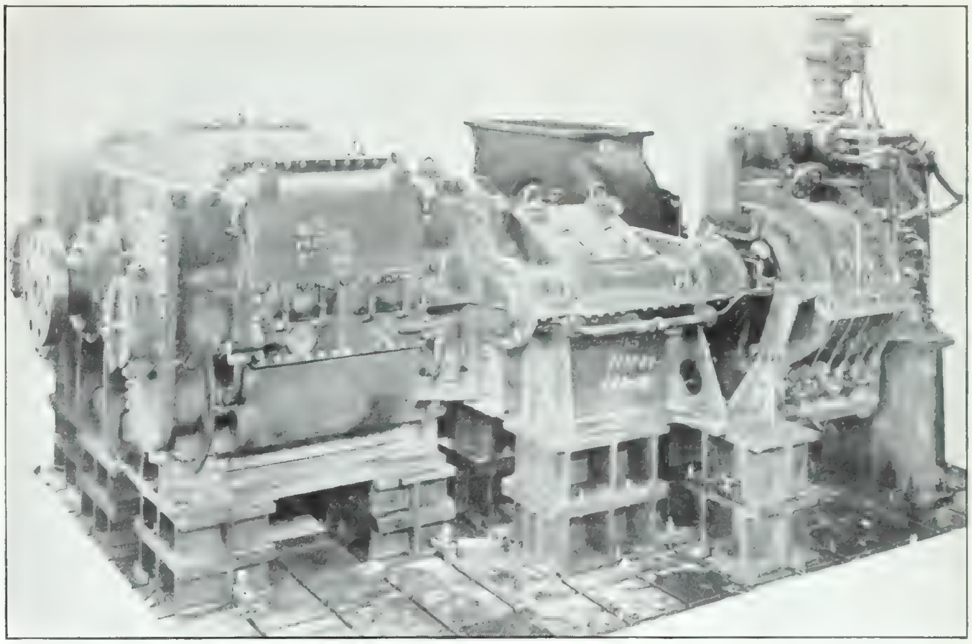
NEW PHILIPPINE TRANSPORTS

On August 13 the United States Army transport Cantigny ran her official trials on the measured mile course at the Delaware breakwater. This steamer is the first of twelve army transports built and now outfitting at the Hog Island shipyard of the American International Shipbuilding Corporation for the United States Shipping Board. As these vessels are to be used on the Pacific and presumably between San Francisco and the Philippines, a description will be of interest to the readers of Pacific Marine Review.

The length of these ships between perpendiculars is 448 feet; beam 58 feet; loaded draft 28 feet ¾ inch. The ships are fitted with five decks and have quarters for 2233 men, including crew, officers, and troops. One unusual feature is the location of the hospital quarters which have been placed on the boat deck, thereby insuring to patients the comfort of ample ventilation and the removal from underdeck annoyances caused by noises incident to the living of men in close quarters and to the propulsion of the ship.

The propelling machinery consists of six Babcock & Willcox water tube oil-burning boilers and a 6000-horsepower General Electric cross-compound double-reduction geared turbine. On trials this equipment drove the hull at a speed of 16.53 knots per hour.

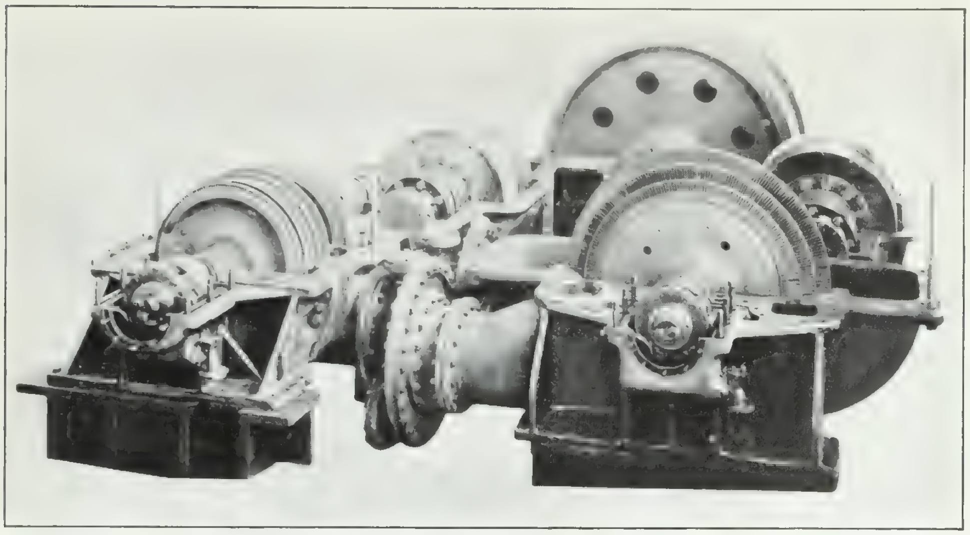
The turbines are of the Curtis type, cross-compound, and the two sections are connected to a twin drive, two-step, one-plane, speed-reduction gear set. The turbine is so arranged that either the high pressure or low pressure section can propel the ship independently in case of a breakdown of one section, the rotor in each section being connected to a separate pinion and each section consisting of three stages ahead and one stage astern. Full power is delivered at a steam pressure of 185 pounds with 75 degrees Fahrenheit super-heat. The condenser carries a vacuum of 28.5 inches.


Curtis Cross-compound Marine Geared Turbine of 6000 H. P. Completely Assembled on Erecting Floor

Each turbine section develops one-half of the full contract power in the ahead stages, and the astern stage develops two-thirds of the full torque of the ahead stage. The direction of rotation of the turbine rotors for both high pressure and low pressure sections is clockwise when viewed from the after or gear end, and the direction of the low speed gear and the propeller shaft is counter-clockwise, or left hand, when viewed from the after end. The speed for the high pressure rotor when delivering full power is 3836 r. p. m. and that for the low pressure rotor 3428 r. p. m. The speed of the propeller shaft is 100 r. p. m., so that the ratio from high pressure section to propeller shaft is 38.36 to 1, while that from the low pressure section to propeller shaft is 34.28 to 1.

The high speed reduction consists of two parts in two separate casings, one of which is bolted to the low pressure, the other to the high pressure section of the turbine. This high speed reduction consists of a flexible high speed pinion carried on a shaft connected to the turbine rotor shaft through a flexible coupling of the pin type which allows free axial movement of the pinion and its shaft. This high speed pinion meshes with a flexible high speed gear on a counter-shaft. The low speed pinion is integral with its shaft, having teeth machined on the periphery of a solid forging which is flanged on one end and solidly bolted to the counter-shaft carrying the high speed gear. Each low speed pinion meshes with the low speed gear through the agency of two intermediate gears which are of the same construction as the high speed gear and keyed to counter-shafts. The low speed gear wheel consists of a strong ribbed casting whose rim is turned and grooved to receive the gear blanks. The wheel is pressed and keyed on to the shaft and the shaft connected with the propeller shaft through the usual fitted bolt flange. All of the bearings of the turbine, gears, couplings and thrust are lubricated under pressure.

The U. S. Army Transport Cantigny on Her Trial Runs



View of the Cross-compound Turbine and Reduction Gears of the Cantigny with upper Casing Removed Showing Turbine Rotors and Helical Gears

The maneuvering valve of the turbines is of the balanced horizontal spindle type and is so arranged that the opening of the steam to the go-ahead nozzle automatically cuts it off from the astern nozzle, and vice versa. Two hand valves are provided for further controlling the steam supply to the first stage nozzles of the high pressure section when less than full speed is desired.

The cross-over connection between the high and low pressure sections of the turbine is so arranged that it may be conveniently dismantled and on an emergency connected so that steam may be used on either section alone for the driving of the ship under half power. An emergency governor is fitted to the forward end of each turbine shaft with a tripping device installed which automatically shuts off the steam in case of over-speeding or in case of failure of the lubrication system and so safeguards the unit. This arrangement of turbine and reduction gear has proven in practice to be easy of control, of great flexibility, and able to stand up well under very trying conditions. These new transports should give a very good account of themselves on the Philippine route.

ATTENTION—SHIP OPERATORS

The Following Questionnaire Has Been Submitted for Your Consideration by the Recruiting Service of the United States Shipping Board

1. Should there be a national system for training officers for the American Merchant Marine?

2. Should the training of officers be left to the private steamship companies and individuals, to be worked out and developed according to the trade and requirements of each particular company or individual?

3. On the other hand, if government assistance is necessary in the training of officers, should it be according to one of the following plans:

A. Through the continuance of the present system of having navigation and engineering schools located at the principal ports on the Atlantic, Gulf and Pacific Coasts, and on the Great Lakes, where experienced seamen are given instruction to prepare them for their examinations, or

B. Through the carrying of deck and engine room cadets on all American vessels, or

C. Through the establishment and maintenance of a maritime commerce course in some of the leading universities and colleges, located at or near the principal American ports; through the co-operation of such universities and colleges, the Shipping Board and the vessel managers, having the men first obtain some college training, then alternate between practice work in offices and on ships, and class room work, or

D. Through the further development and extension of the present system of state nautical schoolships?

E. If none of the foregoing suggestions meet with your approval, what plan would you suggest to replace officers leaving the sea and to take care of the expansion in tonnage?

4. Should men being trained to become deck officers serve some time on a sailing ship? If so, how long?

5. Should men being trained to become marine engineers be required to serve some time in a marine machine shop? If so, how long?

6. Is it practicable to raise the standard of the present licensed officers by giving advanced courses of instruction? If so,

A. What subjects would you suggest?

B. How and where should they be given?

7. Is the training of additional experienced licensed engineers on turbine engines, including electric drive, necessary and desirable?

Note.—Please add any further or additional suggestions or recommendations you may have relative to training of officers for the Merchant Marine.

PART II

1. Should there be a national training system for men below the grades of officers?

2. If a national policy is essential, should men be trained according to one of the following plans:—

A. Through carrying apprentices on all passenger and cargo vessels, or

B. Through a system of intensive training at a shore station where instruction would be given in seamanship, boat drill, compass, and other preliminary work, and followed by a sea voyage of six to eight weeks' duration on a modern ship arranged as a combination training vessel and cargo carrier, or

C. Through placing inexperienced men upon ships in regular berths in the lower positions, such as ordinary seaman, coalpasser, wiper, messman, etc?

Note.—Please add any further or additional suggestions or recommendations which you may have relative to training of seamen, firemen, messmen, cooks, etc.

PART III

1. Should the Sea Service Bureau or some other government agency be maintained at the principal American ports for the purpose of assisting in furnishing officers and men to ships?

2. If the Sea Service Bureau or some other similar agency should not be maintained by the government, through what channel and how should men be furnished to American vessels?

Note.—In answering, please number replies to correspond with the number of the questions, and subdivisions of questions, where they exist.

POWER CONSERVATION

That "20 Per Cent Reduction" in Power

By LETSON BALLIET, M. E.
Efficiency Engineer

ON page 82 of the September number of Pacific Marine Review, I said: "The crying demand is, already, for more hydro-electric development." Since I wrote those lines the power administrator of California has ordered that all power users (except for irrigation purposes) must reduce their kilowatt hour consumption 20 per cent, and that electric display signs and unnecessary lighting be discontinued.

The managers of industries are deeply concerned, and almost panicky.

One manager said, "My business is growing. I want more power. I can't curtail 20 per cent of **my** power."

Another said, "I'm going to put in a steam plant and use shavings and edgings from a nearby sawmill."

Another accused the power companies of raising the alarm to pacify the users over an increase in rates that was recently allowed.

The editor of Pacific Marine Review asks, "If we permit the use of the river waters to irrigate all the arid land in the country, what will become of the power problem?"

These and many other similar expressions bring forth the interesting question, "What can we do to be saved from a power famine?"

The answer is, Industries that want to use power must encourage and financially back more hydro-electric development, and we must use the power more efficiently.

Years ago, while engaged in engineering work in the mining regions, we learned that if we wanted power at an isolated mine on the desert or remote in the mountains we must **"go and get it"** or abandon our mines. The result is that we developed water power 100 to 200 miles away and transmitted it to the mines. Our needs for the mines forced us to get it, and get it we did. When our mines were worked out, these water powers increased their capacities, linked them together and turned the wires into the cities to augment the steam plants that were carrying the lights of the cities.

The miners were the first to extensively use water powers; it was necessity that made them **"go get it,"** but to them it was "free water power" if they bore the expense of getting it. Sometimes a whole district of mines divided the expense, but they got it, and wasted it, and prospered in spite of the waste, and then when they brought it to the industrial centers in great quantities, power users there wasted it and still waste it.

The first power companies were called "Edison Electric Light Companies" and they operated only after night fall. Later they operated in day time at part load and offered "low rates" to any who would use power motors in the day time, so as to make the light plant pay for its day operator.

In the next stage of development we see the electric companies bearing the name "Edison Electric Light and Power Company" with the word "light" preceding the word "power," for the lighting business was the principal business, with the power business merely the by-product. The electric companies in those days didn't care how much you wasted. In fact, it balanced up their load, but the rates were low for the power, and the more you used or wasted the better.

Today the tables have turned, and power loads run to from 50 to 90 per cent of the total business with lighting as the by-product. In many cases the word light has been entirely eliminated from the name. But in coming up to the present condition, the majority of power users have never learned to use electric power efficiently.

Several years ago, in writing a paper for one of the technical mining journals, I wrote, "Electricity is not a cheap power, but it is a very efficient and economical power, if you so use it."

Many present users of electric power learned its use when they paid a fixed price for the rated horsepower of the motor. They did not know and did not care to know how much current they used per month, and they can't get over their early training.

They can see a steam leak, or water leak; they can hear an air leak; they can smell a gas leak; but an electric leak is not in evidence except on the power bill. However, they can pay for it, and most of them do.

The power companies know this and they penalize the users with a rate based upon "maximum demand" or a "ready to serve" charge based upon the "horsepower of connected load." Those words in the contract don't mean much to the users, but they **fix your rate.** It gives the user a chance to earn a low rate **if he controls his maximum demand** (or peak load) and penalizes him **if he over motors** his plant, but why should the power companies care, if he wants to pay the bill.

There are some uses to which electricity is put that are flagrant misuses of the power, but nobody seems to care for economy. Cranes, elevators, hoists, air compressors and pumps are hogs in your power bill. Few operators stop to think that every extra trip costs money, that unbalanced loads cost more than balanced loads, and that every five cubic feet of air per minute compressed to 100 pounds costs a horsepower and that every extra gallon of water pumped is an expense. Air and water are **free,** they think, cost nothing, so why worry about a few extra cubic feet.

It will be interesting to mention a few instances that have come within the writer's notice where unnecessarily large power bills were caused by the misuse of power.

First was a mine hoist that required 8 k. w. h. on the meter to hoist a load from the bottom. A thousand trips a month cost the mine company $240. Every useless trip cost 24 cents, at the rate the mine paid for power. A specially designed counterbalance reduced the power consumption to 2 k. w. h. and the bill to $60 a month. Manifestly a much smaller motor was able to do the work after counterbalancing the hoist. Freight and passenger elevators come under the same operating conditions.

In the second instance, a lot of second-hand shop tools were purchased and were equipped with direct current motors, aggregating 225 motor horsepower, which was over 200 per cent more motor capacity than was required. Direct current electricity was not available, so the manager purchased a direct current generator with a three-phase motor of 200 horsepower capacity to drive it, and was penalized $200 a month ($1 per month per horsepower of the motor) as a "ready to serve fee" and then paid for all the kilowatts he used besides. The company said, "We have to be ready to serve you with 200 horsepower every minute of the 730 hours in the month, so you might as well use the power as the ready to serve fee is the same"; but the fact of the matter was that the shop actually used only about $60 worth of power per month and paid $260 for it.

Third, the selection of pumps and compressors make a big difference in power requirements. In one case a manager bought two old steam compressors, for a very low figure, as he thought, which he remodeled to be driven by belts from motors. The remodeling cost him nearly as much as a new compressor would have cost, and thereafter his power bill was over $600 a month, while another user, within a mile, bought a new compressor and had less than $100 power bill to do the same work.

Many purchasers of machinery are drawn into error by claims that a machine or motor is of a high efficiency, which may be perfectly true if you have the right kind of work for it. In fact, a cotton gin might be 100 per cent officient, but it would be expensive to try to operate it on shipboard and compete with a gin properly located in a cotton country.

In one industrial plant using a number of air compressors, I was able to discontinue the use of half the compressors and reduce the power bill $6000 a month, by a series of changes in piping and usage which stopped leaks and wastage.

In another instance I was employed to make a change in a hoisting equipment. After designing the equipment the manager was offered a much bigger hoist than I had designed (and much bigger than he had any use for) at about the same price that the smaller hoist would have cost. "It was cheap," he said. He bought it, then he found that it required a bigger motor than the other, which made it cost even more than he had planned. But that wasn't the worst of it. The hoist had been taken from its original foundations after eleven years of use and replaced with a large and more modern hoist. The old second-hand hoist was painted and was as good as new, **but it was obsolete,** and the result is that it cost this mine $425 a month for hoisting power which $75 a month would have covered with the hoist designed for the work.

These are only a few illustrations cited to show that cutting off 20 per cent of the power is not such a serious thing as it looks to be. It is likely to be a Godsend in the end, for it will force many to greater economies that will permit them to continue in business, under competitive conditions which might otherwise force them to close their doors.

As to the question of irrigation of all the desert lands making a shortage of water power, I hardly think that will be serious, for most of the lands are lower than the water powers, and the water may be used for irrigation after it has served as a generator of power. Even dams built to serve for irrigation purposes may have a by-product value in power that would not be in existence but for the irrigation dam.

Four-masted Barkentine John Ena of San Francisco Being Towed Through the Panama Canal

SAFE PASSAGE

To Panama come sailing ships
That one time braved the Horn;
Tugs tow them through the Great Canal
Of every canvas shorn.

The sailormen loll on the decks
Beneath the tropic sun,
Safe from the dangers of the Cape,
Another victory won!

C. H. C.

"But not for me," says Sailor Ben
With the expert seaman's hitch,
"Creeping along with a snortin' tug
A thru this bloomin' ditch."

"Give me a gale abaft the beam
With plenty of open sea
On Lightning racing the Flying Cloud
With Spindrift on our lea."

P. M. R.

JAPANESE SHIPPING

H. W. DEANS, formerly of the Pacific Mail Steamship Company and more recently secretary to John A. McGregor, special representative of the United States Shipping Board, Yokohama, Japan, has entered the service of Alexander & Baldwin, San Francisco office, as assistant to W. M. Alexander, president. Mr. Deans and others of the Shipping Board's Yokohama office, among whom were Mr. McGregor and J. L. Luckenbach, have returned to the United States, the Shipping Board's building program in Japan virtually having been completed. A small organization has been left in Japan and China to look after repairs to Shipping Board vessels and to supervise the construction of four vessels building in the Kiangnan Dockyard, Shanghai.

TONNAGE IS EXPENSIVE

Japanese shipping and shipbuilding have slumped badly in common with virtually all industries as a result of the recent panic. On the shipping side, said Mr. Deans, vessels exist far in excess of the needs of the nation; and, as for shipbuilding, the prices of new tonnage quoted by Japanese yards are much greater than those at which British vessels are offered.

Japanese shipping has had many ups and downs since the signing of the armistice less than two years ago. Immediately following the signing of the armistice a period of depression and pessimism succeeded upon the war boom; this gloom was dispelled during the early part of 1919, however, by better conditions; and again the recent panic, the effects of which still are felt, has affected prospects adversely. So marked did this depression become that 200-ton sampans were quoted at a higher figure a deadweight ton than were steel ocean-going steamships. This curious development resulted indirectly from the panic, inasmuch as the failure of many commercial houses in the empire and the general marked stringency of the money market led many importing houses either to refuse their goods or to delay as long as possible in accepting them, so that the two great ports of Japan, Yokohama and Kobe, became congested, both with steamships awaiting discharge and with cargo on the wharves, to a degree almost incredible. Consequent upon these harbor conditions, harbor craft of all sorts were in great demand for lighters, and sampans were quoted for as much as yen 11.25 and yen 11.30 ($5.62 and $5.65) a deadweight ton a month.

27 SHIPS DISAPPEAR

H. W. Deans. Mr. Deans went to Japan early in 1919 as a representative of the United States Shipping Board. Since his return he has been appointed assistant to W. M. Alexander, President of Alexander & Baldwin, with offices in San Francisco.

Steel ocean-going vessels, on the other hand, were bringing only about yen 9 to yen 14 a month, depending upon size and other factors. Not even these low prices resulted in chartering all the available vessels; and numbers of cargo steamers were tied up in Yokohama and Kobe, principally the latter port. When the situation was acute, however, there was a temporary relief of some consequence following upon the Japanese coup at Vladivostok and the necessity of vessels to transport material and soldiers from Japan to Siberia. On one afternoon twenty-seven vessels belonging to one company were lying in Kobe. When the sun rose the next morning the twenty-seven had disappeared, having been dispatched on government service.

But this employment of the idle vessels was not permanent, and the needs of Siberia were satisfied quickly, particularly since many had been needed only to take new army units to Siberia and to transport the relieved regiments home.

MUST FIGHT FOR INDIA

During the war Japanese vessels were placed on trade routes that Europe of necessity abandoned, and also on new services. While the attention of Europe, and especially of Great Britain, was centered on the war, Japan was permitted to pursue these new designs without hindrance; but with the end of hostilities, the situation changed rapidly; Europe manifested a disposition to fight for its old rights, and Japanese vessels are finding retention of these routes quite different from merely winning them. The struggle is centering largely upon India.

One striking aspect of the situation in Japan, said Mr. Deans, is that the Japanese mercantile marine, like that of the United States, is virtually new, most of the vessels having been constructed within the last five years. This condition has been brought about by the sale of older vessels. Especially since the first of the year, Japan has sold large numbers of steamships, most of them coasting vessels of 1800 to 2000 deadweight tons. Great Britain and Italy took the majority of these ships, at low prices.

WORK FOR U. S. S. B.

Shipbuilding continued to draw support from the United States Shipping Board during 1919 and the first half of 1920. Most of the important yards of Japan shared in the contracts for thirty vessels, ranging in size from the Eastern Merchant and Eastern Trader, 13,000 deadweight tons, built by the Asano Shipbuilding Company, to vessels of 5000 deadweight tons. Due to the slow delivery of steel by the United States, completion of these vessels was delayed about a year behind the contract schedule; whence it happened that the completion of the program synchronized approximately with the panic.

Some of the Japanese yards that are equipped for work other than shipbuilding have ceased to build vessels for the time. Others are laying down vessels for their own account, or are doing practically the same thing in constructing for allied steamship lines. As has been commented upon before, close alliances between shipping and shipbuilding companies are common in Japan, and from these alliances some of the yards now are drawing considerable strength, especially if the associated operating companies are old and long-established, such as the Nippon Yusen Kaisha, Osaka Shosen Kaisha and Toyo Kisen Kaisha, each of which is closely connected with one or more building yards. But the fact remains that new tonnage in Japan is costing $150 to $175 a deadweight ton, or more than British vessels. In neither shipping nor shipbuilding did Mr. Deans see any prospect of immediate improvement.

ALL VESSELS COMPLETED

The last of the Shipping Board vessels, the Eastern Sword, built by the Uraga Dock Company, sailed from Yokohama for Seattle August 18. Of the thirty vessels seventeen were fitted in Japan to burn fuel-oil; work on the others had progressed too far, when the Shipping Board decided on the changes, to permit of the alterations being made in Japan, and some of these were converted in American yards. Only the two Asano vessels, the largest of the thirty, are twin-screw.

The ships built in Japan under second-series contracts were:

Vessel	Builder	D.W.Tons
Eastern Sword*	Uraga	5,500
Eastern Leader*	Fujinagata	6,300
Eastern Soldier*	Harima	10,500
Eastern Pilot	Harima	5,000
Eastern Belle	Ishikawajima	5,000
Eastern Maid	Ishikawajima	5,000

Eastern Moon—Kawasaki	9,000
Eastern Ocean*—Kawasaki	9,000
Eastern Planet*—Kawasaki	9,000
Eastern Dawn*—Kawasaki	9,000
Eastern Cloud*—Kawasaki	9,000
Eastern Temple—Nitta	5,500
Eastern Guide—Yokohama	6,300
Eastern Crag—Yokohama	6,300
Eastern Coast—Yokohama	6,300
Eastern Merchant*—Asano	13,000
Eastern Trader*—Asano	13,000
Eastern Breeze—Uraga	6,650
Eastern Gale—Uraga	6,650
Eastern Tempest*—Uraga	6,650
Eastern Importer*—Mitsui	9,100
Eastern Exporter*—Mitsui	9,100
Eastern Crown*—Mitsubishi	8,400
Eastern Victor*—Mitsubishi	8,400
Eastern Glade*—Uchida	8,500
Eastern Glen*—Uchida	8,500
Eastern Knight—Osaka	10,500
Eastern Mariner—Osaka	10,500
Eastern Admiral—Osaka	10,500
Eastern Sailor*—Osaka	10,500

* Fitted in Japan to burn fuel oil.

IN FAVOR OF JAPAN

The Shipping Board recently decided in favor of the Japanese builders a question involving between $500,000 and $600,000. When contracts were let for the second-series vessels, aggregating about 250,000 tons deadweight, at a cost of $175 a ton, the United States agreed to guarantee deliveries of steel at the following prices, f. o. b. mills: "3½ cents per pound for plates (which expression includes boiler plates); 3 cents per pound for shapes; 2.9 cents per pound for bars." The Steel Construction Division of the Shipping Board ruled that all steel prices were base prices, the same as similar materials were contracted for in the United States, but the Japanese contended that their interpretation should be accepted to the effect that the prices were flat prices; that no mention of base prices had been made either in the conferences prior to the signing of the contracts or in the contracts themselves; and that the inclusion of boiler plates at the 3½-cent rate was a further evidence of what was understood all around at the time the contracts were drawn in Tokyo. The Shipping Board recently reversed the decision of the Steel Construction Division on this point, and permitted the Japanese shipbuilders to settle for the steel on the flat basis.

THE URAGA DOCK COMPANY

At Yokosuka, on the western peninsula at the mouth of Tokyo Bay, is situated the shipbuilding plant of the Uraga Dock Company, one of the older yards of the Japanese empire. Founded in 1894 by Admiral Viscount Enomoto, of the Japanese navy, who was assisted financially by L. Arai and G. Watanabe, the plant was completed in 1897. It was enlarged considerably by the purchase of the Uraga branch of the Ishikawajima Shipbuilding & Engineering Company, which was completed in 1899 and which was sold to the Uraga Dock Company when competition became too keen for profit. During the early years of its existence the Uraga Dock Company built principally small vessels and dredges, although it constructed two torpedo boats of between 300 and 400 tons for the Japanese government during the Russo-Japanese war; building was steadily increased and diversified, however, until today the Uraga yard is in the front rank of Japanese building plants, both as regards merchant vessels and men-of-war.

FOUR VESSELS FOR STATES

In the second program of the United States Shipping Board, Uraga was represented by four vessels: Eastern Breeze, Eastern Gale and Eastern Tempest, all of 6500 tons deadweight, and the Eastern Sword, of 5500 tons, the latter of which originally was assigned to the Asahi Shipbuilding Company, Osaka, but which was transferred to Uraga. This number was the largest constructed by any yard of the Tokyo-Yokohama district, and the tonnage was practically that constructed by the Asano Shipbuilding Company, which built the two large vessels Eastern Trader and Eastern Merchant. The principal dimensions of the Eastern Breeze vessels are: length overall, 372 feet; between perpendiculars, 360 feet; molded beam, 51 feet; molded depth to upper deck, 28 feet 3 inches; loaded draft, 23 feet; single-screw; triple-expansion engines; Scotch boilers. The Eastern Sword is: 330 feet in length; 46 feet wide and 30 feet deep to the awning deck; single-screw; triple-expansion engines.

DESTROYERS FOR NAVY

A brief survey of the work of the Uraga yard for the last few years will make clear with what an accelerated pace vessels have been turned out. In 1915, the Japanese government ordered several destroyers, giving Uraga the contract for one of 700 tons. In 1916, five 3500-ton deadweight steamers were built. The next year the yard delivered seven steamers of 6600 tons deadweight each. The year 1918 saw the delivery of four 11,000 tons deadweight each, three of 6600 tons, one of 3500 tons and two of 1700 tons. An 11,000 tonner building for the Asanos in 1918 was sold on the ways to the Shipping Board and christened East Indian. Two of the 11,000 tonners were for the French Messageries Maritimes; and the fourth, the Moiwu Maru, was for Japanese owners. These vessels are twin-screw; 445 feet long between perpendiculars; 58 feet in molded beam; 32 feet in molded depth to the upper deck; of about 7500 gross tons; and equipped with four Scotch boilers and triple-expansion engines.

WORK IN 1919

In 1919 Uraga was engaged on the four vessels for the Shipping Board; one 11,000 tonner for the French Messageries Maritimes, contracted for through the Asano interests; two 6500 tonners for builder's account; two destroyers and a light cruiser for the Japanese navy; the 8300-ton Koyo Maru for the Toyo Kisen Kaisha; four 3500-tonners for the Yamashita Kisen Kaisha; and three other vessels, two of 6500 tons deadweight and one of 1900. Work on some of these vessels continued over into 1920.

The principal dimensions of the Koyo Maru class are: length between perpendiculars, 400 feet; beam molded, 53 feet; depth molded to upper deck, 32 feet; triple-expansion engines; gross tonnage, about 5520.

EQUIPMENT OF YARD

The Uraga yard has six building ways, three of which are at the main plant and three at the old Ishikawajima branch, a few hundred yards removed from the main Uraga yard.

The ways of the main yard are: No. 1, 510 feet long, of which length 200 feet is under water at high tide; breadth, 26 feet on shore and 37 feet under water. No. 2, 652 feet long, of which length 248 feet is under water at high tide; breadth, 28 feet on shore and 38 feet under water. No. 3, 644 feet long, of which length 250 feet is under water at high tide; breadth, 28 feet on shore and 39 feet under water. All these ways are concrete on wood piling. Twenty-five three and four-ton electric winches working on derrick posts serve the ways. There are two seven-ton locomotive cranes at the main yard.

At the old Ishikawajima yard there are two seven-ton locomotive cranes and, serving the ways, sixteen three- and four-ton electric winches working on derrick posts.

The ways are: No. 4, 505 feet long, of which length 200 feet is under water at high tide; breadth, 26 feet on shore and 37 feet under water. No. 5, the same as No. 4. Both are of concrete on wood piling. No. 6, a smaller, temporary way, wood piling only, no concrete having been used; 400 feet long, of which length 120 feet is under water at high tide; breadth, 27 feet on shore and 30 feet under water.

Eleven-thousand-ton vessels have been built on ways 2 and 3, the length of the ships being 445 feet. The greatest possible length of vessels that could be built on these ways would be about 500 feet; and the deadweight about 13,000 tons.

TEN VESSELS A YEAR

Between 70,000 and 80,000 tons deadweight, or twelve or thirteen vessels, could be built a year if a call were made on other manufacturers for engines and boil-

View of the Waterfront of the Main Yard of the Uraga Dock Company

ers; by building its own machinery, however, the Uraga plant can turn out only about ten vessels, because the ways can launch more rapidly than the shops can supply the hulls with motive power. No passenger vessels have been built at the yard, although the company expects later to construct combination vessels.

At the main yard there is a graving dock, 500 feet long, 70 feet in breadth at the top and with 27 feet of water at high tide, which will permit of the docking of a vessel drawing about 26 feet. The branch yard graving dock is 459 feet long, 66 wide at the top and, with 25 feet of water at high tide, can accommodate a vessel drawing about 24 feet.

Main yard shops are: Two plate, served by hand cranes only, having a total area of 570 tsubo (one tsubo is equal to about thirty-six feet). Two scrieve boards, one of 200 tsubo and one of eighty. One bending slab, 205 tsubo. Smith shop, 336 tsubo. Galvanized shop, 126 tsubo. Compressor-house, 102 tsubo; eight compressors, one of 2000 cubic feet, one of 1200; four of 400 each; two of 300 each—an aggregate of 5400. Two engine shops, 1000 tsubo total, monthly capacity about one engine of 2000 horsepower; served by two fifteen-ton cranes. However, the shop is to be extended and two twenty-five-ton and two fifteen-ton cranes added to the equipment. Forging shop, 323 tsubo. Foundry (iron and yellow metal), 420 tsubo; served by one twenty-five-ton, one fifteen-ton and one ten-ton traveling crane. Pattern shop, 210 tsubo in two stories. Carpenters' and joiners' shops, one of 416 tsubo in two stories and another of 84. Electric shop (for wiring vessels and repair work only, no motors being built), 68 tsubo. Sailmakers' and riggers' loft, 80 tsubo in two stories. Twelve warehouses, aggregating about 1000 tsubo. For the yard, the total floor space is 6000 tsubo, or 24,000 square yards.

AT THE BRANCH YARD

At the branch yard there are: Plate shop, 498 tsubo. Compressor-house, 24 tsubo; two compressors of 400 cubic feet each, one of 800, one of 300; 1900 in all. Foundry, 233 tsubo, served by one ten-ton overhead crane; small steel castings, up to about two tons, can be made. Mold loft and carpenters' shop, 880 tsubo in two stories. Boiler shop, 720 tsubo; capacity, about three boilers a month, both Scotch and watertube, the latter only for naval vessels, none being built for merchant steamers; served by one fifty-ton and one fifteen-ton traveling overhead crane. Storehouses, 450 tsubo. Total floor space at the branch yard, 2500 tsubo, or 10,000 square yards.

There are one thirty-five-ton floating crane; one sixty-ton shearleg wharf crane at the branch yard for handling boilers, etc.; four four-ton derrick posts and four stationary jib cranes, from five to seven tons' capacity, all operated electrically, for handling materials coming by water. The yard employs about 4800 men.

T. Machida became president of the Uraga Dock Company in 1911. The head offices are in the Tokyo Kaijo Building, Tokyo.

THE NEW MITSUI YARD

Although the house of Mitsui existed in the seventeenth and eighteenth centuries, and was, in fact, one of the first important commercial establishments of Japan, antedating the modern industrialism and the scores of new corporations founded within the last sixty years, no attention whatever was paid to shipbuilding until 1917. In that year the Mitsui Bussan Kaisha founded a temporary yard at Uno, on the Inland Sea; built a few vessels; and in 1919 abandoned the Uno yard for a permanent plant at Tama, Hibimachi, Okayama-ken.

TEMPORARY YARD AT UNO

Construction of a yard at Uno was intended only as an expedient, to serve until a more advantageous situation could be found. Shops and three ways were built, however; each of which was capable of taking a vessel up to 3600 tons deadweight. Soon after work had been begun at Uno, a great tract of land, 320,000 tsubo in area (one tsubo equals thirty-six square feet) was purchased at Tama, a few miles distant from Uno, seventy miles west of Kobe, and 130 miles from Mojii, on the Inland Sea; and work was begun in August, 1918.

Two building ways at Tama are 660 feet long by 80 wide, each large enough for the construction of a vessel of 12,000 tons deadweight. They are of concrete on wood piling. The grand plan of the yard is for no less than six other ways, all except one of the same dimensions as the two already completed; but the carrying through of this program is conditioned upon the general shipbuilding outlook. There are two traveling tower cranes, 100 feet in height, and three six-ton and three-ton electric yard cranes.

GRAVING DOCK AT TAMA

A graving dock at Tama was completed in 1919. It is 450 feet long over-all, 65 feet wide at the top, 20 feet deep on the keel blocks and capable of taking a vessel of 12,000 deadweight tons. To build this dock the removal of a hill of rock was necessary; this having been done, the excavation was faced with concrete. The other equipment of the yard is: engine, coppersmith, forge, machine, fitting, pattern, anglesmith, blacksmith, steam-turbine, riveting and boiler shops, iron and brass foundry, bending slabs, warehouses, mold loft, powerhouse, offices, clubhouse and workmen's quarters, the last housing about 3000 men.

The Tama yard built two vessels for the United States Shipping Board: the Eastern Importer and Eastern Exporter, which are 397 feet long over-all; 385 feet between perpendiculars; 51 feet beam; 28 feet deep molded to the upper deck; of about 5800 tons gross, 9100 deadweight capacity; 10½ knots' speed; single-screw; having triple-expansion engines, three Scotch boilers, two masts, five hatches, ten winches, two derrick posts at the main hatch. Keels of these vessels were laid March 31, 1919, on building ways that had been completed only a month before.

WORK AT TWO YARDS

Prior to the construction of the United States Shipping Board vessels, Tama had built only one vessel, a wood steamship of 1700 tons deadweight; but Uno had constructed the Kaisho Maru, a 1200-ton steamship, in 1917-1918, and followed with a 1700-ton wood steamship, three steel vessels of 2000 tons each, one of 3800 tons, a 2300-ton, an 800-ton and two of 3800 each. All were laid down for builder's account.

SOUTHWESTERN SHIPBUILDING COMPANY

IN December of 1918 Pacific Marine Review printed an article describing the plant of the Southwestern Shipbuilding Company, which had in October of the same year launched its first ship. This plant was at that time of great interest to shipbuilders on account of the remarkable speed record which had been achieved in building the plant. The first stakes having been set up by the construction engineers on March 23, 1918, the first spikes driven on April 1, the plant was completed on June 20, and the keel of the first ship laid on July 17. At that time we ventured the opinion that this new yard was very well laid out and had made very "effective utilization of all available space." That assertion has been proven to be very well founded both by the record of the yard in the finishing of its building program for the Emergency Fleet Corporation and in its recently proven ability to compete in bidding for contracts for new construction with the older yards both on the Atlantic and the Pacific Coasts.

The yard covers sixty-five acres situated on a sandspit with the open sea on one side and a deep water launching basin and slip for the outfitting wharf on the other. It is laid out according to the accompanying diagram, which shows clearly the very unique and convenient arrangement of industrial trackage and of the shipbuilding ways. It will be noted that the plate shop extends along the inshore end of the ways with ample room for fabricating park and that the ways are arranged in pairs with spurs from the tracks running down the wide space between each pair of ways. This space is used for the convenient storage in racks of plates and shapes that are ready for working into the hull and may also be used to some extent as fabricating park space.

The Southwestern Pipe & Steel Company was organized by Mr. J. A. Talbot, president of the Western Pipe & Steel Company of San Francisco and Los Angeles, which company had already turned the Schaw-Batcher Pipe Works at South San Francisco into Schaw-Batcher Ship Works. Co-operating with Mr. Talbot were Marco H. Hellmann of Los Angeles, who was made president of the Southwestern Shipbuilding Company; William F. Howard, who became vice-president; Irving Hellmann, treasurer; Emanuel Cohen, secretary; and Daniel K. Drake, Benjamin E. Page and J. W. Mason, who, with the officers, constitute the board of directors, J. A. Talbot being first vice-president and general manager. This company secured the services of the late David Hollywood as works manager, and it was largely due to his ability and experience that they were enabled to show their early records in construction work.

J. A. Talbot, Vice-President and General Manager Southwestern Shipbuilding Company

The two yards of the Schaw-Batcher Company Ship Works at South San Francisco and Southwestern Shipbuilding Company at East San Pedro held contracts with the United States Shipping Board Emergency Fleet Corporation amounting to thirty-six 8800-ton deadweight cargo steamers. At the date of this writing they have delivered thirty-four of these vessels. On August 19, 1920, the Southwestern Shipbuilding Company delivered its last ship, making an average delivery of forty-five days per ship from the time of first keel laying up to August 19. The Schaw-Batcher Company Ship Works expects to complete its program by October 1, at which time that plant will be salvaged as far as shipbuilding is concerned, and all of the efforts of the company will be concentrated at the East San Pedro plant. Already a large portion of the technical organization, including O. B. Kibele, present works manager of the Southwestern Shipbuilding Company, and H. O. Shuster, chief engineer, has been moved from the plant at South San Francisco to that at East San Pedro.

At the present time the Southwestern Shipbuilding Company has under construction, or contract, one 8800-ton tanker for the builder's account, which vessel is being converted to a tanker after several weeks' work had been accomplished on her as a standard freighter of the Robert Dollar type; three tankers for the Union Oil Company of California, two 12,000-ton and one 7500-ton; also three 8400-ton tankers for the Anglo-Saxon Petroleum Company.

The service, equipment and general layout of the yard works to great advantage in the handling and fabrication of ship material, the steel going straight through from the storage racks to assembly and ship. The service machinery for handling material includes one 30-ton 6-wheel locomotive crane and five smaller locomotive cranes. Fabricated material is received and stored by a division of the erection department and a record is kept of each piece received, storage racks being located by letter series, each series containing certain continuous numbers. Assembly and erection are closely associated, and the fabricated storage stock is drawn on for material as called for by progress on the hulls, drawings being marked up daily in such a manner that they show the completed amount of material erected in each hull so that the works manager can keep a continual graphic check on all operations. Assembly in the fabrication park is served by a large gantry crane, skids and two steel towers, each of which has four 33-foot booms carrying air-gap riveters. The assembly fitter works on one side of the tower and the riveters on the other.

The business of the Southwestern Shipbuilding Company will include shipbuilding, ship repairing, wharfage and general engineering. Modern repairing equipment is being added to the plant continually and its efficiency thereby increased. Machinery and tools are being acquired so that this plant may be able at any time to promptly and efficiently dispatch any repair or general engineering job.

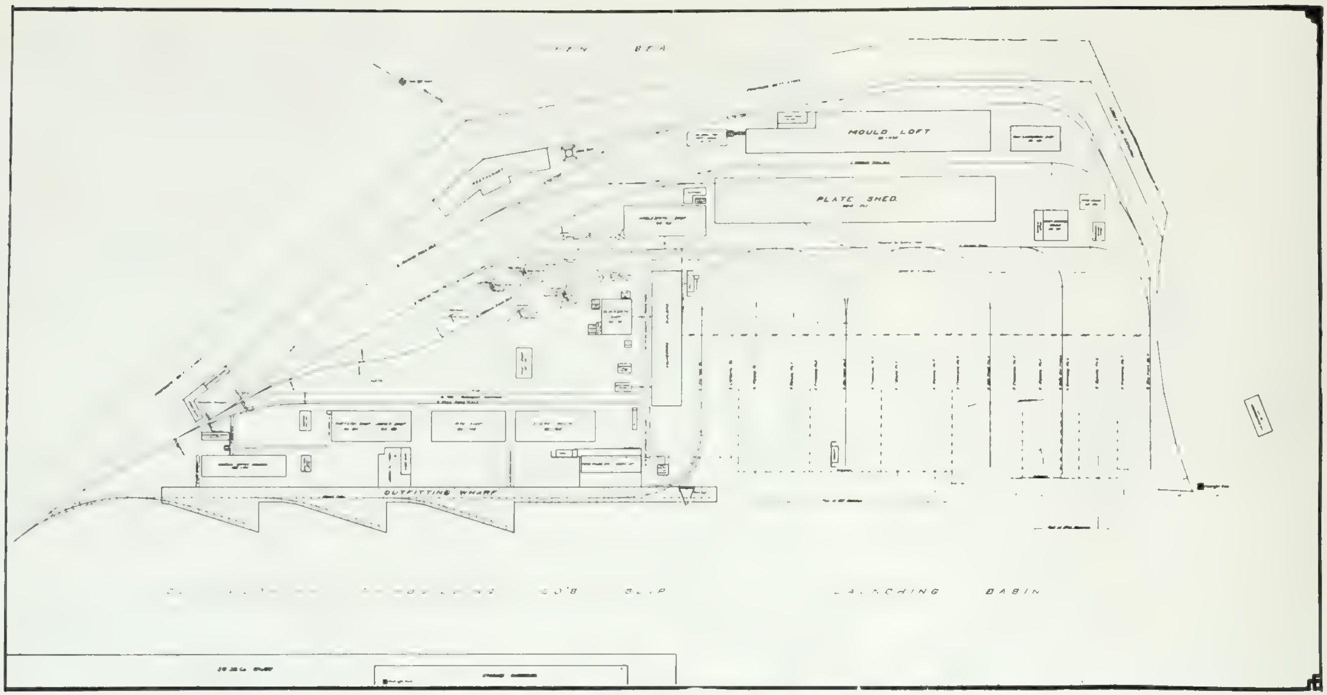
The active management of the Southwestern Shipbuilding Company is largely under the direction of two men, Mr. J. A. Talbot, vice-president and general manager, and Mr. O. B. Kibele, works manager.

O. B. Kibele, Works Manager Southwestern Shipbuilding Company

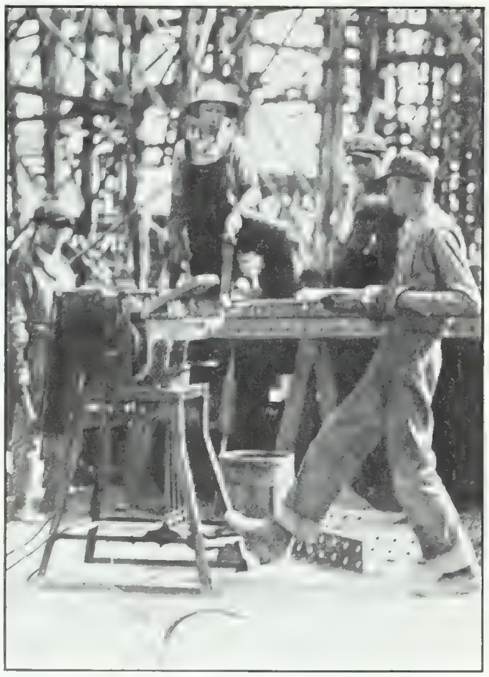
Mr. J. A. Talbot came out to the Pacific Coast about eighteen years ago and accepted a position as bookkeeper with the Thompson & Boyle Pipe Works at a salary of $60 a month. After several years' employment with that firm, Mr. Talbot associated with himself Mr. William F. Howard and Mr. Tom Hayes, and these three purchased the Thompson & Boyle Pipe Works largely on credit. This was about thirteen years ago, and starting with this small beginning Mr. Talbot and his associates have worked themselves into the control of the Western Pipe & Steel Company with factories and branch works at Richmond, Los Angeles, Fresno and Taft in California, and at Prescott, Arizona. Their contracts with the Emergency Fleet Corporation of the United States Shipping Board amounted to approximately $60,000,000, and their pipe business and other plate and steel work would probably total in the neighborhood of $5,000,000 or $6,000,000 a year. Mr. Talbot is a very simple, modest sort of chap, and it is hard to get any information out of him about his own record. He is naturally a lover of things marine and is taking a very great deal of pleasure at the present time in the supervision of the building for himself at the Schaw-Batcher Company Ship Works of a 60-foot pleasure launch named the Miss Snip. He has also had built for his own and his friends' use a 40-foot pleasure cruising launch for transportation between the Southwestern Shipbuilding Company's shipyard and San Pedro and for occasional pleasure trips to Catalina Island and cruising up and down the coast.

J. A. Talbot's New Pleasure Launch Miss Snip

O. B. Kibele, works manager of the Southwestern Shipbuilding Company, like many of America's self-made men, started life on a farm, working as a farm hand in Ohio until he was sixteen years old and receiving such schooling as he could get by attending the district school for three months during each year. At the age of sixteen he started an apprenticeship in a sheet metal shop and learned thoroughly the trade of sheet metal worker, during the latter part of his apprenticeship attending school and studying electrical engineering. From the time of completing his apprenticeship up to the opening of the Spanish-American war, Mr. Kibele served in various positions with industrial



and railroad companies of the Middle West. On the opening of the war he enlisted in the navy and served for four years as a navy machinist. In 1910 Mr. Kibele came to California, a total stranger, and accepted a job at $90 a month, but in less than three months he had become chief engineer of the Producers' Transportation Company Pipe Line. In 1914, while still holding the position as chief engineer of the Producers' Pipe Line, he was made superintendent engineer of the Union Oil Company's fleet of tankers and, subsequently, chief engineer for all the pipe lines owned by the Union Oil Company. Shortly after this he was appointed general superintendent of all the transportation facilities of the Union Oil Company, including the design and new construction of vessels, dock and wharfage facilities, and all pipe line engineering. Beginning October, 1917, he served for a year as yard superintendent at the Union Iron Works plant of the Bethlehem Shipbuilding Corporation and then he was appointed general superintendent of the Schaw-Batcher Company Ship Works. After making a very creditable record in construction at that plant, in February, 1920, he was appointed works manager for the Southwestern Shipbuilding Company.

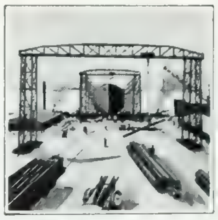

Electric Rivet Heater in use at the Southwestern Shipbuilding Company

This outline of Mr. Kibele's life shows that his experience covers practically every phase of marine and mechanical engineering. Undoubtedly, much of his success as a shipyard manager is due to this broad experience, not only in construction but in the operation of ships.

It is the intention of the directors and management of the Southwestern Shipbuilding Company that their plant shall be made the most efficient and best equipped shipbuilding and ship repair plant on the Pacific Coast, and it would certainly appear that they are going to give some of the older establishments a healthy lot of competition.

Scenes in the Plate Yard and Fabricating Park at the Southwestern Shipbuilding Company

Material Handling



AUCKLAND HARBOR

THE British Dominion of New Zealand, or "Newest England," as it has frequently been called, is composed mainly of two large islands, designated North and South. Both of these are abundantly supplied with very commodious and safe harbors. Probably no city in the world is quite so well supplied in this regard as is New Zealand's capital, the City of Auckland. North Island sends out a long, prejecting finger of land some three hundred miles in length and averaging less than sixty miles in width. This peninsula is almost pierced at a point about one-third of the distance from its southern base by two great estuaries of the sea. On the eastward side the Firth of Thames opening into the south of the Hauraki Gulf pierces the land in a southerly direction for about sixty miles. On the west side of this great firth, almost hidden by several large islands, the mouth of the Waitemata River forms at its entrance to the firth a great landlocked estuary. On the opposite side of North Island lies a great bay known as Manukau Harbor, completely landlocked and with a very narrow entrance. This bay is over twenty miles deep and at its most northerly point is about seven miles south of the south shore of the Waitemata Estuary. One branch of this estuary, bending down toward the south, is at one point less than three miles from the waters of Manukau Harbor. Captain Cook in his voyages of exploration noted this point as being one of the locations on these two islands best adapted for European residence, and when in 1840 New Zealand was proclaimed a Crown Colony, Captain Hobson, the newly appointed governor, chose this narrow isthmus as the site of his capital.

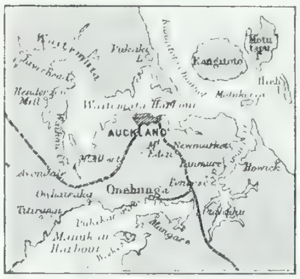


Diagram Showing Auckland and Manukau Harbors

Auckland, as is shown by the small insert map reproduced herewith, is situated on the south side of the Waitemata Estuary, which forms the inner harbor of the port. This estuary has a total area of seventy-three square miles and a water frontage of 194 miles. It is so completely sheltered by an outlying chain of islands to the eastward and by a peninsula at the northern entrance that it may be said to be completely landlocked. The anchorage is of the very best description, with good holding ground in depths of from five to twelve fathoms. The rise and fall of tide varies from five feet six inches to twelve feet, and the whole of the harbor with all its approaches is well lighted, all channels being clearly marked by buoys and beacons so that the port may be entered at any hour of the day or night with perfect safety.

ADMINISTRATION

The port of Auckland is administered much of the endowed land is still avail- by a public board constituted under act of Parliament of the General Assembly of New Zealand. It now consists of fourteen members elected and appointed as follows: one appointed by the governor in council, three elected by the city of Auckland, two elected by payers of dues on ships, one elected by payers of dues other than dues on ships, and the balance elected by various counties, boroughs, town and road districts contributary to the port. The board holds two meetings a month, and its affairs are carried on through an official holding the offices of secretary, treasurer, and chief executive.

The first board was appointed by the governor in 1871. Its chairman was Captain W. C. Daldy, who held office until July, 1877. Captain Daldy was a very farsighted, practical business man and built well for the future prosperity of the port of Auckland, in that he persuaded the provincial government to endow the Auckland Harbor Board with large areas of the tidal lands on the bed of the harbor, amounting in all to over 5000 acres. Large portions of this tidal land have been reclaimed on the foreshore of the city, some of which have been turned back to the Dominion government for railroad rights of way and railroad yard purposes, some turned into recreation parks, and a large portion graded and intersected with streets and leased for industrial purposes. As this land comprises much of the present business portion of the city, the revenue derived therefrom has very materially assisted the port in carrying out its scheme of harbor improvements, and as

American Fleet in the Harbor of Auckland

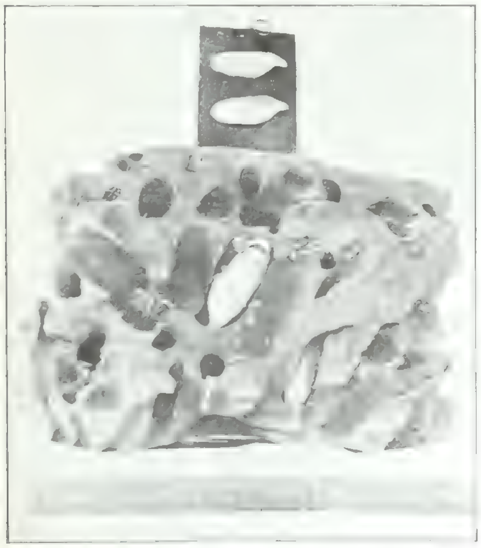
View of Wharves and Shipping in the Central Portion of Auckland's Waterfront

able for reclamation and for industrial and business purposes, it is very evident that the Harbor Board of Auckland is on a very firm financial foundation.

The latest figures available from financial statements are those of January 1, 1916. These show the assets of the port at that time to have been conservatively valued at £2,722,221 6/1, with liabilities equaling £1,661,493 16/10, leaving the very tidy balance of assets over liabilities at £1,060,727 9/3. This balance consists of permanent improvements and lands, all of which are rapidly increasing in value and will increase more rapidly as the projected harbor improvements are carried out.

HARBOR WORKS

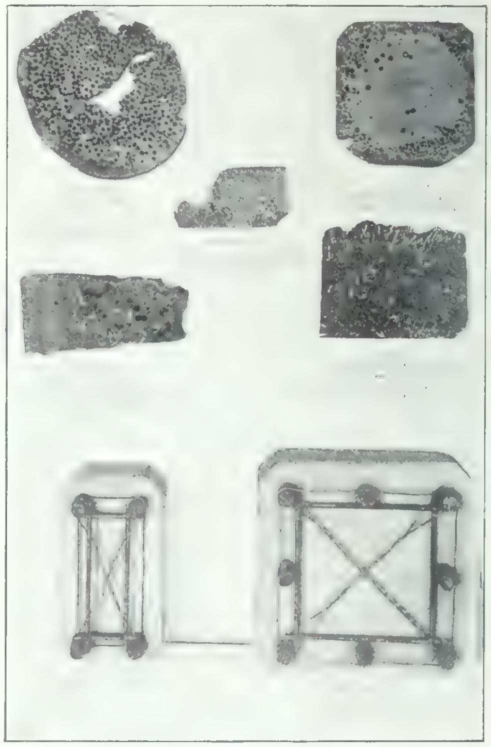
All of the first wharves and piers in the harbor of Auckland were constructed of timber piling, and up to the year 1904 they consisted of the ordinary timber wharf with either open space or covered shed and depended for handling cargoes entirely on the ship's tackle. Very early in the history of the port it was observed that in these waters marine pests were exceedingly active, and that piles of the hardest eucalyptus timber and even of kauri were very quickly honeycombed with borers, both of the worm and mollusc type, the mollusc borers in this vicinity being so well equipped with drilling apparatus that they find very little difficulty in penetrating ordinary sandstone. Faced with this condition, which made necessary the constant renewal of timber structures, the board's engineers began experimenting with plain and reinforced concrete, and in 1904 recommended to the board a permanent scheme for berthing accommodations in the harbor based on reinforced concrete piling, which scheme was adopted and work begun immediately. Concrete retaining walls were built surrounding an area of about seventy acres at Freemans Bay and a wharf, known as Kings Wharf, constructed on reinforced concrete piling, was completed in 1908. The general design, as will be noted in the plan of the harbor works reproduced herewith, calls for a width of wharf which will admit of a central roadway with sheds on either side and a side quay between the water side and the outside of the shed. These central roadways are sixty feet in width, the sheds eighty feet in width, and the water side spaces about thirty-two feet in width, so that all of these quays will have double lines of railway between the storage sheds and the water with convenient cross-over railroads intersecting the lengths of the sheds. All of these wharf lines are connected with the Dominion of New Zealand Railway system. It has been found that this plan of wharf lends itself very readily to extension into deeper water whenever this may become necessary.



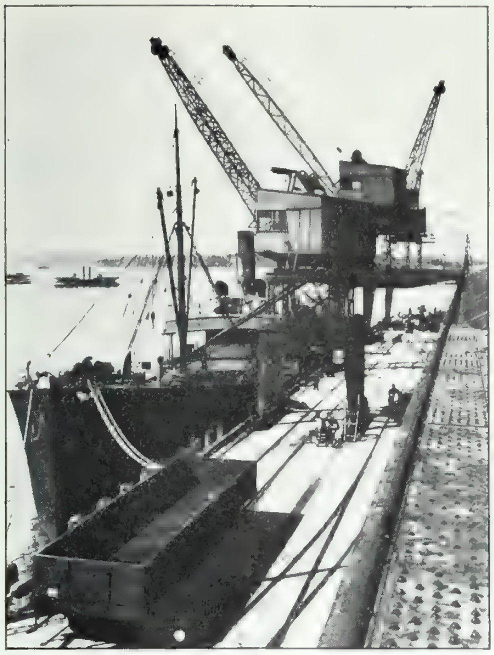
Burrows Made in Sandstone by Mollusc Borers in New Zealand Waters

The construction of Kings Wharf was quickly followed by that of Queens Wharf and of ferry slips and convenient arrangement of cove for industrial and pleasure motorboats, which are very extensively used in the coastal waters of New Zealand. As the wharves were built they were equipped with the most modern electrical machinery. Kings Wharf, which is 930 feet long and 240 feet wide, is equipped with ten traveling electric cranes of the gantry jib type, the gantry spanning two rails and the capacity of the cranes ranging from three to five tons. Queens Wharf, which is 1100 feet long and 280 feet in width, and which is used largely for the larger overseas' steamers, having deeper water on both sides than Kings Wharf, is equipped with six electric cranes of five tons' capacity each. Electric capstans are provided on both wharves wherever needed, and for the lifting of heavier weights the board has equipped and operates a self-propelling floating crane with a capacity of eighty tons. This equipment is shown in illustrations accompanying this article.

In the reclamation of the seventy acres referred to, the only graving dock on the Auckland side of the harbor was cut off from the water. Fortunately, however, the board had already built the present Calliope Dock at a convenient point on the northern shore. This has a length of 566 feet, an over-all width of 110 feet, with a depth of water on the sill of 33 feet. Under arrangement with the Admiralty a complete plant has been provided at this dockyard for the repair and reconditioning of merchant ships. The plant includes an 80-ton shear legs, 10-ton steam crane at the side of the dock, and all the machinery necessary for the repair of any



Typical Sections of Timber Piles Infested with Marine Borers and Typical Cross-section of Reinforced Concrete Piles Now in Use at Auckland



View of Kings Wharf, Auckland, Showing Four Electric Cranes Working Cargo on One Steamer

naval or any merchant vessel visiting the port. This dock and the yard with its repair facilities are constantly at the disposal of the Auckland Harbor Board when not in use for naval purposes. For smaller vessels a patent marine railway is maintained and operated by the board on the Auckland waterfront.

In addition to Kings Wharf and Queens Wharf, and lying between them, there has been built a wharf known as Central Wharf of practically the same dimensions as Queens Wharf, and a smaller wharf known as the Northern Wharf, which is used only for coastal craft. Work is now progressing on the extension of the Hobson Wharf at the foot of Hobson Street, which will make this terminal of a little greater capacity than the present Queens Wharf. Between this Hobson Street Wharf and the western breakwater three piers of the same standard design are to be constructed based on the seawall of the reclamation work lying between Custom Street West and the Freemans Bay reclamation, while a larger pier with more than double the capacity of Queens Wharf is proposed, to be based on the western breakwater and an extension thereof. East of Kings Wharf the reclamation work is now going on on the water side of Quay Street, and it is proposed in this section to erect two wharves parallel with Kings Wharf with seawall quays and quayside warehouses between the shore ends of the piers.

This work when finished will give the Auckland waterfront a berthage capacity at least four times what it is at present, and all of this berthage with its warehouses, quays, and railroad system, will be of the most permanent character, operated under one central control which owns not only the improvements but the land upon which they stand and all of the adjacent industrial and business section of the city. In this respect the administration of Auckland Harbor is not dissimilar to that of San Francisco Harbor, where the ownership of the waterfront is in the people of California through the State Board of Harbor Commissioners, which body is gradually approaching the ownership of considerable industrial and business property in certain sections of its waterfront as it reclaims tide lands. In that part of the Auckland reclamation work lying between the eastern breakwater and the most easterly of the proposed commercial wharves, there will be a great naval dockyard, and in this scheme provision has been made for the building of a graving dock 1010 feet long, 120 feet wide, with a depth on sill at ordinary high water of 40 feet. This dock will be arranged in such a way that it can be divided by caissons into three compartments. The plans of the Harbor Board call for a complete dockyard establishment at this point, and a very thorough provision for foundational work under immense cranes and shear leg structures for handling the great weights incident to modern marine machinery and naval ordnance.

REVENUE AND SHIPPING

The port of Auckland has had a tremendous proportional growth since the first establishment of these modern harbor works, as is evidenced by the following figures of revenue and of tonnage: in 1874 the overseas' net tonnage inbound amounted to 86,963; outbound 90,373; and the revenue of the board amounted to £15,721; in 1894 the revenue of the board had a little more than doubled, amounting to £33,670, while the tonnage had jumped up to 262,714 inbound, 210,708 outbound; in 1904 the revenue had more than doubled again, amounting to £71,909, while the tonnage in and out was 543,199 and 382,540. In 1914 we find the revenue more than doubled again, amounting to £159,000, while the tonnage, affected by the war, shows not nearly so large a proportional increase, amounting to 734,148 in and to 621,427 out. An analysis of the figures for the first few months of 1920 would indicate that already the overseas' tonnage arriving and departing from the port is exceeding the pre-war figures and bids fair to total what would be expected for this year under the

Floating Crane of 80 Tons Capacity Owned and Operated by the Auckland Harbor Board

The Ferry Building at Auckland and Part of the Business Section of the City

Gantry Crane Landing Buick Automobiles on Queen's Wharf at Auckland

proportional rate of increase before the war. In July, 1920, the overseas' arrivals amounted to 83,388 net tons and the departures to 72,477 net tons.

MANUKAU HARBOR

On July 20, 1913, the Harbor Board of Auckland took over the control of Manukau Harbor, the large inlet which is separated from Auckland Harbor proper by the isthmus upon which the city stands. This inlet has a water area of approximately 152 square miles and an harbor frontage of 240 miles. The principal town facing on its waters is Onehunga, which is on the opposite side of the isthmus from Auckland and about six miles south of Auckland and is connected thereto by electric tram and steam railways and by excellent roads. The control of this harbor gives to Auckland rapid communication by water with all the ports on the western coasts of both islands and is particularly valuable as affording close connection with Wellington by water. The harbor has a very narrow entrance and a shifting bar, but usually five fathoms can be figured on in the channel at low water spring tide. The Auckland Harbor Board is thus in a position when the growth of the city demands it to form a double harbor for the port with two exellent landlocked bays at its command. Auckland has now a population of approximately 130,000 and is growing rapidly, so that it requires no very great stretch of the imagination, especially to anyone who is used to California cities, to assume the municipal boundary lines running across a six-mile wide isthmus and the city having deep water frontage on both bays.

COMMUNICATION

Communication is very well taken care of at Auckland, this port being the terminus of the Pacific cable which was completed in 1902 and runs to Vancouver, B. C., via Norfolk Island, Fiji and Fanning Island. The New Zealand government has installed a high powered wireless station just north of Auckland which is in telegraphic and telephonic communication with the offices of the Harbor Board and with the government meteorological office at Auckland. This wireless is in constant communication with Sydney, New South Wales, and through the stations there with the commercial world.

ANCHORAGE

Anchorages in the harbor are well laid out to avoid interference with the fairway to the wharves and with special sections separated widely from the main anchorage grounds for the accommodation of vessels with explosives.

PILOTAGE

Pilotage at Auckland is compulsory. A day and night signal station is maintained by the Harbor Board on Tiri-Tiri Island near the main shore on the west side of the entrance to the Fifth of Thames about forty-five miles north of Auckland. All vessels are signaled from this point and their arrival telephoned to the city. If the arrival is known approximately, the pilot meets the steamer near Tiri-Tiri and she is brought in. Pilotage charges are 3 d. per ton net register each way on sailing vessels not employing a tug, 2 d. per ton when a tug is employed, and 2 d. per ton each way on steamers, the maximum charge being £45 each way. Vessels calling a second time at Auckland on the same trip to the Dominion of New Zealand are charged half rates for such second trip.

PORT CHARGES

All vessels over fifteen tons net register using the port are assessed 3 d. per ton, payable half yearly in one payment. Harbormaster's fees are charged for such services as he may render to the vessel, as in the removal of a vessel from one wharf to another, from a wharf to the stream, except that in the case where a vessel is moved out by the harbormaster acting as a pilot the pilotage charge includes the harbormaster's fees. For vessels about 120 tons and up to 8000 tons the harbormaster's fee is 1 d. per ton, and for vessels over 8000 tons net register 1 d. per ton for the first 8000 tons and ½ d. for every ton in excess of that amount. Wharfage for all vessels above 20 tons registered is charged at the rate of ¼ d. per ton net register per working day.

Much credit for the work being done at Auckland Harbor is due to the present chairman of the Harbor Board, Mr. H. D. Heather, and to Mr. J. H. Gunson, his predecessor in that office. For technical assistance the board has depended upon Mr. W. H. Hamer,, M. I. C. E., its chief engineer, and upon Mr. Holderness, its assistant engineer and present acting chief. Mr. W. H. Hamer prepared the present plans for the development of the harbor and has supervised their execution. He is at present on leave of absence enjoying a much needed vacation. The harbormaster, Captain H. H. Sergeant, has contributed largely to the popularity of the port of Auckland among shipping men by his fairness and courtesy in carrying out harbor rules. Pacific Marine Review is greatly indebted to all of these gentlemen for assistance in compiling the data and obtaining the illustrations needed in preparing this article.

Motorboat Landings and Waiting Rooms, Auckland Waterfront

HANDLING GENERAL CARGO

Some Suggestions for the Marine Terminal Engineer

By S. FASTING, M. E.

To be able to compete in the world market and also to counteract the ever increasing costs of commodities, a great deal of study is given to the problem of reducing the wastes of effort found in so many phases of our economic system.

One of the most important of these wastes is the lack of efficiency in handling freight at our railroad and marine terminals, as well as on board ships.

Rapid and efficient service will not only save money in the direct handling charges, but will effect enormous savings in the capital necessary for construction of adequate terminals, in railroad cars and in ships. With some thought on this matter, we will see that if, by efficient handling apparatus and a well balanced system, a terminal will handle double the amount of freight in a given time than what is being handled under the present old-fashioned, inefficient system, that this will save the construction of an entire terminal of the same size, and will as a continuing source of income bring an earning to the railroads and ship-owners equal to the loss represented by each idle car day or ship day saved in the handling time at the terminal, and last but not least, will increase the effective tonnage of the cars or ships in the same ratio to their actual tonnage as the number of days saved will be to the days in the year.

Anyone making some approximate figures on these assumptions will be surprised to see the great amount possible to be saved by improving the present systems.

Making the handling problems on board ships and at marine terminals the object for this article, we have learned from past experience that the first idea of the ship and pier operator who desires "speeding up" of his handling is to employ more men. This is naturally a correct idea as long as the men will be able to do their work efficiently; it will, however, soon be found that there are certain phases of the handling which present themselves as absolute limits in regard to the speed possible. The space in which these portions of the handling have to be done is of such a nature that additional men will avail little or nothing, and it will be at these points of congestion where the first work of making the system of higher efficiency will have to be applied.

The ship's hold is one of these places of congestion and another is the point at which the cargo is deposited on the pier or at the pier shed door for inbound as well as outbound traffic.

Considering the hold of the ship, the system generally used at the present time is to employ one large gang of stevedores, the hoisting work being effected by the ship's gear with the ship's booms braced so as to lower the hook approximately in the center of the hatch and also near one of the shed doors on the pier; in other words, the universally known "burtoning system" is being used. In lowering the draft to the center of the hold, the stevedores will have the longest possible distance over which to transfer their packages for stowing, and they will try partly to overcome this by swinging the load with a pendulum action and then lower on a given signal, when the load will have swung to a somewhat more desirable location. This way of handling will only partially improve the conditions, as it consumes time and, by the swinging, interferes with area in which work might otherwise be going on. Operating in this manner, the stevedores do not want any succeeding draft to be lowered in the hold before the first draft has been disposed of. This condition could very easily be improved upon by arranging the handling machinery in such a manner that the drafts may be lowered in distributed positions without the stevedores' efforts to produce the effect; even in this case the stevedores may help to place the draft, but distances being shorter this will be done by pushing, which takes little or no space when compared with pendulum action, and the time consumed is also short.

The best system when the use of ship's tackle is being considered seems to be one which apparently divides the hold in four squares, each square being served by a small gang of stevedores, and the hoisting machinery so arranged as to drop the drafts in rotation in these squares. This decreases the carrying distances for the packages and will give time for each draft to be disposed of before the next one will arrive.

In this manner the amount of manual labor required for stowing a draft will be decreased to about one-half by distributed placing. By disposing of each draft quickly, the stevedores will be ready when the next draft arrives, and the machinery will have a chance to work up nearly to its full capacity. We can, in fact, make a hard and fast rule that speed can only be attained when the matter of distribution is taken care of in an intelligent manner. This underlying principle has been partially tried out here and has been in vogue in European marine terminals long enough to prove distribution to be the key to rapid handling.

To increase the amount of cargo handled, the ship winches have gradually been constructed for higher and higher speeds. There are winches built which even go to about 300 feet per minute with full load. From some figures and diagrams made to determine the actual possibilities of the winches, it seems as if these high speeds are not necessary except in special cases, as slower speed winches can handle more cargo than shown to be possible by actual working results.

The use of electric winches is being considered to a greater and greater extent as a remedy for the "space using," and often troublesome steam pipes and steam winches; the electric winches are free from troubles resulting from cold weather and will also help in keeping a clear deck. The motorships especially will require this type of winch, so as to get away entirely from space consuming boilers, etc.

A later article will treat the different types of electric winches, but a short extract of the working results of the two main classes will give some preliminary data of interest.

The electric winch with dynamic braking and the winch with automatic mechanical braking are the two general types. Here we will find that, basing our figures on winches with a full load capacity of 5000 pounds at a speed of 125 feet per minute, the other loadings with speeds corresponding to the characteristic curves of the motor, that the cargo handled per hour with a set of winches of each kind will be as follows:

TWO WINCHES WORKING TOGETHER ON A BURTONING SYSTEM

Loading Draft	Dynamic Brkg. Cargo per Hr.	Mechanical Braking
5000 lbs.	105 tons	135 tons
3750 lbs.	82 tons	105 tons
2500 lbs.	57 tons	74 tons
1250 lbs.	30 tons	41 tons

Even though the cargo handled with the mechanical braking winch is about 30 per cent more than with the dynamic braking, the current consumed is 20 to 30 per cent less for the mechanical brake winch.

The figures are based on ordinary ship conditions and both doing the same work; this shows us that the speed of the winch will not produce the speed of handling, but distributed placing will have to be the remedy.

As stated before, the second serious congestion is when the load is deposited on the pier. The drafts in unloading from the ship will by present methods be deposited in one position on the pier from each hatch. It can be plainly seen that it would be impossible to place the one draft on top of the other, so the progress here will be regulated by the speed at which each draft can be taken care of. The fact that the longshoremen will have to get up to this small pile of goods to receive the loads for their hand trucks will limit the number of men by reason of lack of space. To remedy this condition, it seems as if the best system would be to arrange for depositing the drafts at two well separated positions, or at two pier shed doors. This in itself will improve the conditions 100 per cent over the present one, but even this is not enough, as we will have to look to the greater amount of cargo handled from each hatch. One system which would be employed here to great advantage would be the use of cargo tables. These are slow moving, portable conveyors, which would be placed with one end at the point where cargo is delivered, the other end reaching into the pier shed. The cargo tables can be 20 to 30 feet long or more and may be placed end for end, transferring goods across one bay over into the next one. The speed of movement would just be fast enough to have one draft out of the way before the next one arrives.

While on the cargo table good opportunity is given for checking and sorting and the longshoremen will have an extended line on which they can get up to receive their loads, without any interference with each other. The cargo tables will also work well in combination with overhead traveling cranes and monorail systems. In two-story piers the cargo table will be placed to extend outside of the building on the second floor and form a landing platform for the drafts which will be found to be of great value.

The other types of handling apparatus on the piers will depend so much upon the type of cargo and on the general operating system that very little can be said of equipment which could be regarded as standard, as the individual case will have to be decided after studying its requirements. One thing, however, should always be set down as a hard and fast rule in pier design: "Never employ a design which at a later date may block the installation of possible mechanical handling apparatus." It will often be found that certain changes in cargo or system will need different treatment than what is supposed to be right at the time of designing the pier. A low shed will make installation of handling apparatus difficult and knee braces for the girders, curtain doors winding up inside the building, stairways in the bays proper and similar details are examples of what should not be in modern constructed piers.

Taken all in all, we will have to employ our well-known American creative ability and practical sense to develop the handling systems to a point where we will stand as the leaders of the world.

Observation of the moneys and efforts spent in the European countries for efficient handling systems and efficient motorships to carry the cargoes should teach us that we certainly ought to wake up before it is too late.

HARBOR CONSTRUCTION NOTES

Skinner & Eddy Terminal.—Norton, Lilly & Company, agents for the Isthmian Steamship Line, owned by the United States Steel Products Corporation, and for the Societe Generale de Transports Maritimes a Vapeur of Marseilles, have announced that the Skinner & Eddy shipbuilding yard, Seattle, will be used as the Puget Sound terminal of the two steamship companies. Skinner & Eddy recently began dismantling the yard of its shipbuilding machinery. The yard will form an excellent steamship terminal, wharves already being in place and buildings being available for sheds. The area of the yard is twenty-five acres.

Warehouses for Alaska.—Brown & Hawkins, of Anchorage, Alaska, are planning the construction of warehouses at the principal ports of Southeastern and Southwestern Alaska from Ketchikan to Cook Inlet.

New Seattle Dock.—Work has begun on a large lumber dock for ocean vessels at Kirkland, on Lake Washington, Seattle, where vessels will not be affected by the tide. The lake is fresh water and is connected by a canal with Puget Sound.

Pier Site Purchased.—The site for the Ballantyne pier at the foot of Heatley Avenue, Vancouver, B. C., has been purchased from the Great Northern Railway and the Weaver Estate, according to a statement issued by the board of harbor commissioners. Grant & McDonald, contractors for sub-surface work, were instructed to proceed with the dredging and filling of the foreshore.

Seattle Port Earnings.—Net earnings of about $100,000 by the Seattle Port Commission properties for 1920 are forecast by the return for the first seven months of the year. After about $56,000 had been set aside for depreciation, and interest and overhead charges allowed for, the earnings were $17,731. The Smith Cove Terminal netted $71,934; the Spokane Street Terminal, $19,740. Weighing and rentals were profitable. The other terminals lost money.

Colombian Port Work. — Barranquilla and Cartagena, Colombia, to which the vessels of Swayne & Hoyt's Pacific-Carribean-Gulf Line ply, giving direct connection with the Pacific Coast, plan harbor improvements to eliminate cargo congestion. Cartagena's program comprehends increasing docking facilities and dredging the canal connecting the city with the Magdalena River, so that the river steamers can go there to load. An organization of Barranquilla has signed a contract with the national government for the opening of the bar at the mouth of the Magdalena River so that ocean-going vessels may go to the city. Neither of these projects will be of any immediate benefit in relieving the existing congestion, however. Barranquilla's situation has been worse than that of Cartagena, as it handles twice as much freight as Cartagena.

Oil Tanks at Perim.—Two oil tanks of a capacity of 8000 tons each are being constructed at the Island of Perim, Straits of Bab el Mandeb, near Aden, for the Asiatic Petroleum Company and the Shell Transport Company. They will be controlled by the Anglo - Saxon Petroleum Company, an allied Corporation. A second 2,000,000-gallon tank is being built for the Anglo-Persian Oil Company at Aden. Arrangements for obtaining fuel oil at Aden must be made with the London office of Shaw-Wallace & Company, Limited.

New York Harbor Plans.—The Commission of Docks of New York City has formulated plans for a great waterfront improvement to cost about $50,000,000 and to require ten years or so for completion. The commission would construct eighteen new piers from 950 to 1025 feet in length on the North River; two piers would be 100 feet wide and nine 125 feet wide. These works, the proposed vehicle tunnel to New Jersey and the Cunard and Luckenbach terminal plans will go far toward solving New York's dock problem.

Pneumatic Grain Unloaders at a British Port

CHINA BASIN, SAN FRANCISCO

PLANS have been drawn by Frank G. White, chief engineer of the Board of State Harbor Commissioners, California, and approved by the board, for extensive improvements in the China Basin area, San Francisco. At an estimated cost of $2,300,000 the board will improve the area lying between the Embarcadero, China Basin, Third Street and Berry Street by tearing down the Hay, Berry Street, Second Street and Third Street wharves; constructing a seawall extending from Third Street, near the north end of the Channel Street bridge, to the Embarcadero adjacent to Pier 46 and along the Embarcadero to connect with the existing seawall; reclaiming the land within the seawall by filling with dredged material; and constructing a reinforced concrete wharf over the outer slope of the seawall from Third Street to Pier 46 and a combination wharf shed and warehouse of reinforced concrete facing the wharf. On the wharf and behind the warehouse and elsewhere as needed will be railroad tracks.

THIRTY-FOUR FEET OF WATER

Plans of the wharf are for a reinforced concrete pile structure extending to the toe of the rock seawall, with a depth of water alongside of thirty-four feet at low tide. One railroad track will be laid on the wharf. Immediately inshore from the wharf will be the wharf shed, 816 feet long, six stories high; 123 feet wide on the main floor, 110 feet on the second and 100 feet on the four warehouse floors, the difference in width being due to a stepping-back of the walls in order that the weight of the main building on the seaward side may be borne inside the bulkhead wall. This stepping-back also will provide landing platforms at the levels of the second and third floors. The use of revolving semi-portal electric cranes will permit the handling of cargo between vessels and the first, second and third floors of the building in one operation; and whip hoists, mounted on the roof, will serve the three upper floors on the wharf side, while inside the building will be elevators and other conveying equipment.

THREE DEPRESSED TRACKS

Behind the building will be three depressed railroad tracks, which also will serve the industrial property available between the tracks and Berry Street. Berry Street will be widened and improved, and thus will become a principal thoroughfare connecting the Embarcadero with Third Street and the south portion of the waterfront.

A summary of the additional facilities that will be provided is as follows:

A wharf 990 feet in length provided with a shipside track.

A combined wharf shed and warehouse, six stories in height, with floor areas as follows: first floor, 100,370 square feet; second floor, 89,760 square feet; third, fourth, fifth and sixth floors, 81,600 square feet each. If the first and second floors are used as outbound and inbound transit sheds and the other floors as warehouses, the improvement will provide 190,130 square feet of wharf shed space and 326,400 square feet of warehouse space.

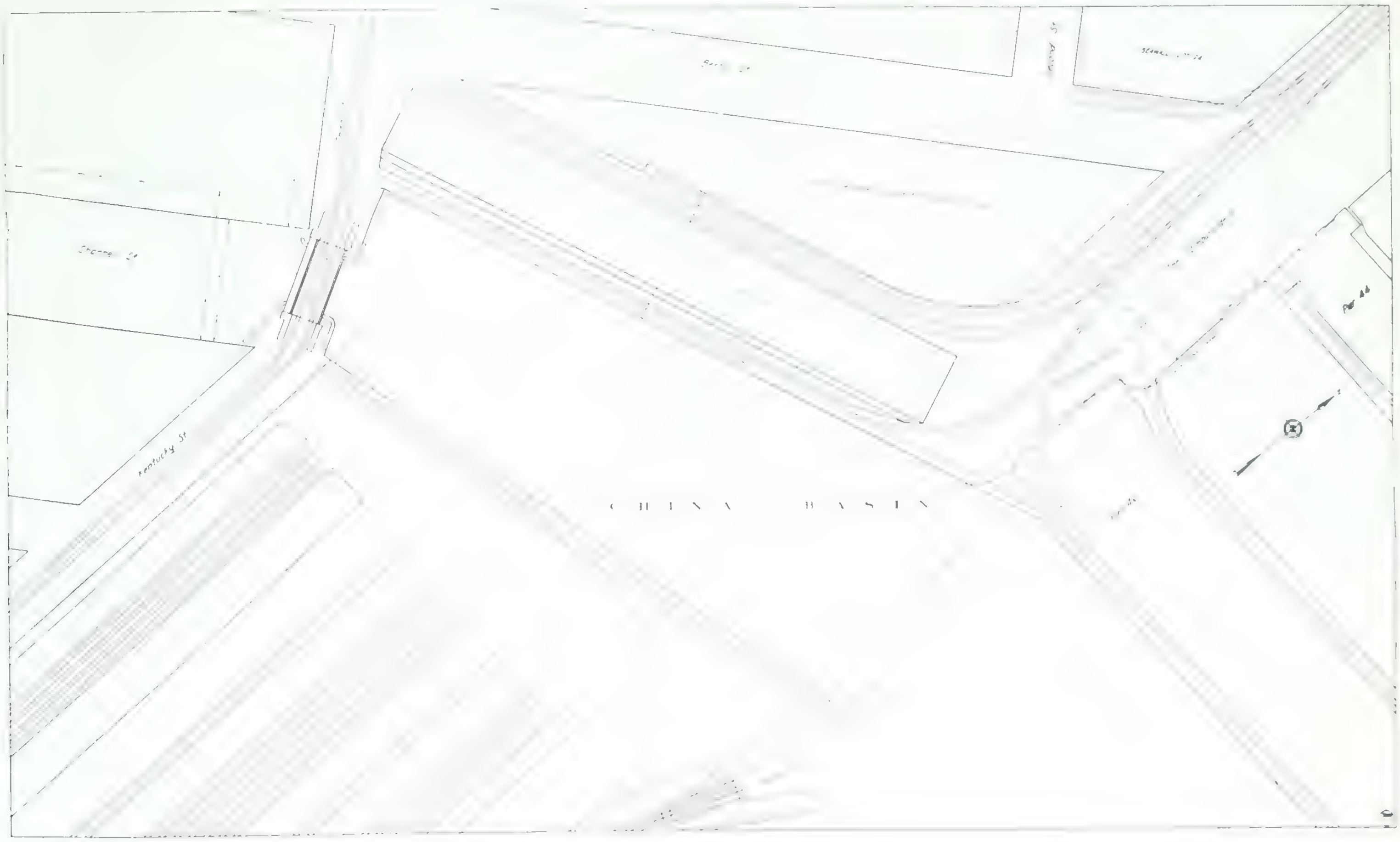
Inbound and outbound depressed tracks behind the building connecting with the Belt Railroad.

Industrial property fronting on Berry Street with an area of 105,000 square feet.

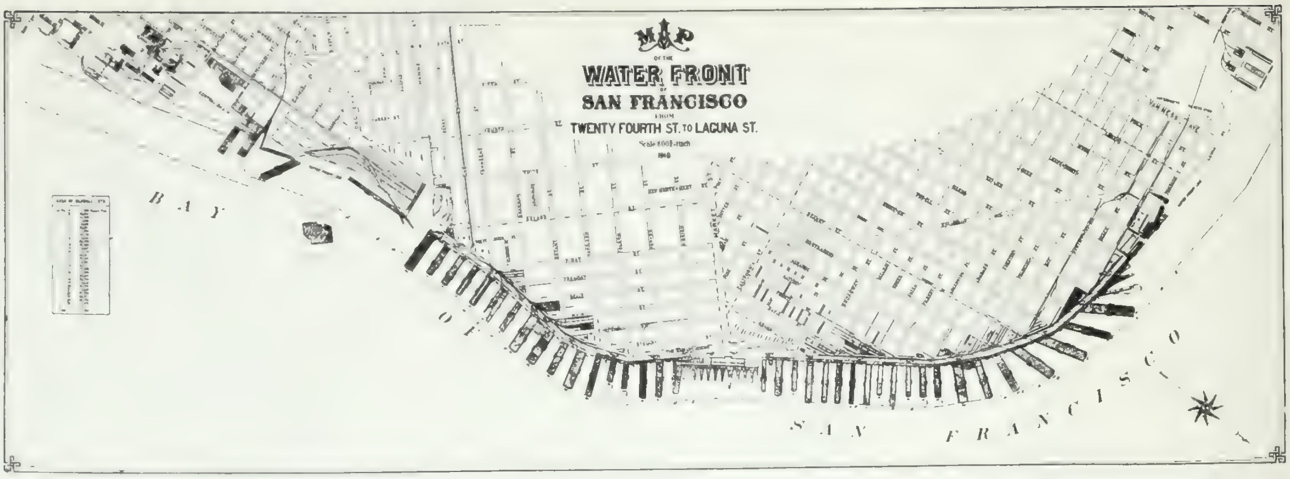
The old structures, which will be replaced by the new work, have been in place for several years.

A UNIQUE WAREHOUSE

"As an adjunct to this development and to partially replace the structures which will be removed, it is proposed to enlarge the wharf on the opposite side of the channel by the construction of a triangular addition between the existing car ferry slip and Third Street. This addition will have an area of 42,000 square feet and will furnish a berth 830 feet in length," said Mr. White's report.



Plan showing the contemplated improvements at the China Basin section of the San Francisco water front



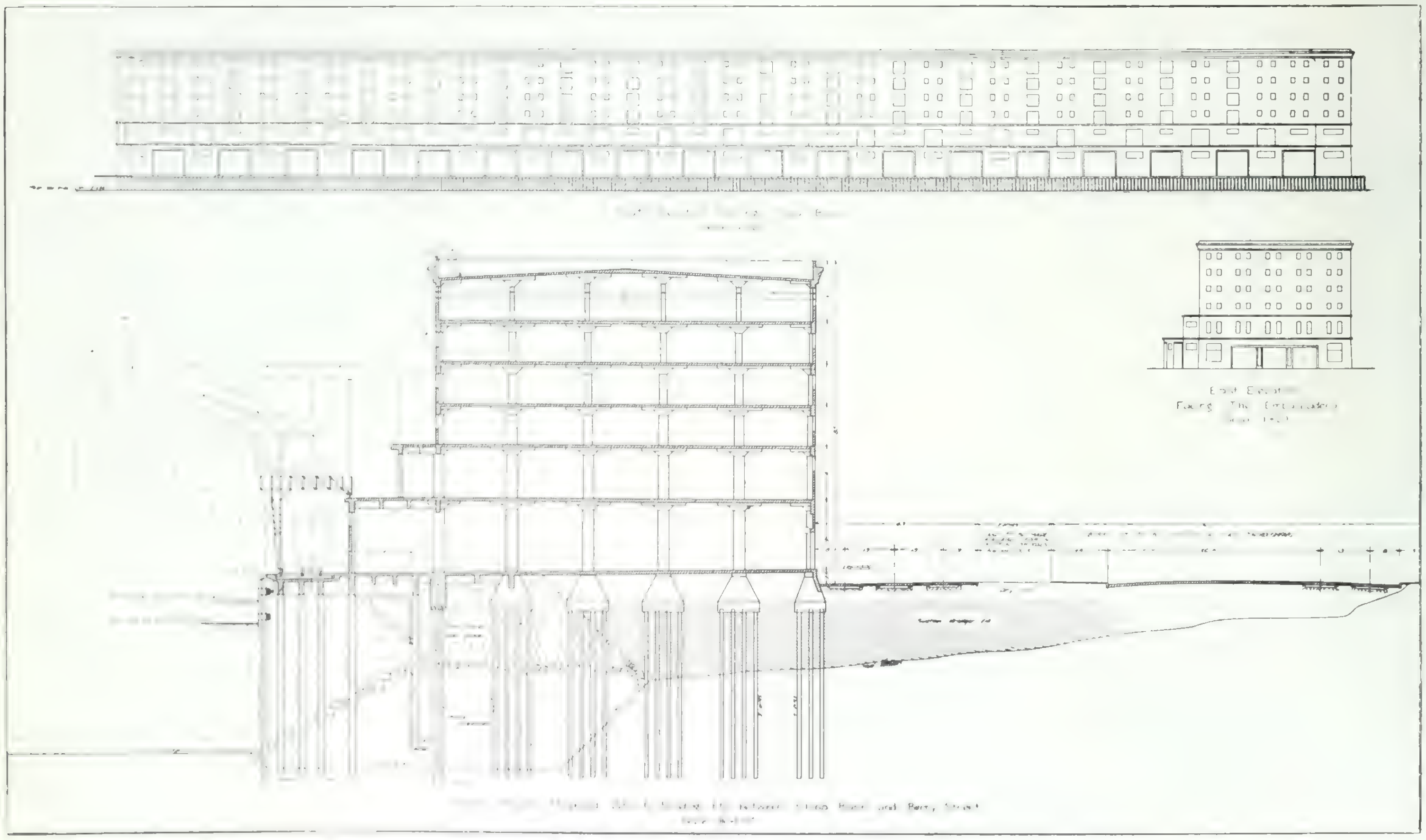
Map of the waterfront of San Francisco showing the location of Channel Street and the importance of the improvements in that location to the whole of the balance of the waterfront

"The improvement of the property as outlined will provide facilities unequaled anywhere along the waterfront. The wharf shed and industrial areas will add materially to the existing harbor facilities. The most important part of the project, however, is the warehouse, so located as to permit of direct transfer of cargo to and from ship. This will be the first multiple-story warehouse on the Pacific Coast, if not in the United States, located immediately adjacent to deep water, with a berth which will permit of docking large ocean steamships."

STORAGE SPACE NEEDED

As examples of the need of warehouse space, Mr. White cited the demand of grain exporters for storage room for sacked grain awaiting loading. Commodities discharged at San Francisco for transshipment heretofore have lain on the wharves, with consequent confusion and congestion, or have been carted to warehouses and returned to the waterfront for loading—an expensive procedure. Hawaiian canned pineapple is a case in point. Of the millions of cases transported by the Matson Navigation Company and other lines during the year, many thousands are for export to Europe, and are discharged at San Francisco to be reloaded. The new warehouse will take care of such commodities satisfactorily.

Pipe soundings discovered quite favorable foundation conditions. At a depth of forty to fifty feet below city datum the bottom is a mixture of hard clay and sand, and clay decreasing to a small amount within a few feet. There probably is no better place, from the standpoint of foundations, on the San Francisco waterfront for such structure as planned.



Elevations and section of proposed seawall, fill and six-story warehouse on the China Basin section of San Francisco's waterfront

EUROPEAN MARINE NOTES

Exclusive Correspondence of Pacific Marine Review

SEVERAL very interesting facts are brought out through the medium of the figures which Lloyd's Register has just published. We have, for example, the decline of the German shipping industry and the revival of the American. There is Japan's increase of steam tonnage and good movements in connection with the mercantile marines of France, Italy, Spain, Holland and Norway. Of course, the United Kingdom has now a long lead of other countries in steamships, its total in June being 18,111,000 tons gross, or 781,000 less than in June, 1914. The United States comes next with 12,406,000 tons seagoing steamers, an increase of no less than 10,379,000 on 1914. Germany is nearly wiped out, its total being 419,000 tons, a fall of 4,716,000. France has 2,963,000 tons, an increase of 1,041,000, and Japan 2,996,000, an increase of 1,228,000. Norway and Holland, which alarmists said were going to do great things, only show increases of 23,000 and 301,000, respectively. In 1914 the United Kingdom owned 41.6 per cent of the world's steam tonnage; the present percentage is 33.6. Norway, which occupied the fourth place, is now seventh, while Japan, which was sixth, is now third.

Excluding vessels trading on the Great Lakes of North America, the United Kingdom percentage of the world's seagoing steam tonnage has decreased from 43.9 in 1914 to 35.1 in 1920, while the proportion of the United States, which was 4.7 per cent six years ago, now reaches 24 per cent. The world's net increase is 8,501,000 tons. These totals, of course, do not take into account the present efficiency of the world's tonnage as compared with 1914. During the last few years virtually no replacement of steam tonnage has taken place solely for reasons of age, whereas before the war a very considerable amount of old steam tonnage was broken up each year. The reduction in sailing tonnage since pre-war time—say, June, 1914 — amounts to 641,000 tons, which is a much smaller decrease than what occurred in previous periods of six years. This shows that the shortage of tonnage has to some extent given a new life to the construction of sailing vessels.

ENGLISH SHIPS FOR GERMANY

Reference to the decline of the German merchant marine reminds me that the question of the sale of surrendered vessels is receiving a good deal of attention from the German press, and, according to the "Hamburger Korrespondent," negotiations are proceeding between the Hamburg-Amerika Line and other shipping companies at Hamburg on the one hand, and English shipowners on the other, in relation to the proposed transfer to the former of a number of German ships which were formerly surrendered to Britain. The English firms concerned are said to be willing to sell the vessels to the Germans on a credit basis extending over a period of five years. The former put forward the contention that the ships should fly the English flag for two years, but this was declined. The negotiations are being continued respecting the flag question and other details of the suggested agreement.

Another German newspaper, dealing with the same subject, states that the initiative in the matter was taken in English circles who have abandoned their reserve towards German shipping since German shipping companies have concluded, or are in course of concluding, agreements with American companies. The English government, the newspaper remarks, must be in agreement with the proposal, as Count Lucowich, of the German legation in London, was asked to offer the ships to the German companies and, should the occasion arise, also to the German government, who, it is stated, desire to establish a State shipping undertaking for special purposes without competing with German private enterprise. The ships in question have been in the market for some time, and represent a large number.

REPARATION AND THE PRICE OF SHIPPING

Prime Minister Lloyd George, in a recent speech, pointed out that in the 2,000,000 tons or thereabouts of ex-German shipping now in Britain's possession three is ample security for the relatively small advances this country is preparing to make to Germany for her economic reconstruction under the coal proctocol framed at Spa. Lloyd George, however, was unable to specify the price at which the shipping in question would be finally entered in the general reparations account. As a matter of fact, the proposed valuation has given rise to a lively inter-Allied discussion as to whether the price per ton should be assessed as that which ruled at the date of the armistice or that of the actual surrender of the vessels or of their subsequent sale, etc. Hence assessments varying from $68 to $160 per ton. The question is still in abeyance, which explains the vagueness of the agreement as published in official memoranda. Much of the ex-German tonnage is, however, of the liner type, and passenger vessels, like oil tank ships, are still badly needed. High prices are being offered for oil tank vessels of considerable age, and it may be that liner companies which are in urgent need of vessels to maintain their services would offer substantial prices for some of the German passenger ships in spite of age. This remains to be seen. The prime minister states that he cannot say whether the price is £20 or £25 ($80 or $100) until the "market is made." Shipping managers are asking when the market will be made, and what exactly is meant by selling the ships in the market. No information has yet been forthcoming as to whether the intention is to offer the ships publicly by auction to the highest British bidders, or to dispose of them by private negotiations. It is recalled that the efforts of the Ministry of Shipping to sell the government standard cargo ships individually were not exactly successful, and now, with freights and the values put on cargo steamers slipping downwards, it is becoming increasingly difficult to estimate what values should really be placed on the different types of vessels. The fact remains that the value of $240 a ton of last year was a greatly inflated one, caused largely by the German ruthless destruction of merchant tonnage, and it would clearly have been wrong if Germany had been credited with any such values.

SEAMEN'S HOURS AND WAGES

First at Genoa and then at Brussels seamen have been meeting internationally to discuss the question of hours and wages. British seamen are apparently determined to secure the forty-eight-hour week and British shipowners are equally determined to take up a strong negative attitude. All kinds of statements and manifestos have been issued by both sides. "If the seamen were to succeed in their demand for a forty-eight-hour week there would have to be an increase in trans-Atlantic passenger rates ranging up to nearly $28," said A. B. Cauty, the joint manager of the White Star, Dominion and American Lines, Liverpool, in an interview about a fortnight ago. "A forty-eight-hour week for seamen would indeed be a very serious matter for companies such as the Cunard and White Star, maintaining very fast passenger services across the Atlantic. High speed, of course, means a large stokehold and engine room staff. Heavy passenger lists necessitate a great number of stewards, etc. To increase these staffs—in addition, of course, to the deck hands—to enable an eight-hour day to be worked would entail a very large addition to the total complement carried. For the Aquitania the increase would be from 250 to 300 men in all branches. In wages alone this would cost from $14,000 to $16,000 a month. The Mauretania, burning coal, would need about 260 hands, costing in wages about $14,800 a month.

"Besides the question of extra wages, extra food has to be considered. And particularly, it must be remembered that a large amount of passenger space would have to be given up for the accommodation of the extra hands. I can give you the total cost in the case of the Baltic and Adriatic of 24,000 tons; figures are practically the same for the Cedric and Celtic, which are slightly smaller. Extra wages $10,840 per month, extra victualing

$5156, loss of third-class passenger capacity $29,200; total $45,196 a month. This is for 191 extra hands. Additional running expenses, coupled with decreased passanger carrying capacity, must inevitably send up passenger rates and freights. On the first-class passenger rate from England to New York, the increase would have to be $26.80, second-class $12, and third-class $6.80."

INDUSTRIAL LULL SPREADS TO SHIPBUILDING

Something of a decided lull in manufacture and trade has spread all over Great Britain during the last month. Whether it will persevere remains to be seen, but the outlook is gloomy. The check has spread to the shipbuilding boom, which on the Mersey anyhow is now regarded as being over. The question is being asked there whether the boom may not be followed temporarily, at all events, by a feeling of depression. In the ship repairing departments the slackening is very marked. The reconditioning of ships after war service is practically at an end, and the "slump" may soon become serious. So far as new tonnage is concerned, it is believed that any further addition to the cost of construction would be disastrous. I was told that if the last wage demand of the trade unions associated with the shipbuilding industry had been sanctioned by the Industrial Court, cancellation of orders for ships could scarcely have been avoided. The disturbing factor with shipowners is the sharp fall in freights. So long as these were high no price seemed to be prohibitive for new construction, but competition for cargoes has suddenly become keen, and rates are falling all over the world. I cannot hear of any orders having been cancelled on the Mersey up to the present, but shipping companies there, as elsewhere, who have new boats on the stocks are reported to be already nervous as to the character of the employment they will be able to find for the vessels. The situation as yet may be regarded only as disturbing, and some people believe that the outlook will improve again, but it is fast becoming apparent that if the shipbuilding firms are to retain even a part of the prosperity enjoyed in recent years they must be in a position to quote a firm price in the future and not have to make their contracts subject to expansion in respect of rising costs.

SHIPPING SALE RESTRICTIONS

In view especially of the present state of shipbuilding and the freight markets, criticism is still being made in shipping circles of the existing government restrictions on the sale of British tonnage to foreign owners. The London Times points out that the Ministry of Shipping will only consider granting permission for the sale of ships of over fifteen years old, and it then subjects any suggested transactions to exacting requirements. Owners are called upon to pay 15 per cent of the proceeds of a sale to the government and to give an assurance that the remainder of the money will be invested in a new steamer of equivalent value or will be employed in the purchase of an ex-German vessel. As events have developed, it is arguable that a wiser policy would have been to allow the free sale of old tonnage to foreign owners at the high values ruling only a few months ago, on the understanding, perhaps, that the money was invested in modern ships later, if and when costs of construction decline. Today there is very little inducement to build cargo tonnage—owners seem more concerned to cancel, on payment of fines, existing contracts, and one result of the restrictions is likely to be that British owners will find themselves with a large amount of old tonnage at a time when there may be only sufficient employment for the most efficient carriers.

BRITISH SHIPPING CONDITIONS

By CAPTAIN ROBERT DOLLAR

FREIGHT rates are declining very fast. In a recent number of a timber journal, the following occurred: "The freight market is thoroughly disorganized. The drop has been almost too rapid and there are no market rates, as during the past thirty days Canadian prices have dropped from 300 shillings to 180 shillings and Baltic rates have dropped from 200 shillings to 100 shillings; in fact, large steamers have been chartered at still lower prices. Time charters have dropped to fourteen shillings on the deadweight and the end has not nearly been reached; and it will go on until it will be a survival of the fittest. Vessels are now chartering at ten shillings."

FREIGHTS AT PRE-WAR LEVEL

Taking into consideration the great increase in the cost of operating steamers, freights are now about as low as during the hard times before the war. European sailors' wages have increased 300 per cent, bunker coal 400 per cent, stores of every kind more than 200 per cent, stevedoring 200 per cent, and the delay in ports is one of the great causes of extra cost. In Cardiff recently more than 600 steamers were waiting their turn to get bunkers or cargo, and many were waiting on employment.

In every port vessels are waiting their turn either to discharge or load or to get bunkers. All this accounts why and how the great increase in new tonnage of over ten million gross tons is absorbed as compared with the tonnage of pre-war times, so that when good dispatch in ports comes up to pre-war times there will be a lot of steamers unable to get business. It is true the commerce of the world has increased, but not nearly as much as the building of new ships. In ship building a year ago reports were published that the yards had contracts enough to keep them fully employed for two years. That was true. But it is also correct to say that many hundreds of contracts have been canceled even after having paid one, two and sometimes three payments. A great many of these were Norwegian. Of course, reliable and strongly financed firms have to carry out their agreements, and ships coming off the stocks now are being offered for sale at prices much less than the contract prices of two or three years ago. Ordinarily, cargo steamers can be bought at $72 a ton. High-class freighters, 12 to 14 knots' speed, are offered at $20 a ton more.

END IS NOT YET

Those prices represent a big slump, and all seem to be sure that the end is not yet and in a year's time prices will be very much lower. Of course, other changes must also take place. Labor will be lower, but before that takes place the necessities of life will have to come down. The price of steel is bound to come down. Then the most important part of it all is that labor in coal mines and steel-producing plants and in shipbuilding will have to get back to pre-war times, and every man do a day's work for a day's pay, and not as at present give a half-day's work for a whole day's pay. That appears to be the greatest difficulty that Great Britain is laboring under today. But it is fair to say that Britain has not a monopoly of those conditions, as they are prevalent in other countries. And until these changes take place, the shipbuilding plants will not be able to make very much lower prices. And shipowners will not buy ships at present prices; therefore, so long as the low freights prevail, shipowners will not build except where special ships are required. The fact remains that with this exception no new contracts are being made and with the present contracts on hand and with few exceptions all the yards would be out of employment in a year's time.

MANY SEAMEN IDLE

The secretary of the Seamen's Union at Cardiff, in a very sensible article, which was published in many papers, stated that he had 1800 men on his hands out of employment, caused by the miners working only seven hours a day and only doing half work. This has decreased the coal for export to the extent of 50,000,000 tons, thereby causing about 1000 ships to be laid up throughout England for want of cargoes, and their crews are ashore out of employment.

ISLAND WRECKS VI

By ANDREW FARRELL

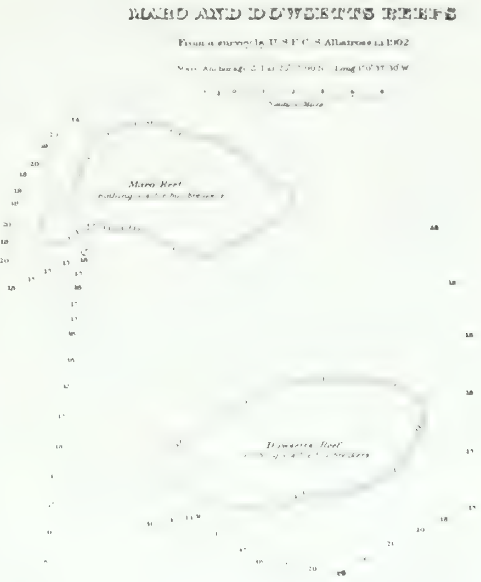
A NOT uneventful sharking expedition to the leeward islands was made in 1872 by the Hawaiian brig Kamehameha V. First of all there were the aquatic hogs of French Frigate Shoals, which would have delighted the author of "The Origin of Species." Left on the island when the bark Daniel Wood was wrecked in 1867, the pigs had thriven lustily, although there was little vegetation and less fresh water; and had adapted themselves completely to their environment; for when a boat from the Kamehameha V landed on their islet they took to the water and swam off to a cluster of rocks, just awash, where they seemed quite at home. This episode goes to prove that, whereas the pig in the sty remains a pig, he needs only nautical experience to become a gentleman of parts (particularly if he adventures into waters infested by sharks).

THROUGH MAZE OF ROCKS

From French Frigate Shoals the Kamehameha V sailed westward. At 3 o'clock in the morning of July 11, in the darkest hour of a pitchy night, she struck an uncharted reef. Dawn disclosed sunken rocks strewn in all directions, through which she had wound her course, until her bows finally blundered into a patch of coral. This reef was not on any chart in the possession of the brig's master, Captain E. Wood, although it may have been that on which the Two Brothers was wrecked fifty years before, despite the fact that Two Brothers Reef (E. D.) is charted far to the east of the place where the Kamehameha V struck. Captain Wood named his discovery Dowsett's Reef, after the owner of the brig, and with tolerable accuracy* determined the position of the center as latitude 25:13 north, longitude 170:38 west. The reef extended northwest and southeast about eight miles, from latitude 25:08 to 25:16; ran to a point on the northwest and spread to a width of four miles on the south, where it was fringed with a narrow strip of rocks even with the water. The weather side of the reef was a steep wall.

But the most enticing experience was at Lisiansky Island, whither the Kamehameha voyaged after being pulled from Dowsett's Reef. Said Captain Wood's report:

"July 24 made the reefs at Lisiansky Island, and saw a wreck on the reef to the southeast of the island. Came to anchor, and at 3 p. m. sent off two boats for the sand spit, about two miles off. On the west side found a studdingsail boom, rigged as a flagpole, with signal halyards rove. On the northeast side found the long-boat on the beach, having drifted ashore. She had been rigged for sea, and had capsized or stove on the rocks. She had a canvas deck, a bowsprit, rigged; the last with the rigging had been cut clear of the boat. She was bady stove. On the south end of the island found the place where the crew had landed. There was found her quarter-boat, with a mast and remains of a sail, moored to two water casks, half full of fresh water, and a grapnel offshore. She was a wreck, being badly stove. On the sand beach were the remains of clothing, some carpenter's tools, a bag of bread, a box of Jenny Lind cakes, and three of soda crackers, all wet with rain water; a tin chart case, empty; some tins of pineapples, put up in New York (Hawaiian newspapers of 1920 please copy); the poles that had been used for a tent; a topmast studdingsail, made up. The wreck was about four miles off, and it was too late for the boats to get to the her that day, and as the weather looked threatening, we were compelled to go on board. There was the appearance of a flag at half mast on one of the masts that were standing, and a boat's crew volunteered to make the attempt to board her that night, which, however, was not done.



LAST ENTRY IN LOG MAY 9

"The next morning at 7 o'clock started for the wreck, Mr. Andrew J. Cahill in charge of the boat, the wind blowing hard in squalls with heavy rain. The boat was five hours in reaching the wreck and three in getting back. Found the wreck to be a brig, laying with her head to the northwest, full of water; the starboard rail out of water; the maintopmast gone at the cap; main yard across, with remains of mainsail; the foremast, topmast and topgallant masts standing, with all the yards across; foretopsail set, remains of topgallant sail flying, which was what had appeared like a flag at half mast the day before. Two casks of fresh water were lashed securely to the larboard quarter outside. She lay on the northeast side of the reef, which extends ten to twelve miles to southeast. No breakers in sight from the wreck. Mr. Cahill cut a hole in the house on deck, and getting into a stateroom, found the vessel's log book, which he brought away. By this it appears that the wreck was that of the North German brig Wanderer, of Hamburg, from San Francisco, bound to Port May on the coast of Tartary. The last entry was dated May 9. The log book was brought to Honolulu and placed in the hands of the acting German consul."

As an account of what Captain Wood found on Lisiansky, this is both concise and complete; but it leaves unanswered many questions; particularly, what became of the crew, which, so far as I am aware, remains unsolved, and now, of course, insoluble.

SHARKS AND MEN

Caught in heavy weather off the coast of Hawaii, July 26, 1885, the little schooner Pohoiki was running for shelter when a squall struck her, capsizing her and throwing her entire company into the sea. Two men seized a boat in tow of the schooner and clambering into it attempted to rescue those still in the water; the wife and child of the captain disappeared almost immediately, however, and about the spot where they had gone down appeared the telltale dorsal fins of sharks.

In the meantime the sharks, attacking the captain, had pulled him under water and torn off his right leg in a manner peculiarly horrible. While attempting to get him into the boat the men were terrified to see that another shark had fastened itself upon him and was mutilating his left leg; two sailors, who continued to swim, also were attacked, one being bit in the left side, from which a great fragment of flesh was torn away; while the other lost most of his left arm. But all three were hauled into the boat.

CAST BACK INTO SEA

Thereupon, so ran the tale, the captain cried to be cast back into the sea. "He could not live, so we threw him overboard again and he was drowned." Lost were the captain and his family; and lost, according to one account, the two mutilated sailors; another story says that they were saved. After three days of intense suffering the remainder of the crew landed on Kona, Hawaii.

Those unable to reconcile this tale with others in which men and sharks swim and dive together may speculate all they wish. What sharks will or will not do is one of the magnificently puzzling questions of the sea; or, rather, it is a favorite theme of liars. In view of this, why should I tell of the shark-killing dogs? No one would credit the narrative, veracious and voracious though it might be.

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* Captain Wood's accuracy is tolerable only in comparison with that of other masters of his day, because the center of Dowsett's reef is now given as latitude 25:20 north, longitude 170:30 west; and the reef scarcely can be said to extend northwest and southeast. In dimensions Captain Wood was accurate within a mile or so. Two Brothers Reef is reported to lie in latitude 24:14 north, longitude 168:28 west, but several vessels have searched for it without success, and great depths were obtained at its reported position.

VESSEL BURNS AT SEA

Twenty-one survivors of the British ship Norval, abandoned burning at sea in latitude 10:34 north, longitude 117:39 west, arrived at Mahukona, Hawaii, March 24, 1882, after a 2000-mile voyage in twenty days. Another boat, in which were the first officer and seven men, did not make Hawaii, but was picked up instead by a vessel bound to Europe.

The Norval sailed from Hull October 26, 1881, with a cargo of coal for San Francisco. On the afternoon of Thursday, February 28, the ship then being in latitude 8 north, longitude 115:40 west, a smoky vapor and gas appeared at the fore hatch. By the next morning the smell of gas had increased; and at 9 o'clock, when the main hatch was opened, there issued smoke, steam and a "strong smell of burning." Water was pumped into the hold abreast of the main hatch for the remainder of that day and the next and until the afternoon of March 2, when some of the pumps were discontinued. Pumping to free the ship of water then was begun, with the result that water in the well had been reduced from seven feet to two feet ten inches on the afternoon of March 3. With the water up came cinders and pieces of charred wood; nevertheless, there was hope that the measures taken had been successful, and the ship was held to her course.

"BURSTS UP EVERYTHING"

Soon after the men had ceased pumping there came, without any warning whatever, an explosion of frightful violence that "burst up everything." The first mate was sitting in his room writing in the log. That book was blown into the corner of the cabin, tearing out the leaf on which the mate had been writing, and the captain's memorandum book was destroyed. The mate himself scarcely was injured.

Captain George Halliday immediately clewed up and backed the main yard and lowered two boats into the water and stocked them with provisions. They lay by the ship all night; but were taken in during the morning of March 4 and sail was made in order to get as near as possible to Hawaii. At 11 o'clock fire was issuing from the pump-well; at noon the ship was very hot, with great volumes of smoke rising from the after and main hatches; and all hands took to four boats. Two of these were twenty-six-foot life boats; the others were smaller. At 1.45 o'clock the mainmast went over the side. From the mainmast to the stern blew a blaze of fire. At 4 o'clock the mizzenmast also went over the side, and the ship, enveloped in flames, played off before the wind.

MATE'S BOAT DISAPPEARS

On the next morning, March 5, the first mate's boat had disappeared, not to be seen again. This parting occurred about latitude 13:34 north, longitude 121:40 west. On the morning of March 6 the boatswain's was abandoned and the crew transferred to the two craft in charge of the captain and second officer, which now held all told twenty-one men.

With strong trades from the northeast, the boats made daily runs of from 100 to 135 miles, until March 20, when a calm fell, reducing the run that day, even under oars, to forty miles. On March 24 at daybreak land was sighted, and by 6:30 o'clock the boats were well toward shore, which, obscured by rain and mist, could not be made out well. Beating around the southern part of Hawaii the boats found the steamer Likelike at Mahukona, whence the crews were taken to Honolulu.

"Thank God, everyone is in good health and, I am glad to say, looks well," runs the log of Captain Halliday. "Our food was one biscuit each night and morning, with a six-pound tin of beef or soup or bouillon, making the same do one and a half days among twelve men, with about three parts of a pint of water in the morning, with same at night, and about one-half pint at noon; in all about one quart daily. I never was asked for water, only on one or two occasions, but thirst was beginning to tell on us all the last four or five days."

About midnight July 15, 1886, the British ship Dunnotter Castle, from Sydney with coal for San Pedro, struck on a sandy bottom between two reefs of Ocean Island. From both sides of the island ran the ledges of rock, trapping the Dunnotter Castle securely and making futile all efforts to float her, although the crew worked for four days jettisoning cargo and attempting to stop with canvas a great hole stove in her bottom by the rocks. Soon after she struck her water tanks broke adrift and salt water, mingling with the fresh, spoiled all except a small quantity; some provisions, however, were saved.

After the crew had remained on the island nine days, it was decided to send a boat to Hawaii for assistance, in charge of the first mate, Henry Norman, of Loewstaff, Suffolk, England; the boatswain and five men. They took twenty-eight days' provisions and a quantity of water. With the twenty-two men who remained on the island they left provisions for the same number of days, and of water 283 gallons.

Then began one of the longest voyages ever made from the leeward shoals, fifty-two days. On August 31 Neckar Island was sighted, to no avail, because the boat could not get within four miles of land. On September 5 Bird Island was picked up; and two days later the boat pulled entirely around it, only to discover that there were no traces of water; whereupon the voyage was resumed to Kauai, at which the men arrived September 12.

A HALF BISCUIT A DAY

For three weeks after departing from Ocean Island the crew of the boat was on half rations. Thereafter, when the scanty supply almost was exhausted, the allowance was cut to a biscuit and a pint of water a day. This regimen continued from August 23 to September 1; on that day the allowance was reduced still more, to one-half biscuit and one-half pint of water, to which were added two booby birds caught off Bird Island.

The steamship Waialeale was dispatched from Honolulu to Ocean Island to take off the others of the Dunnotter Castle's crew. When the Waialeale arrived in the early morning of September 20, no man was to be found on the island. At length, hanging to a pole in a shelter on the beach, a bottle was discovered, in which was a letter from Captain H. Martin, saying that he and the twenty-two men had been taken off by the ship Birnam Wood, bound for Chile. Thereupon, that the voyage might not be wasted, Colonel Boyd, representing His Majesty Kalakaua, took possession of the island in the name of Hawaii (seeing that the bureau of genealogy had discovered that in ancient days Hawaii extended far to the northwest), and renamed it Moku Papapa.

(To be continued)

SAFETY FIRST

THE Pacific steamer Avalon, owned and operated by the Wilmington Transportation Company and carrying passengers from Wilmington to Avalon on the island of Santa Catalina, is equipped with a very abundant supply of life-saving apparatus.

She carries eight 30-foot Lundin life boats aft and eight 26-foot Lundin life boats forward, and enough of the American Balsa Company's A B C rafts to take care of 1500 persons. The life boats are all carried under Welin davits.

This equipment is more than ample to take care of every passenger that could possibly be crowded on the decks of the Avalon.

EFFICIENT TUBE CLEANER

THE Poole Flexible Tube Cleaner for either fire tube or straight tube water tube boilers has just been placed on the western market. This tube cleaner is the most economical cleaner on the market. It is made of strong cutters followed by a wire brush to sweep out the deposit. This tube cleaner saves fuel, assists in producing a maximum of power and lengthens the life of the tubes. All sizes are carried in stock at San Francisco by C. L. Rea, manufacturers' agent.

THE CABLE AND RADIO SITUATION

A FEW years ago the people of the United States were concerned little with transoceanic communication. Prior to the outbreak of the war our foreign trading houses were relatively few; deep-water vessels flying the American flag were far between; we were not interested greatly in international politics; in short, we lived largely out of touch with the remainder of the world, in a situation that we were pleased to describe as "splendid isolation." All this was changed by the war. We learned that quarrels between Austria and Serbia might affect us hugely; our overseas' commerce leaped upward with each day; a new American merchant marine was created; and we discovered a hundred new points of contact with the remainder of the world. Almost coincidentally with the birth of this world-spirit came a disorganization of international communication, caused in part by the enormous demands of the several governments, the dispatches of which had preference; in part by the general disarrangement of everything incident to the war, and the inability of companies to maintain their equipment in a state of high efficiency; and also caused by the imposition of censorships and by the marked bungling of government supervision and operation.

FOREIGN TRADE COUNCIL'S REPORT

With the ending of the war conditions improved somewhat, but the disarrangement of international communication continues to be of great importance to importing and exporting houses, steamship companies and, in fact, to all corporations and individuals having relations with nationals of other countries. The situation has engaged the attention of the National Foreign Trade Council, with the result that an investigation and preliminary report has been made, from which one may ascertain the present state of cable and radio lines and the prospects of improvement.

Perhaps the most striking fact brought out by the report is the relative paucity of cable lines in the Pacific. That the Pacific had totally inadequate facilities has been known to anyone who had even a superficial knowledge; but that it had only one cable line between America and the Orient, as compared with almost a score between America and Europe, probably will be news to many.

FREQUENTLY INTERRUPTED

This single Pacific cable is operated by the Commercial Pacific Cable Company between San Francisco, Honolulu, Midway, Guam, Manila, Tokyo and Shanghai. The branch to Tokyo splits from the main trunk at Guam; part of this line, from Ogasawara, or Bonin Islands, to Tokyo, is owned by the Japanese government; the total length of the cable, including the Japanese government's portion, is 10,010 nautical miles. As all know who have communicated with the Orient by cable, this line is subject to serious interruption, because of the coral character of the seabed between Manila and Guam, and because of the static conditions of summer. "The Commercial Cable Company states that there is a steady improvement in transmission, which is to be attributed to the slackening of business. At present this company claims that it clears up one day's traffic before the beginning of the next business day, although generally there is a delay of about twenty-four hours to the Philippines, China and Japan," says the report to the National Foreign Trade Council.

AMERICA VERSUS BRITAIN

"There is only one line operated by an American company to the great markets of the Far East," the report continues, "and over 50 per cent of the stock of this company is owned by British interests. This is the only American cable having landing stations, other than those on the mainland of the United States, on American territory. Although Great Britain controls 44 per cent, or 133,328 nautical miles of the world's submarine cables, the landing stations at both ends of nearly all of these cables are on British soil; while the United States, with 21 per cent, or 63,933 nautical miles, does not control the landing stations at both ends of any cable, with the exception of that of the Commercial Cable Company to the Philippines."

NEW PACIFIC LINE NEEDED

The report lists four lines urgently needed now, among which is one providing "adequate and dependable connections with markets of the Far East by an additional trans-Pacific cable, to supplement present service and make it more reliable." Various beginnings have been made, both in America and Japan, looking toward the laying of such a line. Kakichi Uchida, former vice-minister of communications of Japan, proposed a new cable in the spring of 1919, in which American and Japanese capital would be interested; as for the attempts made on this side of the Pacific, the report to the National Foreign Trade Council says: "The Commercial Cable Company states that it has options on cable to be made in its turn, which it intends to use for a new line from Midway Island to Japan, so that its existing line, west of Midway, may be employed solely for the Philippines and China. From two to three years would be required for the completion of this cable. Landing rights in Japan have been applied for but have not as yet been granted. The Japanese have not yet shown any disposition to grant these rights, and construction of the cable will not begin until landing rights are assured."

It will be apparent that there is rivalry in the trans-Pacific field, with consequent probability of delay.

NO DELAY TO AUSTRALIA

American business with Australia must go by way of the Pacific Cable Board's line between Bamfield (Vancouver), Fanning Island, Suva and Norfolk Island, on which, the report says, there is no delay now. One other Pacific system is that of the United States government between Seattle and Alaska.

Much American communication with the Far East has been carried on by way of the trans-Atlantic cables, however. Conditions as regards China, Japan and the Straits will "be greatly improved as soon as the Great Northern Company and the Indo-European Company have restored their services," the report states; and adds this interesting sidelight: "It is a fact that previous to the war the cable to the Far East from San Francisco did not have enough business to make it a paying venture."

CABLES IN ATLANTIC

Atlantic cables may be summarized from the report as follows:

Commercial Cable Company—Five American-European lines, all of which touch British territory; one terminates in Ireland, one in France and three in England; no communication with the Continent possible except through British territory. Operates a cable from New York to Havana. Another line, Miama, Florida, to Havana, under construction; new trans-Atlantic cable planned.

Western Union Telegraph Company—Eight trans-Atlantic lines, all of which have British landing stations. Five cables from United States, connecting with eight trans-Atlantic lines in Newfoundland; four of these go to Ireland and four to England. Three cables from England to Continent, two of which are government-owned but operated by the Western Union. The company is constructing two short cables in Canada; one from Ireland to England; and a 1630-mile cable from Miami, Florida, to Barbadoes, connecting there with the new Barbadoes-Brazil cable of the Western Telegraph Company, London. Also has concession for 3600-mile cable, Miami-Panama-Arica, via West Coast.

United States & Haiti Telegraph Company—New York-Haiti line; company is French-owned.

ALL-AMERICAN SYSTEM

All-American System—Two cables, New York-Cuba-Panama-Valparaiso-Buenos Ayres; two new lines, Buenos Ayres-Santos and Buenos Ayres-Rio de Janeiro. No British landing stations; company American-owned. The company operates cables of Central and South American Telegraph and Mexican Telegraph Company. Is seeking concession to extend cable from Rio north to United States. Also operates three cables from Galveston to Mexico and Central America.

Two former German cables, New York-Azores-Emden, were seized during the war; the British cut one and moved the western end to Halifax; the eastern end into Penzance; the French cut the other, moving the western end to Long Island; the eastern end to Brest. The British now have exclusive landing rights in the Azores. The French line from Long Island to Brest is the only Continental line that does not pass through British territory.

CONDITIONS OVER WORLD

Of the Atlantic and world systems the report says:

"The service to Europe is about normal, except to some of the central European countries to which there is generally a delay running from twenty-four to seventy-two hours, due entirely to local conditions. The service to Asia, via the Eastern Cable from London, shows a delay of from twenty-four to thirty-six hours, due to the fact that the Eastern route is the only one of the three European routes normally serving Asia that is in operation. There is a delay of about thirty-six hours on the Eastern system to Africa, and a delay of from twenty-four to forty-eight hours on the Western to South America. The All-American reports that it has no delay to South America. There is considerable delay to some of the British West India Islands, such as Barbadoes, Trinidad, etc., due to interruption of the cables of the West India and Panama Telegraph Company. Repairs to these cables are now under way. South American markets are being taken care of and accommodations will be even better when the new British-American cable to Brazil is in operation."

FRENCH LINE BACKWARD

With one exception the policy of the companies is progressive. The exception is in the French Cable Company, which operates its three trans-Atlantic and one Haiti line in simplex—that is, messages are not sent in both directions at the same time. The capacity of the lines could be increased 80 per cent by the use of duplex. Delays in messages to foreign countries frequently arise from the fact that cable companies must deliver messages through the postal departments, as in France, where two days may be required for delivery of a message that was transmitted in twenty minutes. Landing rights to foreign companies are given by the United States, Great Britain and Mexico and South American countries.

The report says regarding reports of discrimination against American messages:

"It has been impossible to secure proof of delay or disturbance of American messages by foreign influence in favor of the messages of their own nationals. Numerous cases have been reported, the circumstances of which set up presumption of such interference. There have been repeated authoritative denials that this practice was permitted, especially by British officials. In the face of these denials competent proof of official connivance at such interference is exceedingly difficult, if not impossible, to obtain. It is suggested that some cases of interference may have been due either to over-zealousness on the part of subordinate operatives or to their corruption by private influence."

CABLES STILL CLOSED

The following cables are closed:

Three sections of the former German-South American and African System, parts of which were seized by the French.

German cables, Yap-Shanghai, Yap-Guam and Yap-Menado, seized and sealed by the Japanese, who are reported to be taking up the Yap-Shanghai section for relaying elsewhere.

Emden-Vigo and Emden-Brest lines still out of service. Constantinople-Constanza cable needs repairs. Several German-British cables restored.

Indo-European Telegraph Company's lines, which carried 40 per cent of the Indian traffic prior to the war, remain interrupted, but the prospects are that the service through Germany will be restored soon. Political conditions prevent the use of alternative routes through Russia and Persia.

Communication over the lines of the Great Northern Telegraph Company between European Russia and the Far East was suspended in April, 1918. Prior to the war this company carried 30 per cent of the European-Oriental business, and the closing of its lines and those of the Indo-European Company threw all business on the remaining lines, causing congestion. A new cable has been laid by the Eastern Telegraph Company between Bombay and London, however, relieving the situation.

NEW LINES NEEDED

In addition to a new trans-Pacific line the report enumerates the following as more urgently needed:

"Direct connection between the United States and the east and northeast coast of South America, to compete with the English and unreliable service of the French cable. It is hoped that this condition will be remedied when the new Western Union cable to the Barbadoes is completed to connect with the new cable of the Western Telegraph Company, Ltd., from Brazil, which touches every important coastal port in Brazil and also at Montevideo and Buenos Ayres.

"The markets of Germany, Holland, Central and Southern Europe should be brought into closer and more rapid contact by the diversion or re-arrangement of some of the existing cables and the opening and operation of offices in those countries by American companies. There should be direct American cables to the Continent.

"Direct cables with the Scandinavian countries, with the idea of future extension to Russia, should be constructed, and there should be a line to the south of France, which would permit direct communication with Spain and Italy."

RADIO CORPORATION OF AMERICA

Besides the naval radio system, the report says, there is one American company, the Radio Corporation of America, doing a world-wide business. During the war the General Electric Company put the new Alexanderson system into use on the Marconi stations, taken over by the navy, with the result that the General Electric became more interested in radio telegraphy and eventually bought the American Marconi Company, eliminating stock-ownership by the British Marconi Company. Thus the Radio Corporation of America was formed. A new company, owned jointly by the British Marconi Company and the Radio Corporation, but with permanent control in the hands of the Radio Corporation, has been formed to take over the rights of the British Marconi and Radio Corporation, including those of the General Electric, for transoceanic service from South America.

OVERSEAS' WIRELESS SERVICES

The following are the services maintained by the Radio Corporation:

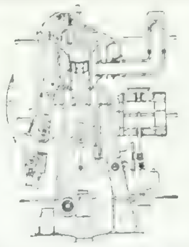
	Approximate Miles
Belmar, N. J., to Towya, Wales	3000
New Brunswick, N. J., to Carnarvon, Wales	3000
Chatham, Mass., to Nacrobe, Norway	4000
Marion, Mass., to Stavanger, Norway	4000
Marshall, Cal., to Kahuku, Hawaii	2000
Bolinas, Cal., to Koko Head, Hawaii	2000
Hawaii to Funabashi, Japan	4000

The Radio Corporation's equipment is described briefly as follows:

"The stations in New Jersey and Massachusetts were built in 1915 and 1916 and have recently been greatly improved by the addition of the Alexanderson transmitting machine, built by the General Electric Company, which produces continuous waves, now recognized to be the most efficient form of radio transmission, and the Weagant receiving system, which largely reduced the serious effects of atmospheric difficulties and allows the maintenance of uninterrupted communication through the summer months of the year, day and night, formerly impossible.

"The California and Hawaii stations were built in 1914 and 1915, and the Japanese station at a somewhat later date. The Radio Corporation is at present constructing a super-powered station near Port Jefferson, Long Island, which will be known as the New York Radio Central. The former French wireless station at Tuckerton, New Jersey, has been bought by this corporation, and it is at present being rehabilitated for direct commercial communication with France. Direct service with Germany is also about to be undertaken through the station at Marion, Massachusetts."

Oil Engines and Motorships



MOTORSHIP BUILDING IN EUROPE

Exclusive Correspondence of Pacific Marine Review

IT would probably come as a great surprise to engineers, shipbuilders and shipowners in America if they could walk through the workshops of some of the leading British Diesel engine builders. On the Clyde two large concerns have equipped new works with magnificent machinery, solely for the manufacture of marine oil engines, while Doxfords are doing the same on the Northeast Coast. It is an indication of the size of the factory and the finely organized system of production which has already been reached that between September of this year and May, 1921, the program of Harland & Wolff at their Glasgow works is to complete the machinery for no fewer than twelve twin screw motorships, six fitted with engines totaling 6400 i. h. p. and six with motors of 3600 i. h. p. But this represents only a small part of the future development of the firm in motorship work, for a new factory has been acquired on the Clyde, which will be laid out like the existing works, and have a similar output, while Diesel engine manufacture will also shortly be commenced at Harland & Wolff's famous Belfast works. It will be remembered that Lord Pirrie is the dominant figure in this concern and the facts given above are sufficient to show how strong is his belief in the possibilities of the motorship.

It has always been claimed by the advocates of the internal combustion engined vessel that one of its great advantages was the excellent opportunity it opened out for standardization of propelling machinery. This is well evidenced in the case of Harland & Wolff's works, where only two sizes of cylinders are being built, developing respectively 300 and 400 i. h. p. The engine sizes constructed are six-cylinder sets of 1800 i. h. p. and eight-cylinder sets of 3200 i. h. p. Thus standard ships of 10,000 tons and 14,000 tons deadweight are produced fitted with twin screw machinery of 3600 i. h. p. and 6400 i. h. p. respectively, and as the same type of auxiliary plant is used in each ship—namely, three or four sets of three-cylinder 150-horsepower Diesel engines driving 100 kilowatt generators—a remarkable system of standardization is built up.

At Harland & Wolff's Glasgow works, Diesel engines only are built and the whole of the equipment is laid out with this end in view, special machine tools being provided for every special purpose, and it is the builders' hope and belief that they will be able by the perfection of standardization and organization, ultimately to manufacture Diesel machinery at approximately the same cost as a steam plant. It would not be surprising if, when the whole of their program has been completed, they will be able to turn out the machinery for forty motorships every year. The present state of affairs may be gauged from the fact that orders for motorships are being refused every week—a fact that may give American engine building firms some idea of the success which has attended the policy of concentrating on oil engine manufacture. But it must be remembered that Harland & Wolff have now had eight years' experience in producing large Diesel engines and have evolved a design which, according to shipowners, gives absolutely no trouble of any sort.

In the middle of August two important motorships ran their trials, and were due to start on their maiden voyages at the end of the month. The first of these was the 14,000-ton Glenogle (the largest motorship in the world) for the Glen Line, and the second the Dorsetshire, a 12,000-ton craft for the Bibby Line. During the same month a sister ship to the Glenogle was launched and the engines installed, while two similar vessels are due for launching in September and October, respectively; so that by the end of the year the Glen Line will have four 14,000-ton 12½-knot motorships trading to the East in addition to their present fleet of about eight 10,000-ton craft. Three more oil engined vessels were completed in the same month, these being the 11,000-ton Theodore Roosevelt, which is trading to San Francisco, and is owned by the Olsen Line; the 9500-ton Elmaren, built at Gothenburg for the Transatlantic Company, a sister ship to the successful 4000-horsepower vessels Tisnaren and Bullaren; and the Mexico, a 5000-ton tanker, especially constructed by the East Asiatic Company to carry oil fuel, since motorship-owning firms are now finding it necessary to make their own arrangements for the transport of the oil required for their fleet. The Mexico has two 800-horsepower four-cycle Diesel engines built by the Holeby Works in Denmark, and these are by far the largest of the type yet installed in any vessel.

Some details of the Glenogle have already been published, and it is therefore unnecessary to repeat these except to say that she is 502 feet in length and is an ordinary cargo ship with accommodation for a dozen passengers such as is nearly always provided in European motorships. A few particulars of the auxiliary plant may, however, be recorded, as these have not yet been given. Following the general custom, all auxiliaries are driven electrically, and on the port side of the engine room there are four generating sets, each consisting of a three-cylinder 150-b. h. p. four-cycle Diesel engine coupled to a 100-k. w. 220-volt Allen dynamo running at 300 r. p. m. It may seem strange that four sets should be fitted, but there are two very good reasons for the adoption of this policy. In the first place this is a type of machine which is built in very large quantities by the manufacturers on a standardized scale, both for the 14,000-ton and 10,000-ton ships. Secondly, when the ship is in port three sets are required to be in operation when the cargo is being loaded or discharged, so that unless four were provided it would be impossible to have one spare set on which repairs or overhauls could be carried out when in port, and all work would have to be done at sea, when only one, or at most two, sets are required.

Two auxiliary maneuvering compressors are installed on the starboard side of the engine room, and each of these is direct driven from a 180-b. h. p. electric motor running at 250 r. p. m. These are, of course, only required when the ship is entering or leaving harbor, and one is sufficient in ordinary circumstances, the second being a standby. The other electrically driven auxiliaries in the engine room comprise three lubricating oil pumps, two bilge pumps, two circulating water pumps, one ballast pump, one fuel oil pump, a C. O$_2$ compressor for refrigeration, while there are motors for turning the main engines and driving a lathe and drilling machine. The steering gear is of course electric, and the Cochran donkey boiler is only used for heating, and also for driving a small auxiliary compressor in case of complete loss of compressed air. The main engines each have eight cylinders, 740 mm. by 1150 mm., and develop 3200 i. h. p. at 115 r. p. m., and an interesting feature lies in the employment of the now popular Michell thrust block. Altogether it is unquestionable that the Glenogle is the finest motor vessel afloat, and should prove wonderfully economical, as the fuel consumption is only about eighteen or nineteen tons a day, while the lubricating oil used is almost negligible.

Orders were recently placed by the British India Steam Navigation Company for two further motorships in addition to the four which are already under construction on the Clyde. The new vessels, however, will be of a much smaller type, being only 245 feet in length with a tonnage of 2000, and the machinery installation will comprise a couple of six-cylinder Diesel engines of 600 i. h. p. each. These are being built by the North British Diesel Engine Works of Glasgow, and are four-cycle machines similar in design to the large twin screw sets which are shortly to be installed in the first motor passenger liner to be built in Europe.

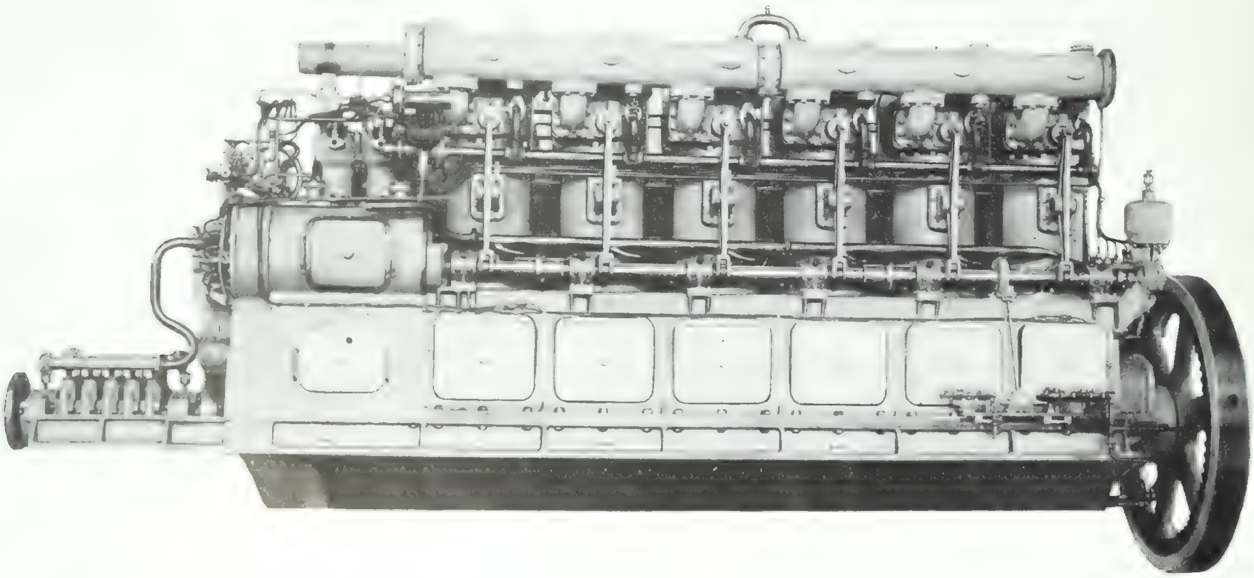
It is one of the most significant features of the development of oil-engined vessels that two of the leading shipping men in Great Britain, Lord Inchcape, who controls the British India Steam Navigation Company, and Lord Pirrie, the head of the Glen Line and a director of nearly a dozen other important concerns, should have adopted the motorship on such a large scale. In view of these circumstances, it is not surprising that there is a tendency on the part of many of the large shipowning companies to order motorships, and in spite of the slump in shipbuilding which is predicted it is believed that there are plenty of contracts ahead for those builders who are in a position to offer reasonable deliveries, and who have already gained some experience in marine oil engine manufacture. Lamport & Holt is the latest firm to enter the sphere of motor shipowning, and their first 10,000-ton vessel, fitted with twin screw 3600-i. h. p. machinery, will shortly be launched.

The chief difficulty being experienced by oil engine builders in the United Kingdom is in obtaining castings, especially of large size, for cylinders, bed-plates, etc., and it is estimated that the output of motors could easily be doubled if the necessary supply were forthcoming. So acute has the problem become that both Harland & Wolff and the North British Diesel Engine Works have recently acquired very large foundries of their own, which will be devoted solely to the production of castings for oil engines, and when these are in full swing it is expected that a great improvement will be effected. As is well known, Diesel engine manufacture calls for castings of better quality than are needed in the construction of steam engines, and by having the works entirely under their own control the builders will be assured not only of an adequate supply but also of castings of the right kind for oil engines. It is stated that in the case of Harland & Wolff as much as one million pounds sterling is involved in the transaction leading to the establishment of their own special foundry which gives a good idea of the amount of money British firms are willing to lay down in order to perfect their arrangements for oil engine manufacture.

It is clear that we have by no means reached the maximum size of motorships, for the East Asiatic Company, which has a larger fleet than any other shipowning concern, and whose last vessel was the 13,000-ton Afrika, is contemplating the construction of ships of 20,000 tons deadweight, carrying capacity to be built and engined by Burmeister & Wain at Copenhagen. It is not yet known what power will be installed, but it will scarcely be less than 8000 to 10,000 horsepower. The maximum size of Diesel engine now built is an eight-cylinder 3200-horsepower set, but it is thought that the builders, for the larger ships, will increase the cylinder power to about 400 or 500 horsepower, giving an eight-cylinder engine of 4000 or 8000 horsepower, with a twin screw installation. Possibly the innovation will be made of providing a triple screw arrangement totaling 12,000 horsepower, but in any case it is certain that the number of cylinders will not be increased beyond eight per engine. It is also Harland & Wolff's intention to build larger motors than at present standardized, and the firm's engineers anticipate no difficulty in running up to 5000 horsepower in eight cylinders, while even this is not looked upon as the final limit for a four-cycle engine.

MANY SEAMEN DESERT

Data compiled by immigration authorities of the state of Washington show that 239 sailors deserted from vessels in Washington ports during the last fiscal year. Of the 239 men, 202 were Japanese, thirteen Chinese and twenty-four of other nationalities. In addition to the deserters, 159 Japanese escaped after being granted permission to go on shore. Virtually all the desertions were from Shipping Board vessels built in Japan and delivered in Pacific Coast ports; the crew of regular trans-Pacific steamships generally remain with their vessels.



A 360 b. h. p. Nelseco Diesel engine of the marine type as installed in the freight and passenger towing vessel Ambassador. This sturdy American crude oil engine has been giving a very good account of itself in the runs along the rugged Alaskan coast. The log of the Ambassador on her first voyage from Tacoma to Alaska, as given in Bulletin No. 7 of the New London Ship & Engine Company, is very convincing evidence of the power and flexibility possessed by this motor.

THE DIESEL ENGINE

Its Development, Design and Construction, Particularly as Applied to Marine Propulsion

ANNOUNCEMENT

This article is the first of a series written for Pacific Marine Review by a competent Diesel engineer. It is intended in these articles to treat of the development of the Diesel idea, its application to marine propulsion, and the design and construction of marine Diesel engines purely from the standpoint of the marine engineer and the motorship operator. The articles are written and printed mainly with the idea of removing from the minds of American marine engineers any prejudice which may exist against motorships.

The first two or three of these articles will be of a historical nature, the material being taken from the original German of Dr. Rudolf Diesel. In subsequent articles on the design and construction of marine types of Diesel engine it is hoped to incorporate some information from more modern German, Swiss and Italian sources which have not yet been translated into English. During the development of this series of articles we shall be very glad to receive suggestions and criticisms.

IN 1893 Dr. Rudolf Diesel, the German inventor, covered in patent No. 82168 the fundamental ideas of his new internal combustion engine, the claims of which were in short:

I. The increase of the temperature of the air in the working cylinder of the engine far above the ignition temperature of the fuel to be used.

II. Introduction of highly atomized fuel extending over a certain period and in a desired quantity into this highly heated and compressed air and, at the same time, delivery of energy by the moving piston—and for the reason that any fuel before combustion can take place has to be gasified, the following principle to extend on non-gaseous fuels.

III. Gasification of the fuel directly in the working cylinder, utilizing for this process part of the heat of the compressed air in the cylinder. This third claim was to eliminate the complicated and inefficient gas producer.

The above items show clearly that the general conception making self-ignition of the fuel the principal issue of the Diesel process is not correct; and the extent of the compression defined from the reason to insure self-ignition of the fuel when the introduction of it begins at the dead center.

Engines with self-ignition had been built previously, and the idea was never claimed by Diesel. What Diesel wanted was high thermal efficiency, and as the temperature of the air in the cylinder was to be far above the ignition temperature of the fuel, the self-ignition was bound to take place, but was never the reason for the high compression employed.

In order to insure the highest possible efficiency it was necessary to find a compression point up to which whatever was gained in thermal efficiency was not eaten up by excessive friction load, and further a compression by which the greatest possible output per cubic inch of cylinder volume was obtained. This compression pressure was found to be between 450 and 500 pounds per square inch.

Claims II and III are also often overlooked in the definition of the Diesel process; and the third item especially is of greatest importance, as it is the one which affords the greatest possibilities but also sets the limitations to the process.

The gasification of the fuel in the working cylinder was also by far the greatest difficulty to be overcome in the Diesel process, and it was this difficulty which for a long time seemed to make the practicability of the process impossible.

The Diesel process does not only mean a compression of the air in the cylinder so that the increased temperature insures ignition of the injected fuel, but consists of a number of processes, each of which is vital to the success of the whole.

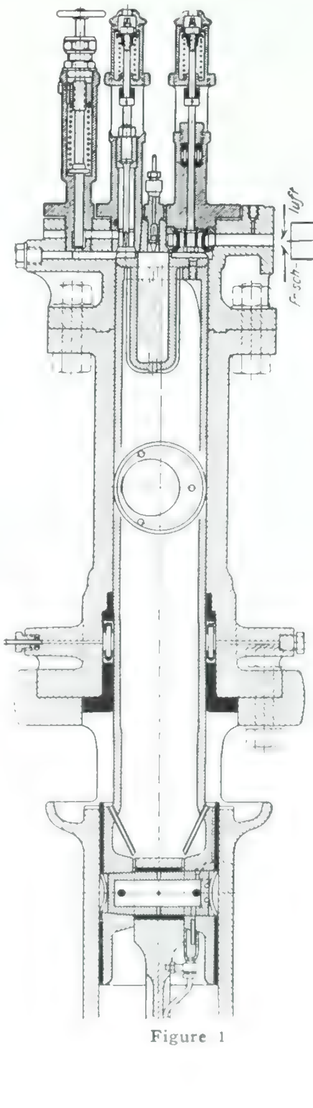


Figure 1

February 23, 1893, and agreement was signed between Diesel and the Augsburg Engine Works for the building of an experimental engine, and on April 10 of the same year another agreement with the Krupp Works. The two firms decided then to do all the experimental work jointly.

Right from the start the most important aim was the utilization of liquid fuels and not the use of coal dust, as often mentioned, and the first engine was designed and built for the use of liquid fuels only. The fuel ordered for the first test was a tarry crude oil (Pechelbroner), but on account of the difficulties in handling this thick stuff, the first tests were made with gasoline and kerosene.

July, 1893, the first engine was ready for test. It was of six-inch bore by about sixteen-inch stroke. Figure I gives the details of design of cylinder head, cylinder and piston. The upper half of the cylinder serving also as cylinder head was a steel casting, while the cylinder proper was of cast iron. No water-jacket was provided on this engine. The plunger piston was also a steel casting, and at its lower end formed a round crosshead guide with a pin for the connecting rod. U-shaped bronze rings under oil pressure were to serve as stuffing box. After the first test the plunger piston was discarded as being a practical impossibility.

For the operation of the valves a set of cams was provided as is done today. The engine worked on the four-stroke cycle. Exhaust and admission valves were combined in one double-seated valve. The exhaust pipe was not attached tightly to the cylinder head, but enough room was left for the admission of air during the suction stroke. The fuel needle was operated by a cam, as shown in Figure 2, and was down by the camshaft instead of in the cylinderhead as today. From the needle a fuel line led to the head and a Korting nozzle into the cylinder. The fuel was supplied to the needle valve under constant pressure from a tank.

After a new piston with cast-iron rings had been fitted, the tests began, but it needed twenty days to make the necessary improvement to raise the compression as first obtained from 255 pounds per square inch to 480 pounds. The first combustion chamber was an eccentric located cylindrical bore (see Figure 1) of 255 ccm. An investigation disclosed then that there

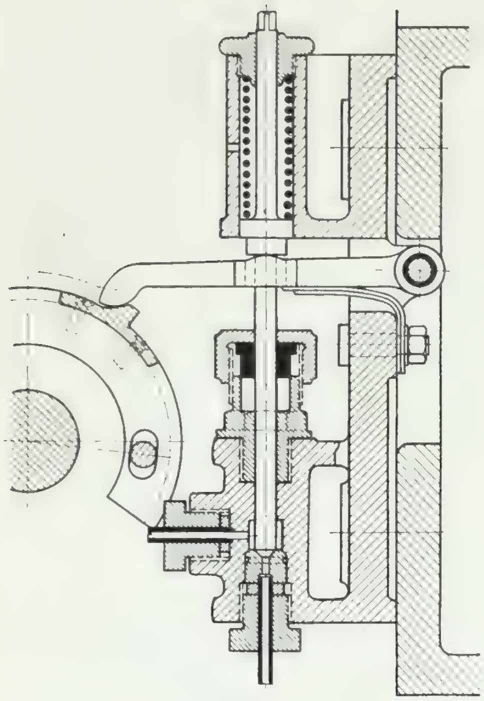


Figure 2

were nine other small spaces of together 157 ccm. content or 60 per cent of the main chamber. This gave the idea of the unsuitability of a separate combustion chamber in the compression space with the resulting large surface.

August 10, 1893, the first tests with the injection of fuel were made and this with gasoline. Ignition took place immediately with explosion pressures of over 1100 pounds per square inch. The terrific explosion wrecked the indicator but did not harm the engine, as the latter was built as "strong as a cannon." A few more tests were made, resulting in more or less terrific explosions and misfiring, which latter at the time could not be explained. The exhaust was black, and after brief periods of running, the piston rings and valves were carbonized and leaked badly. The best diagram showed 2.15 i. h. p., not enough to keep the engine running idle. The engine was never able to run alone under its own power.

The experience gained with this first engine indicated:

Combustion chamber must be of compact form without pockets with the smallest possible surface.

Ignition is obtained automatically.

Admission and exhaust valve must be separate valves.

Fuel needle must be arranged as close as possible to the combustion chamber.

Piston with rings must replace plunger piston.

Design of valve gear and cams.

Typical starting system.

Unsuitability of steel for piston and cylinder.

Rules for fuel piping.

Within five months a second engine was designed, the details of which are shown in Figures 3, 4 and 5. The piston, cylinder head and fuel pump were new. The other parts were the same as used on the first engine. The first tests were mainly to find a suitable piston design. The final construction is shown in Figure 6. Then followed investigation for injection and atomization. In place of the fuel needle a check valve was used opening into the cylinder. Test at open air showed good atomization under high pressures, but the even distribution of fuel over the valve seat was not reliable. After this, the first mechanically operated fuel needle was designed which was to work in connection with the fuel pump.

Although the fuel pump was designed with a controlled suction valve similar to the one used today, the results were unsatisfactory and it seemed a practical impossibility to build a pump for such small quantities and such high pressures. For this reason the system of keeping the fuel under a constant pressure and regulation through lift of needle was adopted. This system did not give good control, the amount of fuel varying with the engine speed, at slow speeds more, at high speeds less. For this reason the injection by means of compressed air was decided on, and in February, 1894, the engine was ready to begin with the tests of this new scheme. The details of this construction are shown in Figures 3, 4 and 5. The injection air entered where the connection for the air chamber was, as shown in Figure 4. The atomization was effected

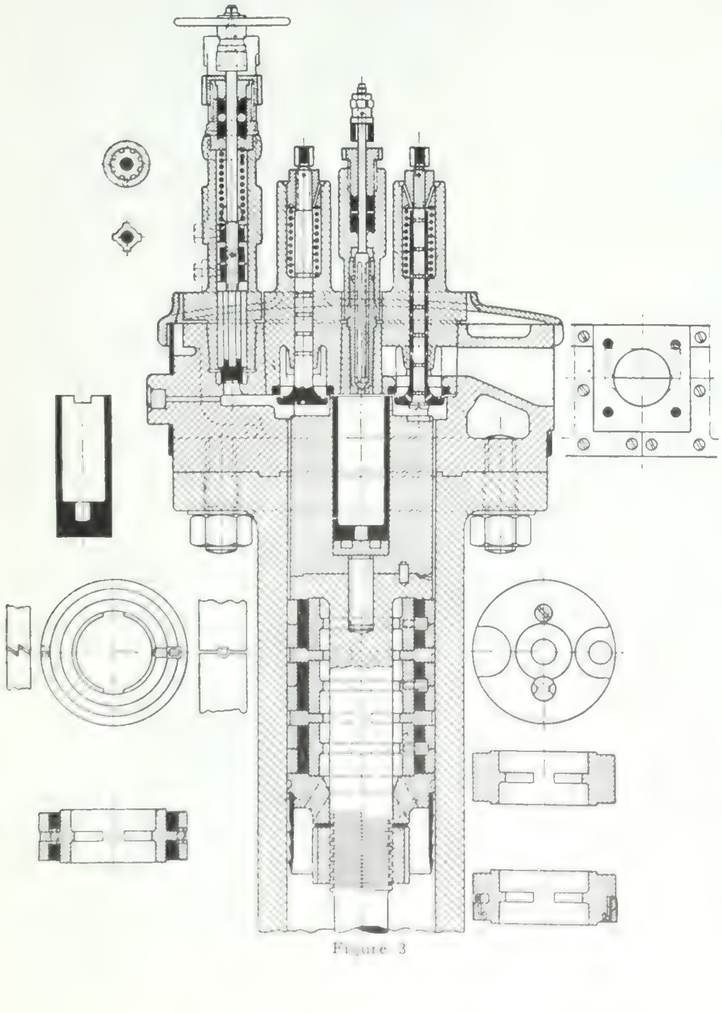


Figure 3

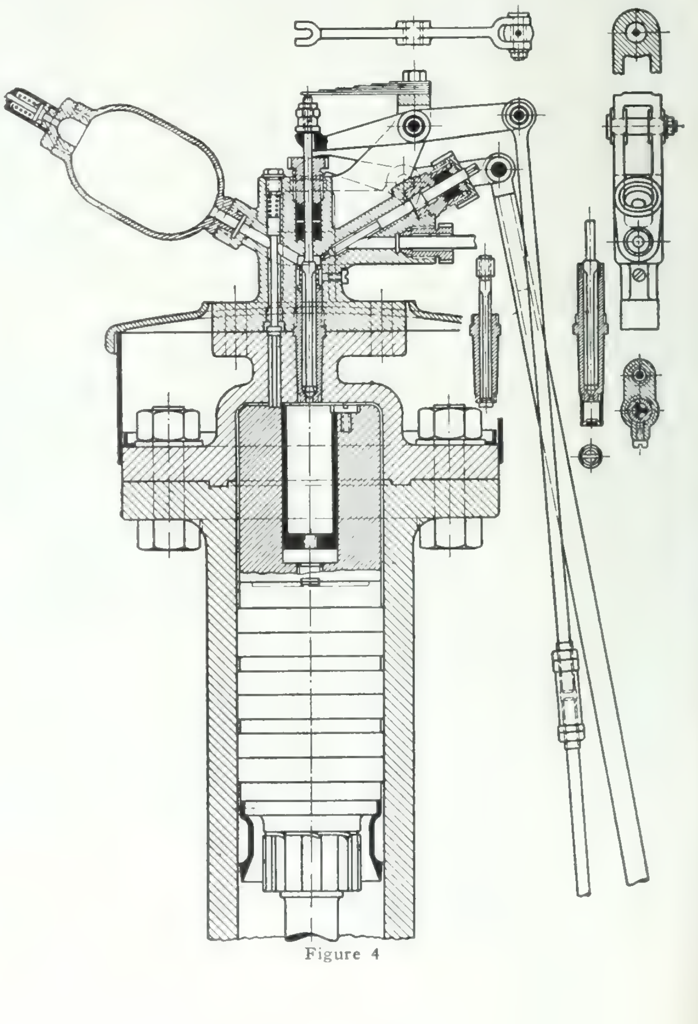


Figure 4

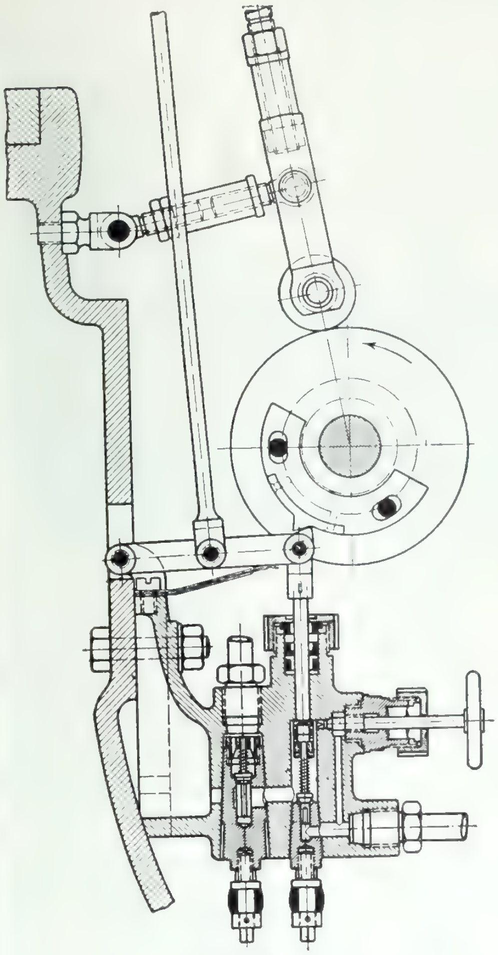


Fig. 5

through a small opening on top of needle valve seat bushing (see Figure 4).

Tests on open air showed perfect atomization, the degree varying with the air pressure. The first trials with this system in the engine resulted in strong explosions at dead center (see Diagram No. 5) and blowing off of the safety valve at 680 pounds per square inch. The combustion was very irregular and gave no development in the width of the diagram. Different adjustment of the needle resulted in more quiet combustion (Diagram No. 6), and February 17, 1894, the first no-load run was obtained, but only for one minute at 88 r. p. m. (Diagrams 7, 8, and 9.)

After these tests Dr. Diesel thought himself close to the final solution of the problem and had no idea that years of hard research work were still ahead of him.

Further extensive tests with numerous changes of valve setting could not prevent the explosions immediately after the ignition took place and which prevented the rest of the fuel from entering the cylinder; in fact, the fuel was blown back into the nozzle and caused further explosions in the fuel valve. Going back to solid injection (without air), the explosions increased to such an extent as to make it impossible to take diagrams, and for this reason it was decided to discard this latter system entirely.

Returning to injection with air, after several tests a no-load run of thirty-eight minutes was possible, but otherwise no real progress was made, as whenever the fuel was increased the exhaust turned black and the engine slowed down instead of increasing the speed. As the introduction of the fuel by means of compressed air necessitated a special compressor, it was decided to try self-injection; that is, during the compression stroke the air entered the air chamber (Figure 4) through a check valve and from there acted as injection air through the nozzle after the compression in the cylinder was lowered by the movement of the piston downward. The additional air chamber resulted in a loss of compression pressure of from thirty to thirty-five pounds per square inch. The period of combustion was 140 to 170 pounds per square inch below compression pressure and took place at about 215 pounds per square inch. The engine ran well under no-load conditions, but as soon as more fuel was given, the exhaust blackened and the engine began to slow down, and explosions in the air chamber necessitated shutting down. Investigation showed that combustion took place in the air chamber and nozzle on account of the high temperature of the air.

As a result of these tests the following decisions were arrived at:

The method of air injection is practical, the injection air can be supplied by separate compressor or by the means of the working cylinder itself.

The injection air must be cooled before mixing with the fuel in the injection valve.

Further, means must be provided to distribute the fuel evenly in the injection air as the present method always gave too much fuel at the beginning of the injection period and too little after the first explosion.

But the most important assumption as a result of these tests was that all methods for the injection of liquid fuel have the common disadvantage of necessitating too much time for gasification in the cylinder, resulting in late combustion and at accordingly low pressures. This condition was to be remedied by introducing the fuel in form of vapor. As a matter of fact, it was only the incorrect shape, size and location of the combustion chamber which caused the unsatisfactory test results and, although this item was mentioned during the first tests, it was not considered important enough and even today there are designers that do not give it due consideration. For this reason the third series of tests did not result in any progress, as they were based on a wrong assumption and departed from the correct method of introducing of the fuel.

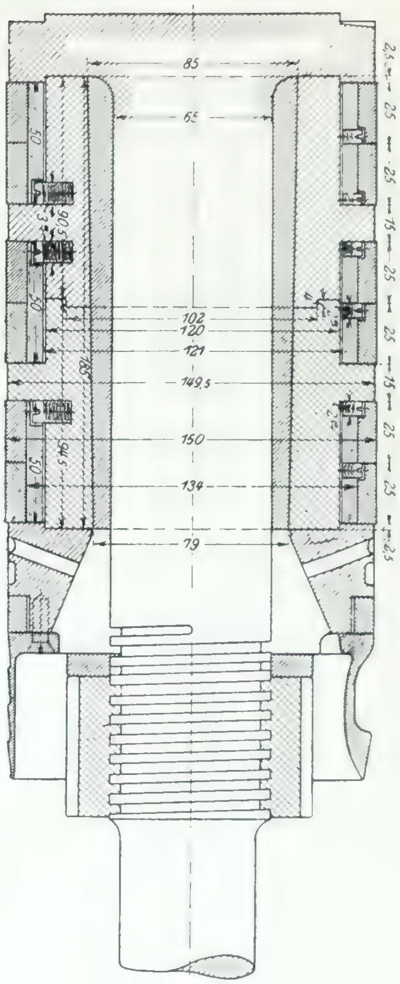


Fig. 6

(To be continued)

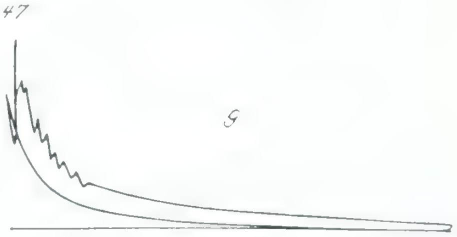


Fig. 8

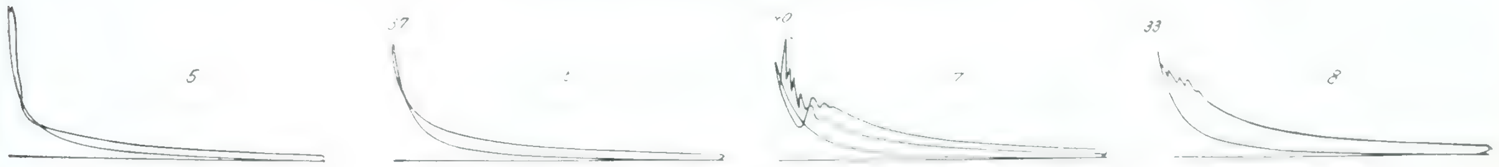


Fig. 7

SHALLOW DRAFT MOTOR BOAT

New Shallow-draft Motorboat Blazer Built at the Chilman Shipyards, Hoquiam, for the Queets Trading Company and Engined With Two 35 Horsepower Union Gas Engines

IN the putting into service on the coasting run north from Grays Harbor, primarily to the Queets River, of the powerboat Blazer, a new step has been taken in the development of this class of trade. The new boat, built, owned and operated by the Queets Trading Company, which also owns the salmon cannery at the mouth of the Queets River, is a big improvement over anything so far put into the coasting trade on the North Pacific. It has sixty-five-ton cargo capacity and draws but three and a half feet of water loaded.

The Blazer was built at the Chilman Shipyards, Hoquiam, and embodies in her design the combined ideas of Ivar Chilman and F. A. Leonard, manager of the owning company. The vessel is 64 feet 10 inches in length, and 19 feet 6 inches in width over the guard. The keel and keelson are 12 inches by 36 inches in dimension. The bilge ceiling is built of fir planks, 4 inches wide and 6 inches thick, each bolted securely to the timbers. A center-board 8 feet long has been built in forward.

Equipped with two 35-horsepower Union engines, of the latest improved type, the Blazer is well provided with power. She carries two sets of wet batteries, and one set of dry cells, thus providing three sources of ignition for the engines. Gasoline supplies are carried in two 410-gallon tanks, one on each side of the ship. In addition there is an emergency tank of a 200-gallan capacity. A 50-gallon tank of cylinder oil is carried under the starboard wing.

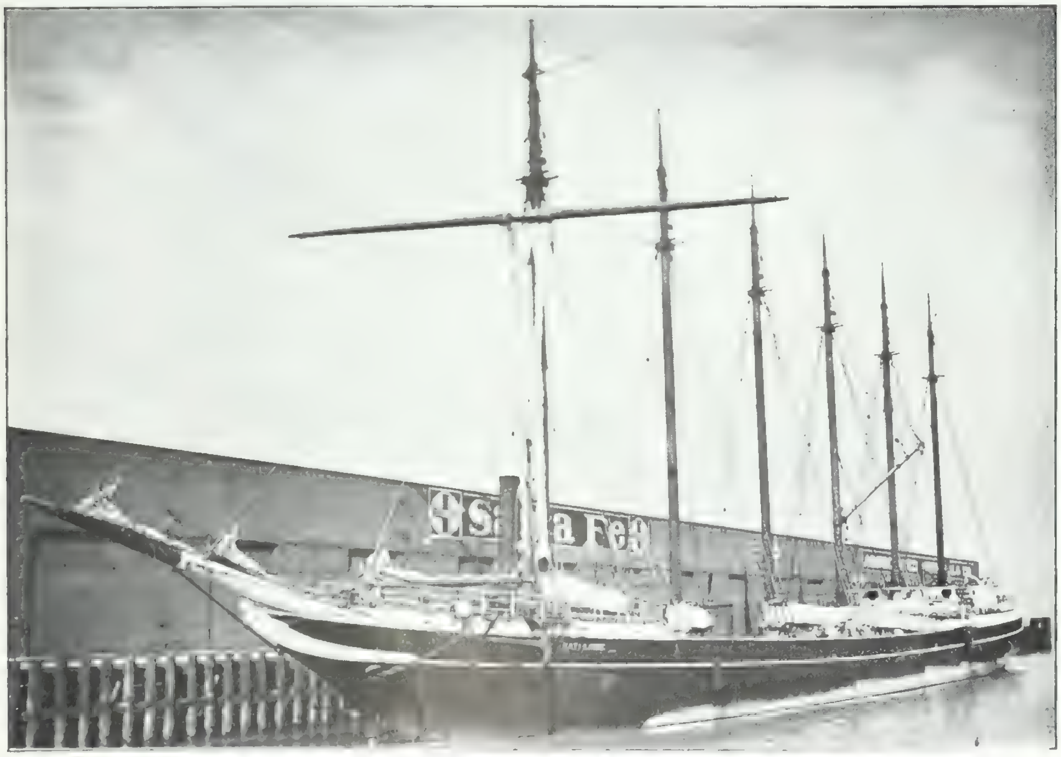
In the pilot-house two bell systems and a speaking tube are provided for communication wlith the engine room. Controls are arranged for a powerful searchlight and the latest Dirigo shadow-box compass electrically lighted is installed.

A 6-horsepower Fairbanks-Morse winch, equipped with a "wildcat" for hoisting anchors, handles cargo with the aid of a sturdy boom on the mast. The cargo hold is forward, and is 30 feet long in the clear with a hatch 8 feet by 12. Two anchors with 40 fathoms of chain, a lifeboat and twenty-five life preservers assure the safety of ship and crew in all ordinary emergencies. The Blazer carries sufficient sail to navigate nicely in case of engine trouble.

Staunch and seaworthy in every particular, built to weather the roughest seas, yet drawing only three and a half feet of water loaded, thus enabling it to enter practically any inlet, the vessel is expected to "blaze" the way into the great Queets, Hoh and Clearwater River valleys. The resources of this section of the Olympic Peninsula are practically untouched. A rich black soil from three to five feet in depth covers the valleys. The waters teem with fish. The largest stand of cedar in the Pacific Northwest is found in this section. The mountains contain billions of feet of standing timber.

There is no limit to the possibilities of the dairy and stock business. Pure water is abundant everywhere and thousands of horsepower are going to waste. The sanitary and climatic conditions are such as build up health and tourist resorts. Wild game is abundant, elk by the thousands roam the hills and valleys; bear, cougar, deer, etc., are numerous in the foothills, and the waters abound with trout, salmon and other fish.

The Queets Trading Company, organized and incorporated by a group of Grays Harbor business men, now owns the large cannery, general store, hotel and transportation business of the old Superior Trading Company, and about seventy acres of land, located on an island just within the mouth of the Queets River, about fifty miles north of Hoquiam. A modern hotel has been erected and with the Blazer making regular trips between Grays Harbor and the Queets, it is destined to be a mecca for tourists.



Six-masted Vegetable Oil Motor Tanker Katherine. Engined With Twin 320 Horsepower Bolinder Engines

ADVANTAGES OF THE DIESEL ELECTRIC DRIVE

By RENWICK Z. DICKIE

A VESSEL to be a commercial success must have a power plant that is reliable, flexible and low in weight and fuel consumption. The same power that drives the vessel should steer, handle the cargo winches, heat, light, cook and handle any modern electric appliances.

To make a fair comparison of the different types of power plants, it is well to select a certain type of ship, and put her in the class called the "poor man's ship"; or, in other words, a good investment. Besides this, the vessel should be considered to be operated in the same trade and should have the same cruising radius.

The vessel used as an example has an over-all length of 308 feet, beam of 44 feet, B. P. length of 297 feet, and a depth of 28 feet 10 inches to the shelter deck. She would be fitted with two boilers and a triple expansion engine, 21 - 34 inches and 56 inches diameter, with 44-inch stroke. At ninety revolutions the engines develop 1500 i. h. p. In the table she is compared as a coal burner and as an oil burner, fitted with a high pressure oil burning system.

The designer calculates that with this power, a loaded trial trip speed of 10.62 knots will be developed, giving a sea speed of 9.87 knots. A torpedo stern of modified type is adopted, as they have shown considerable gain which is probably due to the increased water line length.

In steel vessels under 400 feet in length it has been found by experience that the difference in favor of a single screw as compared with a twin screw installation is 5 to 10 per cent—that is, a vessel driven with a single screw required about 10 per cent less power than a vessel of the same dimensions equipped with twin screws to make the same speed.

The loss due to the cleaning of fires in the case of the coal burner is not taken into account, as this would vary according to the personal qualifications of the firemen. There will also be a loss of fuel and time required for raising steam on both the oil burning and coal burning plants.

On the trials of the U. S. S. Jupiter, which was fitted with steam turbine electric propulsion, it was found that the vessel maintained the same speed with about 15 per cent less power than her sister ship, which was fitted with triple expansion engines, and the reason for this is believed to be that the torque delivered to the Jupiter's propellers was continuous, while her sister ship was driven by the intermittent impulses of reciprocating engines.

In the case of a Diesel electric driven ship, one of the main engines of the main power plant will be used for the winches, thus taking care of any big load which may be temporarily necessary to handle. Some time ago a fuel test was made to get the fuel cost of handling cargo and with coal it was $12 per 1000 tons; burning oil it was $7, while with electricity it was $2.

Considerable diversity of opinion exists regarding the losses in the case of an electric drive, but theoretically the losses which occur in the direct drive are greater. In the direct drive we invariably have twin screws with an approximate loss of about 10 per cent, and as the largest motorship builders install 10 to 15 per cent more power in Diesel engines than they would in steam to attain the same result, it would be safe to figure the total loss in this case as 20 per cent.

In the case of the electric drive, a 15 per cent loss will be accounted for in the generators and motors, showing a gain of at least 5 per cent over the direct drive, and this does not take into consideration the torque gain which is bound to occur owing to the power being applied through the propeller in a constant stream.

The efficiency of long stroke Diesel engines of the cross-head type varies from 72 per cent to 74 per cent and short stroke trunk piston type from 75 to 77 per cent and for the sake of comparison 77 per cent will be used in both cases. The steam engine will be taken at a mechanical efficiency of 85 per cent.

Coincident with reduced weight it has been found that in small cylinders 12 to 15 inches in diameter in Diesel engines, the cost of manufacturing is reduced and also it is not necessary to water-cool the pistons, thus eliminating a complication and expense.

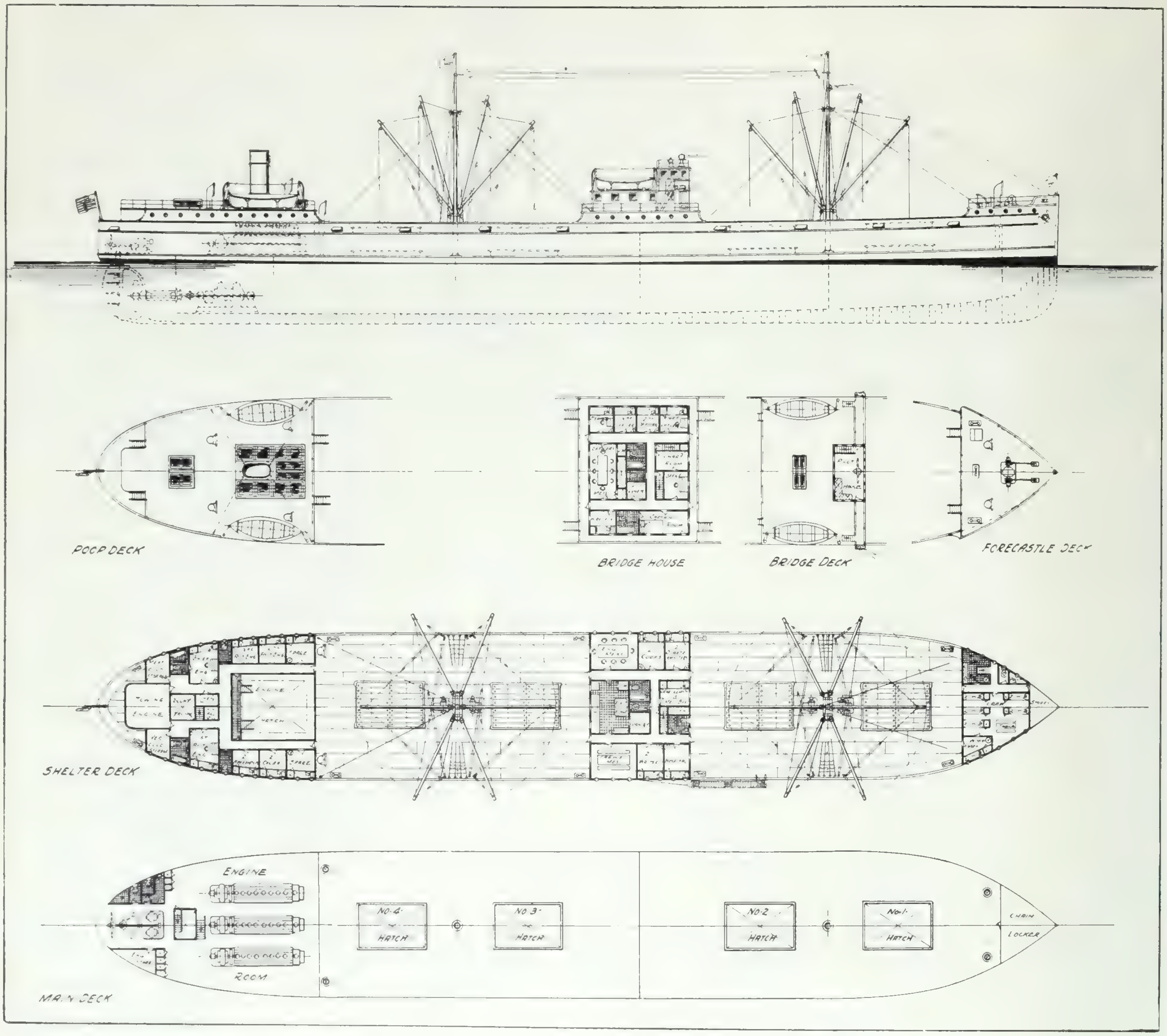
When a cylinder is of larger diameter the walls become thicker and are consequently harder to keep cool on account of the fact that the heat of the cylinder goes up as the cube, and the cooling surface goes up as the square of the dimensions.

Should it be found advisable to arrange the vessel to tow barges or do other salvage work, a steam towing machine could be fitted as shown on the drawing, which could be operated with compressed air taken from the air receiver tank, with a reducing valve on the towing machine. This receiver could be charged by the auxiliary air compressor which can either be driven by a motor using power from the main power plant, or by the auxiliary generating engine.

Direct current has been adopted by the Westinghouse experts and it is their belief that within a year it will not be necessary to carry electricians, as the plant is so simple. Practical engineers concur with this statement because almost every marine engineer is familiar with direct current, but not with alternating, and pride will make them operate the ship without any outside help.

A good article on the Diesel electric drive by Mr. Wilfred Sykes, engineer in charge of marine propulsion of the Westinghouse Electric Company, appeared in Pacific Marine Review of January, 1920, an excerpt from which follows:

> The direct current system has been adopted for the reason that it greatly simplifies the whole arrangement and the operation. In the first place, the primary advantage of the arrangement is that it simplifies the engine problem, inasmuch as it enables engines with relatively small cylinders without piston cooling to be used and powers in excess of those practicable with direct connected units can be obviously obtained without encountering the difficulties of design, building and operation commonly met with in large internal combustion engines.
>
> The elimination of reversing gear reduces the Diesel engine to a very simple machine, and as long as the size of cylinders is kept small, it is well known that very reliable operation can be obtained. Using direct current generators makes it possible to run the engines at a constant speed, and connecting the generators in series, eliminates the necessity of close governing which would be necessary with machines in parallel. If alternating current were used, it would be necessary to vary the speed of the engines in order to vary the speed of the propelling motor and all engines would have to run at exactly the same speed and have the same governor characteristics to properly divide the load. The problem of simultaneously regulating a number of governors in such a way as to vary the speed and at the same time maintain a proper division of the load, would be extremely difficult to solve. With direct current these difficulties do not exist, as slight variations in the speeds of the different engines is of no importance and the speed of the propelling motor is varied by simply regulating the excitation of the generators by means of a suitable rheostat.
>
> The direction of rotation of the propeller is also controlled in the same way, as reversing the direction of the generator excitation will reverse the propelling motor. Therefore, the whole control of the equipment consists of handling the field current of the generator which is only about one-half of one per cent of the main current. During operation the main current is not handled and consequently the control rheostat is of very small dimensions and it can be located in any convenient place, as only a few small wires run to it.
>
> It will be usually arranged so that the voltage of the main generators is the same as that of the auxiliary sets, so that in port one of the main sets can be used for running the winches, etc. This obviates the necessity for large auxiliary sets, as the controlling feature is the requirement at sea.
>
> One very marked characteristic of such an arrengement of propelling machinery is the obvious freedom from complete shutdown in case of accident. With, say, three generating sets, it is hardly conceivable that all would be out of commission at the same time. With the machine connected as shown diagrammatically in the accompanying sketch, throwing the double throw



Outboard profile and deck plans of proposed steel cargo vessel with Diesel electric drive

switch from the upper to the lower position would completely cut out the corresponding machine without interfering with the others. In the case of three generating units with one machine out of service, only two-thirds volage would be impressed on the motor, which would correspond to about two-thirds speed if the motor field were not adjusted. This would only require about 30 per cent of the total power, whereas 66 per cent is available. By adjusting the motor field through a small rheostat, the speed can be raised to such a value as to use all the power available, which would give a speed of about 87 per cent of full speed. A relative result would be obtained with two machines out of service, and, even if all main units were disabled, steerage way could be obtained by connecting the auxiliary sets to the propelling motor. In the case of injury to the electrical apparatus, it would require almost complete destruction to bring about a condition that could not be sufficiently remedied in a few hours to at least enable the ship to make port.

It is believed that this system of Diesel electric drive is particularly applicable to ships of moderate power, up to, say, 6000 horsepower, and that in addition to the low fuel consumption compared with any form of steam drive, it will be, if anything, more economical than direct Diesel drive of the types now used, as lower speed propellers can be used without greatly increased weight. The simplicity of the engines and the smaller weight and size of the individual parts is of great importance from an operating standpoint.

In operating vessels of this size on the west coast of South America during the year 1919, they have been found to net their owners about $50 a ton, after all expenses and overhead charges had been paid.

A curve of ton miles per hour would indicate that the ship with the larger block coefficient will give more tons per mile per hour of cargo carried, but it has been found in practice that a full ship does not make any time in a rough sea, and the freight carried per year will be increased by making a finer vessel and consequently more trips.

In the appended table, a block of .76 is used, but the block of a ship would be decided by the route on which she is to be used.

An advantage not to be overlooked is the possibility of using the power plant on the ship to supply current for operating conveyors and other cargo handling devices on the wharves on either end of the route, or using power from the shore to operate the winches, should it be necessary to overhaul the engines of the main power plant.

Table of Comparisons

PARTICULARS	Steam Triple Expans'n Plant Coal Burning	Steam Triple Expans'n Plant Oil Burning	Direct Connected Diesel Drive	Diesel Electric Drive	REMARKS
	Single Screw	Single Screw	Twin Screw	Single Screw	
Length Overall	308′	308′	308′	308′	
Length Between Perpendiculars	297′	297′	297′	297′	
Beam	44′	44′	44′	44′	
Depth Moulded	20′ 10″	20′ 10″	20′ 10″	20′ 10″	
Depth Moulded Shelter Deck	28′ 10″	28′ 10″	28′ 10″	28′ 10″	
Depth of Hold	18′ 4″	18′ 4″	18′ 4″	18′ 4″	
Draft Excluding Keel	19′ 6″	19′ 6″	19′ 6″	19′ 6″	
Summer Freeboard	8′ 10¾″	8′ 10¾″	8′ 10¾″	8′ 10¾″	
Load Displacement Tons	5,540	5,540	5,540	5,540	
Weight of Ship Complete—Without Fuel or Stores	1,788	1,788	1,800	1,636	
Weight of Propelling Power Included in Total Weight of Ship — Main Engines			271	150	
Auxiliaries			51	8	**Main Boilers of the Ship used for Auxiliaries in Steam Plant. Separate Engines for Auxiliaries in Direct. One Main Engine used for Auxiliaries in Electric Drive.
Total Tons	310	310	322	158	
Block Coefficient	.76	.76	.76	.76	
Reserve Buoyancy in Tons	3,140	3,140	3,140	3,140	
Per Cent of Reserve Buoyancy	36.1	36.1	36.1	36.1	
Total Deadweight in Tons	3,752	3,752	3,740	3,904	
Ratio of D. W. to Displacement Per Cent	67.75	67.75	67.55	70.5	
Deadweight Tons for 30 Days' Steaming — Water	75	75	30	30	
Fuel	723	579	195	195	*This is based on Thirty Days' Operation of the Ship.
Stores	12	12	12	12	
Total	810	666	237	237	
Deadweight for Cargo in Tons	2,942	3,086	3,503	3,667	
Measurement for Case Cargo—Cubic Feet	174,110	195,800	195,800	220,500	
Rate of Stowage—Cubic Feet Per Ton	59.2	63.5	55.8	60.0	
Measurement for Bulk Cargo—Cubic Feet	180,610	202,300	202,300	227,000	
Rate of Stowage Bulk Cargo—Cubic Feet Per Ton	61.4	65.6	57.8	61.9	
Cubic Feet of Case Measurement Per Ton (Net Register)	105.5	118.7	118.7	133.8	
Under Deck Tonnage	1,974	1,974	1,974	1,974	
Gross Tonnage	2,630	2,630	2,630	2,630	
Net Tonnage	1,648	1,648	1,648	1,648	
Brake Horsepower	1,275	1,275	1,500	1,500	
Indicated Horsepower	1,500	1,500	1,948	1,948	
Horsepower of Auxiliary Plant	1 Main Boiler	1 Main Boiler	325	75	
Cost of Auxiliary Plant	20,000	20,000	46,200	8,500*	*One Main Engine used for Electric Winches.
Cost of Complete Motive Power (not Installed)	160,000	163,000	191,000	190,000	
Cruising Radius Loaded—Miles	7,110	7,110	6,900*	7,110	*Twin Screw Effected by loss due to separating Power into two units.
Revolutions of Engine	90	90	115	250	
Revolutions of Propeller	90	90	115	90	
Speed (Smooth Water Loaded)	10.62	10.62	10.33	10.62	
Speed (at Sea Loaded)	9.87	9.87	9.58	9.87	
Fuel Used Per Hour Per Horsepower—Pounds*	1.5	1.2	.4	.4	*The Fuel is taken for Indicated H. P. (Steam) and Brake H. P. Diesel.
Fuel Used Per Hour—Pounds	2,250	1,800	600	600	
Fuel Used Per Day at Sea—Tons	24.1	19.3	6.5	6.5	
Fuel Used Per Day in Port—Tons	5.4	3.9	1.12	1.12	
Fuel Used Per Day at Sea—Barrels		129.4	46.4	46.4	
Fuel Used Per Day in Port—Barrels		26	8	8	
Days at Sea	270	270	270	270	

Table of Comparisons—Continued

PARTICULARS	Steam Triple Expans'n Plant Coal Burning Single Screw	Steam Triple Expans'n Plant Oil Burning Single Screw	Direct Connected Diesel Drive Twin Screw	Diesel Electric Drive Single Screw	REMARKS
Days in Port	95	95	95	95	
Lubricating Oil Per Day at Sea—Gallons	7.5	7.5	22	30*	*Guaranteed.
Lubricating Oil Per Day in Port—Gallons	3	3	7	10	
Cost of Fuel Per Ton	13.55	12.40	15.00	15.00	
Cost of Fuel Per Barrel		1.85	2.10	2.10	
Cost of Lubricating Oil Per Gallon	.55	.55	.55	.55	
Cost of Water Per 100 Cubic Feet	1.25	1.25	1.25	1.25	
Cost of Water Per Ton	.45	.45	.45	.45	
Fuel Used Per Year at Sea—Barrels		34,938	12,528	12,528	
Fuel Used Per Year in Port—Barrels		2,480	760	760	
Fuel Used Per Year—Barrels		37,418	13,288	13,288	
Fuel Used Per Year at Sea—Tons	6,507	5,210	1,755	1,755	
Fuel Used Per Year in Port—Tons	513	371	106	106	
Total Fuel Used Per Year—Tons	7,020	5,581	1,861	1,861	
Water Used Per Day for Power Plant—Tons	1.5	1.5	0	0	
Water Used Per Year for Power Plant—Tons	548	548	0	0	
Lubricating Oil Per Year at Sea—Gallons	2,025	2,025	5,940	8,100	
Lubricating Oil Per Year in Port—Gallons	285	285	665	950	
Total Lubricating Oil Used in 1 Year—Gallons	2,310	2,310	6,605	9,050	
Cost of Water Used Per Day for Power Plant	.68	.68	0	0	
Total Cost of Water Used Per Year—For Power Plant	248	248	0	0	
Cost of Fuel Used Per Day at Sea	326.56	239.32	97.50	97.50	
Cost of Fuel Used Per Day in Port	73.17	48.20	16.88	16.88	
Cost of Fuel Used Per Year at Sea	88,169.85	64,635.30	26,308.80	26,308.80	
Cost of Fuel Used Per Year in Port	6,964.70	4,580.00	1,603.60	1,603.60	
Total Cost of Fuel Per Year	95,134.55	69,215.30	27,912.40	27,912.40	
Cost of Lubricating Oil Per Day at Sea	4.125	4.125	12.10	16.50	
Cost of Lubricating Oil Per Day in Port	1.65	1.65	3.85	5.50	
Cost of Lubricating Oil Per Year at Sea	1,113.75	1,113.75	3,267.00	4,455.00	
Cost of Lubricating Oil Per Year in Port	156.75	156.75	365.75	522.50	
Total Cost of Lubricating Oil Per Year	1,270.50	1,270.50	3,632.75	4,977.50	
Total Cost—Fuel, Water, Lubricating Oil for 1 Year	96,653.05	70,733.50	31,545.15	32,889.90	
Saving in Fuel Per Year—Dollars		25,919.25	67,222.15	67,222.15	
Extra Cost Lubricating Oil Per Year			2,362.25	3,707.00	
Net Saving Per Year		25,919.25	64,859.90	63,515.15	
Net Profits of Ship Based on Steam Plant Economy at $50 Per D-W Ton	133,600	143,200	171,200	179,400	
Net Profits of Ship Including Saving in Fuel Per Year, Excluding Crew	133,600	169,119.25	236,059.90	242,915.15	
Monthly Salaries of Chief Engineer	305.00	305.00	318.75	305.00	
1st Assistant Engineer	216.25	216.25	222.50	216.52	
2nd Assistant Engineer	187.50	187.50	193.75	187.50	*NOTE
3rd Assistant Engineer	163.75	163.75	170.00	163.75	Salaries based on Power Tonnage of 4,130 P. T.
6 Firemen—Coal Burning	540.00				Power Tonnage
3 Firemen—Oil Burning		270.00			
3 Oilers	270.00	270.00	270.00	270.00	1500 H. P.
Water Tenders					2630 Gross
Coal Passers					
Captain	330.00	330.00	343.75	330.00	4130=P. T.
1st Officer	216.25	216.25	222.50	216.25	
2nd Officer	187.50	187.50	193.75	187.50	
3rd Officer	163.75	163.75	170.00	163.75	
3 Quartermasters	270.00	270.00	270.00	270.00	
Steward	110.00	110.00	110.00	110.00	
Cook	100.00	100.00	100.00	100.00	
2nd Cook	90.00	90.00	90.00	90.00	

NOTE

Scotch Boilers with Gauge Glass in Engine Room, no Water Tenders necessary; Bunker Doors open into Fire Room, no Coal Passers necessary.

Table of Comparisons—Continued

PARTICULARS		Steam Triple Expans'n Plant Coal Burning	Steam Triple Expans'n Plant Oil Burning	Direct Connected Diesel Drive	Diesel Electric Drive	REMARKS
		Single Screw	Single Screw	Twin Screw	Single Screw	
Monthly Salaries—Continued	2 Mess Boys	150.00	150.00	150.00	150.00	
	Carpenter					
	4 Winchmen	380.00	380.00	380.00	380.00	*See Note Above.
	8 Sailors	720.00	720.00	720.00	720.00	
Total Per Month—Salaries*		**4,400.00**	**4,130.00**	**3,952.00**	**3,860.00**	
Total Per Year—Salaries		**52,800.00**	**49,560.00**	**47,100.00**	**46,320.00**	
Number of Men		**37**	**34**	**31**	**31**	
Food for 365 Days at $1.25		**16,881.25**	**15,512.50**	**14,143.75**	**14,143.75**	
Net Profits of Ship Including Fuel, Wages and Food Per Year		**133,600.00**	**173,728.00**	**243,283.40**	**252,132.65**	
COMMERCIAL EFFICIENCY		**52.8%**	**68.8%**	**96.5%**	**100%**	

A NOTABLE BOOK

DIESEL ENGINES FOR LAND AND MARINE WORK—By A. P. Chalkley, with introductory chapter by the late Dr. Rudolf Diesel. 365 pages, copiously illustrated, paragraphed, and indexed. Price $4 net. Published by D. Van Nostrand Company, New York.

This is a revision and enlargement of the fourth edition of the author's well-known work on the Diesel engine. The fourth edition was published in London, October, 1914. This revision is brought down to the year 1919. The great bulk of the additions and revisions is made in that part of the work which deals with the marine Diesel engine. An appendix is added giving Lloyd's rules for the survey of internal combustion engines for marine purposes and a copy of Dr. Diesel's original specifications for patents on his process for producing motive power from the combustion of fuel. The work of Mr. Chalkley in collecting such a great number of working drawings of various types of British and continental marine Diesel motors is very commendable. Practically every European manufacturer of Diesel engines is represented, and the student may here with convenience study the trend in Diesel engine design and easily avoid the mistakes made by his predecessors.

PERTH AMBOY DRYDOCK COMPANY

SITUATED at the mouth of the Kill Von Kull on New York's lower bay, almost directly due west of the Point of Sandy Hook, is the growing repair and drydocking plant of the Perth Amboy Drydock Company. This company was organized and a site secured at this location in 1894. Mr. W. P. Runyon and Mr. D. Snedeker, president and secretary, respectively, of the organization, have been with the company since its inception in their present capacities. In fact, these two men were the original promoters and founders of the enterprise.

The plant at present consists of four balance drydocks of the single floating pontoon type. These docks will accommodate 2500, 2000, 1000 and 500 ton vessels, respectively. The two larger docks are served by a 25-ton derrick. The company keeps a 50-foot tug of 120 horsepower available at all times for emergency, salvage and rescue work. This tug is equipped with air compressors, welding apparatus, and the necessary tools for emergency repair work and is very much in demand for meeting ships in the outer harbor.

Plant of the Perth Amboy Dry Dock Company, Lower New York Harbor

Recently the Perth Amboy Drydock Company acquired the Raritan Drydock Company, whose property adjoins, and have laid out an extensive program for enlargement. The program includes the building of a new five-section 10,000-ton floating dock which is at the present writing well under way and partly installed. A new boiler shop is to be built and a large extension added to the present machine shop. The blacksmith shop is also being enlarged and by the time the new drydock is ready for service, which will be some time during the summer of 1920.

LARGEST AMERICAN SHIP REPAIR PLANT

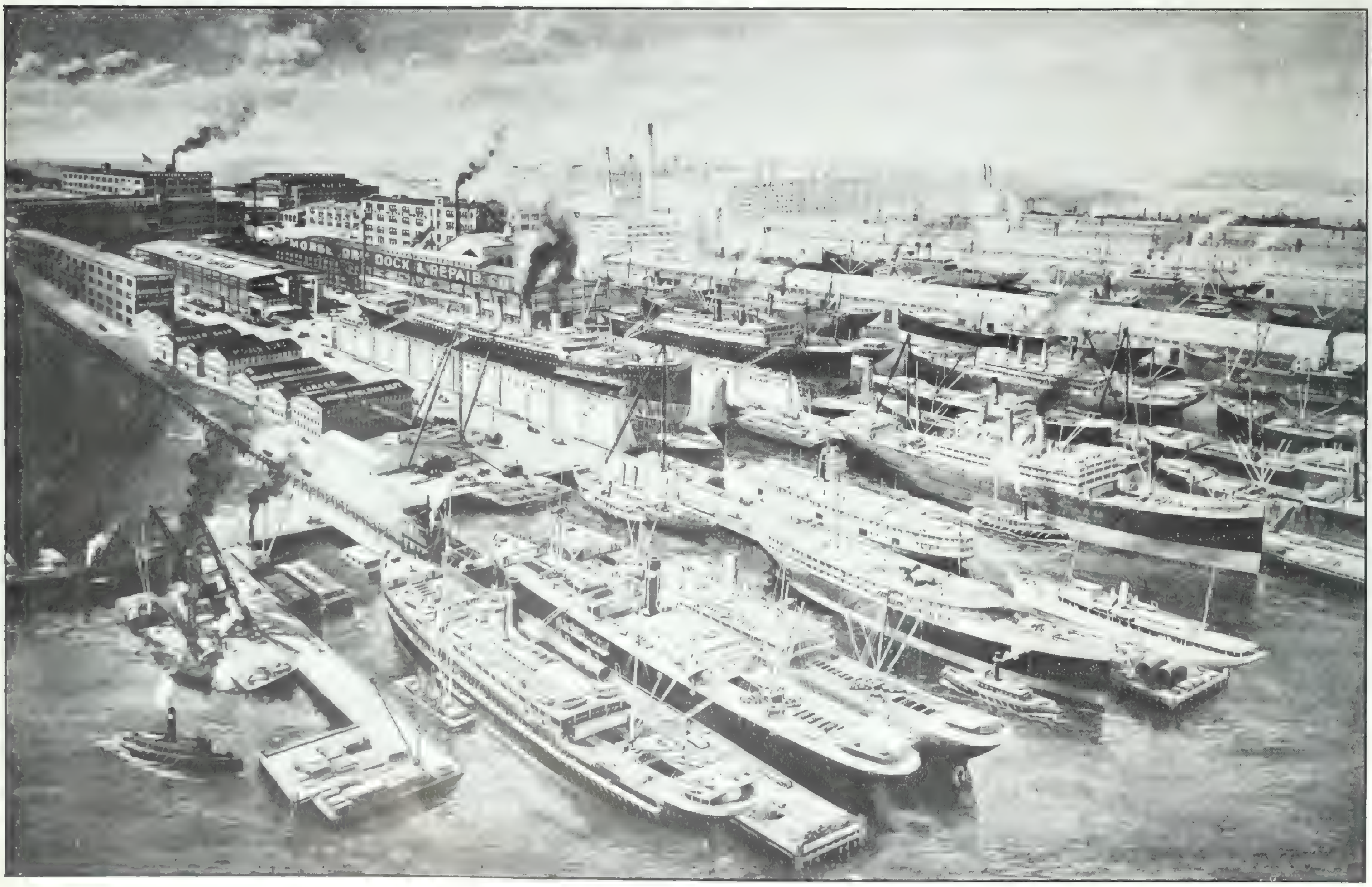
THE Morse Dry Dock & Repair Company of Brooklyn maintains and operates what is undoubtedly the largest individual ship repair yard in the United States and one of the most modernly equipped plants of its kind in the world, located on First avenue, Brooklyn, and extending for three blocks along Brooklyn's waterfront facing lower New York between Fifty-fourth and Fifty-seventh streets. This plant covers forty acres of ground, which is improved with buildings housing practically every activity needed in or contributing to repair work on ships. Two floating dry docks are maintained, one of them capable of docking the largest ships afloat, and in addition to this there are four piers with nearly a mile of docking space.

In order that the convenience of their patrons may receive first consideration, Morse maintains a large fleet of repair scows, derrick lighters and tugs, and a very sizable flotilla of motor cars for carrying supplies and material to and from the various shops.

While this plant does not possess a shipbuilding way, many of their repair operations have been equivalent to the rebuilding of entire vessels with their machinery and equipment in such fashion as to demand a much more complete equipment of shop and a larger assortment of tools than are possessed by the majority of shipbuilding plants. The machine shop of the Morse Dry Dock & Repair Company would compare favorably with those of the largest shipyards in the country. The same may be said of its plate shop. In addition to these two main departments, the company operates a very large foundry and forge shop, a complete planing mill and joiner shop capable of turning out everything needed in the way of woodwork for the furnishing of any steel ship or the building of any wooden ship. The rigging department occupies the fourth floor of a large four-story building and is completely equipped to take care of any rigging problem from that of a fishing boat or a racing yacht up to the largest ocean-going sailing ships. The electrical department on the third floor of this same building is prepared to take care of all electrical installations on shipboard from annunciator bell wiring to the heaviest power work; in fact, Morse Dry Dock & Repair Company are now rebuilding the wrecked Powhatan and transforming it into the turbo-electric ship Cuba, which will be electrically lighted, electrically driven, and electrically operated throughout all her auxiliary machinery—said to be the first application of this method of ship propulsion to a combination freight and passenger vessel. The motor of this ship is to be 3000 H. P. on 100 R. P. M. at 1150 volts. We cite this instance of the activities of the electrical department to show its capacity.

The same completeness of equipment extends to every department, including the boiler shop, pipe shop, paint shop, cutting and welding departments, and the sheet metal works, which is housed in the same building with the coppersmiths and plumbers. To this latter department has recently been added an electro-plating branch so that Morse is now not only prepared to rehabilitate all of the structural work and machinery of ships, but can at the same time replate all the silverware in the ship's pantry and refinish, if necessary, every fitting and fixture.

During the strenuous days of the war emergency many ships were turned inside out at this plant for conversion into troop transports, and the unusual facilities for work here enabled the Morse Dry Dock & Repair Company to make some very unusual records for speed of conversion.



The [illegible] [illegible] of the Morse Dry Dock and Repair Company

Marine Insurance

RECENT DEVELOPMENTS IN MARINE INSURANCE

By C. F. HOWELL

CLOSE attention is being given by marine underwriters to the hearings and discussions under way before the Interstate Commerce Commission relative to changing the provisions and clauses of the standard bills of lading. The granting of any additional exceptions to shipowners and operators is sure to meet with intense opposition from the insurance men, as the latter feel that the carriers already are escaping a considerable share of their legal responsibility as regards the care and delivery of the goods they handle. Any further indulgence granted the carriers throws that much additional burden upon the underwriters. It is contended by the latter that the proposed new clauses violate the Harter act, and that they very likely would not be sustained by the courts.

The revised forms are being studied by the National Board of Marine Underwriters and the American Institute of Marine Underwriters. The Harter act protects the underwriters in that the carriers are held liable for certain losses, and it denies exception in several of the particulars that are now being urged by the carriers. Objection is especially made to any attempt at permitting carriers to be careless in their handling of shipments. It is the opinion of the underwriters that the revised bills of lading weaken the admission that the goods have been received by the carriers. The underwriters oppose the request of the latter for freedom from liability on account of wetting by sea water and from damage caused by "delay, sweat, decay, etc.," whereas the carriers are frequently at fault.

Ship operators are also undertaking to shift all payments for theft and pilferage, and this is objected to by the insurers on the ground that the majority of such thefts and pilferages arise from failure to exercise adequate care of the cargo. There is also a difference of opinion concerning the places for adjustment of losses. The new clauses would seem to indicate that New York City should be fixed as the center for settlements, but underwriters are of opinion that adjustments could be better made at either the port of sailing or the port of destination, as the parties most interested are likely to be located near one or the other.

RIVER TRAFFIC

One of the veteran inland marine underwriters of the country, Edwin C. Gibbs, president of the Cincinnati Chamber of Commerce, and formerly of the old firm of Neare, Gibbs & Company, marine underwriters and adjusters, recently expressed some interesting views of the needs and developments of American river traffic. He points out that through reduced rates offered by the railroads to competitive river points much of the freight that formerly went by river has been diverted to the rails. No other civilized country on the globe, in his opinion, has paid so little attention to its waterways as has the United States. The improvement by the government of the Ohio River from Pittsburgh to Cairo to secure a minimum stage of nine feet, through the building of locks and dams, is more than half completed, and the value of work of this character was impressively demonstrated last winter and spring during the coal strike. Says Mr. Gibbs: "Of course, we need these improvements, and of course more and more do we need boats constructed upon modern lines; but we also need coordination between the waterways and the intersecting railroads, without which the highest development and utilization of inland waterways can never be accomplished. When we are assured of improved channels, modern boats, and of the interchange of freight between the rail and water routes upon a pro rata basis and under through bills of lading, the river transportation business will grow by leaps and bounds; and indeed water transportation facilities are greatly needed to assist in handling the increasing commerce of the country."

CIVIL COMMOTION COVER

Shipments destined for or that have arrived at Baltic ports recently call for strike and riot coverage, in the judgment of many prominent bankers. Loss through civil commotions is being insured against on practically all goods consigned to Poland, East Prussia, or any of the Central European buffer States. A number of large lines of this character have been written in the New York market of late.

HEAVY PILFERAGE LOSSES

There is no material change in the heavy losses sustained through theft, pilferage, and short deliveries. Marine underwriters have made every effort to devise means to reduce such losses, but little or nothing has seemingly been accomplished to date. Claims continue to come in, and there seems to be little reason for believing that the situation will be relieved, even if drastic measures are adopted. The recent adoption of protective clauses by the marine underwriters of several European countries has not proved particularly effective. In this country efforts are still being made to hit upon a better solution of the problem, but without result to date.

FLOATING OIL MENACE

One of the most serious harbor hazards now confronting American ports is that arising out of the regrettable custom of dumping oil waste in harbor waters. The enormously extended use of oil as a motor power on modern ships has greatly increased this peril. Floating oil in harbors has come to be a most serious menace to the invaluable property along the waterfronts of our leading ports, largely from the fact that it floats into inaccessible places under wharves where it can be readily ignited by sparks or cigarette stubs. A few months ago New York City adopted a change in its ordinances prohibiting the dumping of oil waste within the navigable waters of the harbor. Shipping interests of Philadelphia are considering the calling of a meeting to take action on the presence of floating oil on the Delaware and Schuylkill Rivers, which is greatly increasing the fire hazards there. Much of the oil is pumped out with the bilgewater when vessels are being cleaned. Recently a steamship, docked for repairs at a Kensington shipyard, is reported to have pumped at least twenty-five barrels of oil from her tanks into the river before repairs could be made.

FLEETS FOR SYNDICATE "C"

Attention is now being centered upon the development of Syndicate "C," the department organized under the new Merchant Marine Act for the coverage of pri-

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

vately owned vessels and fleets. While it is true that the rates will be somewhat higher than those charged by certain individual companies, the protection is absolutely sure and there will be no delay in settlements. Ratings are being sought by brokers for fleets; and for the convenience of the former a meeting of the rating committee is being held at 11:30 a. m. on Tuesday of each week at the headquarters of the syndicates in the Kerr Building, Beaver Street, New York. Brokers who desire to have fleets rated should notify the assistant underwriter, W. B. Harwood, before noon of the Monday preceding, giving the name of the fleet and full particulars. It is also desired that they indicate whether it is their wish to appear before the board of managers to make any verbal statements relative to the vessels which they are presenting. Gomer H. Rees, secretary of the syndicates, has been elected treasurer of the latter in the place of Charles H. Gardner, who has resigned to return to the American Merchant Marine Insurance Company in order to assist in the reinsurance of the latter.

AMERICANS AS LOSS PAYERS

G. H. Lyne, of the foreign sales department of the Belden Manufacturing Company of Chicago, has considerably stirred up American marine insurance men by severely criticising our companies for slowness in paying losses, taking occasion at the same time to praise English and French companies in this particular. In reply, S. D. McComb, manager of the Marine Office of America, has written the following interesting comment to The Weekly Underwriter:

> In all countries there is a wide variety of companies. There are some very splendid French companies and there are other French companies which we hear of that are not so good. The same is true of American companies. There are some American companies which are perfectly sound and pay all their claims but have no arrangements for paying losses abroad. When they have a claim abroad it is necessary that the documents be returned to them and the payments made in this country. However, the better American companies in the marine business have arrangements for paying losses abroad and they are promptly settled; in fact, a consignee abroad can frequently have a loss paid more quickly than would be the case if the loss occurred in this country, as loss departments here are in a somewhat congested state.
>
> The trouble probably lies in Mr. Lyne's selection of brokers or in the companies with which the brokers place the insurance. There has been some demand for cheap insurance and there has been some rebating. A shipper who will give his business to the broker who will rebate the most or to the company that will write at the cheapest rate should expect to get inferior companies and the poorest kind of service from brokers. Insurance is no different than any other line of business and when cheapness is the only consideration asked for, financial strength and proper service cannot be expected. There are no complaints which I know of in regard to the better American companies.

NEW MARINE HAZARD

Another vivid illustration of the novel hazards introduced by the rapidly extending use of oil for motor power comes from the Jersey coast. Recently a series of explosions and sudden blazes in the ocean off Avalon, New Jersey, alarmed and mystified the coast guards and all others who observed them. The arrival of the fishing schooner Mackintosh at Atlantic City brought the explanation. The tanker Cabrille had grounded off the Brigantine Shoals, and had been floated only by emptying her oil tanks of one thousand tons. The oil drifted northward along the shore, and the engineer of the Mackintosh very foolishly tossed a lighted bundle of waste into the floating oil and set it ablaze. Immediately the entire sea appeared to be on fire, ignition passing rapidly from pool to pool and from streak to streak. It was only with the greatest difficulty that his vessel was extricated from her perilous situation. The danger to shipping and to shore property from such a menace as this is obvious.

NON-ABANDONMENT

Considerable trouble and expense have been incurred of late by British marine underwriters through the non-abandonment of vessels that might well have been handed over as constructive total losses, but which, owing to the inability during the last few years to replace them, the owners have preferred to keep afloat and employ until the inevitable total loss left the underwriters with 100 per cent claims to pay, plus salvage charges and other expenses and yet with no relief in salvage from the sale of the wreck. Underwriters who had reinsured their lines against total loss only were, in such instances, doubly out of luck. However, it is not believed that non-abandonment losses will figure in the future to any such extent as they have of late.

FULL COVER WITHOUT WAR RISK

Since the signing of the armistice it has not been considered necessary by freight forwarders to take out war risk insurance in order to have complied with the provision to "do all customary things to insure the shipper's reasonable protection." The Supreme Court of the State of New York has sustained this view. In the case under consideration action had been brought by Johanna Lambert against the F. William Gertzen Company, forwarding agents, in the Municipal Court of the Borough of Manhattan, New York City, to recover for the loss of a package of goods delivered to the defendants by the plaintiff for transportation to a person in Germany. This was in November, 1919, and the package was lost when the steamer was sunk by a floating mine on the 8th of the following December. The defendant had insured the plaintiff against ordinary marine hazards: not against war risks: and suit was brought on the ground that the latter hazard should have been covered as well. The defendant Gertzen, testifying in his own behalf as an expert, declared that since the signing of the armistice shipping agents have ceased to insure against war risks. Gertzen lost in the lower court but won on appeal.

LIABILITY FOR UNREPAIRED LOSS

The Lord Chancellor has rendered judgment in the important case of the steamer Eastlands which has been before the British House of Lords, and he finds that when a vessel, which has been damaged and temporarily repaired, is later lost through a peril not covered by the marine policy, the underwriters are not required to pay for the unrepaired damages. The government had insured the Eastlands against war

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STREETS, SAN FRANCISCO, CALIFORNIA
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LOS ANGELES
230 BYRNE BUILDING
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ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK
AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

risks, and when she had been sunk by a torpedo the Admiralty paid the loss but deducted a sum that was estimated to cover certain unrepaired damages. The private insurers were sued for this amount by the vessel's owners and the former won after the case had been carried to the highest court. The point involved is of interest to Americans, and we accordingly give the following extract from the Lord Chancellor's brief:

Whether an underwriter is or is not liable for unrepaired damages cannot be ascertained until the expiration of the policy. If before the expiration of the policy there is a total loss, he is not liable to pay for the earlier unrepaired damage sustained during the currency of the same policy, and it makes no difference whether the total loss falls upon him or is due to an excepted peril against which the owner is insured or uninsured.

The true rule is capable of statement in the following proposition: When the vessel, insured against perils of the sea, is damaged by one of the risks covered by the policy, and before that damage is repaired she is lost, during the currency of the policy, by a risk which is not covered by the policy, then the insurer is not liable for such unrepaired damage. The rule so stated embodies the principle upon which underwriters and merchants have based their practice in such matters for upwards of a century, and, even if this House were of opinion that the rule did not correctly state the law, it would be a matter of grave consideration whether such a rule, which has been observed for so long, which has been expressly or impliedly incorporated in so many contracts, and which has profoundly influenced the course of dealing between merchants, should be reversed at this period of its history. In my opinion, this question does not arise.

SECTION 10 REQUISITION CHARTERS

Many Thousands Involved.—A committee representing members of the Pacific American Steamship Association, whose vessels were requisitioned by the United States during the war, is endeavoring to bring about a settlement with the Shipping Board in a case involving several thousand dollars, which, according to a recent ruling of the board, would be withheld from the owners of requisitioned vessels. Section 10 of the time form requisition charter, provided as follows: "In addition to the aforesaid compensation for the use of the steamship, the United States agrees to reimburse the owner for any proper increases in wages and bonuses over the standard prevailing 1 August, 1917, for master, officers, and crew, the owner to produce satisfactory evidence of such increases in wages or bonuses." Section 26 was: "The vessel shall work day and night, as required, and the steam winches shall be at the service of the United States by day and night, with full steam; whenever possible without additional expense to the owner, same to be worked free of cost by the crew. The United States shall reimburse the owner for all overtime, provided the same be certified by the agent or nominee of the United States; or, if no agent is present, by the master, at such standard rates as may be in force from time to time." Apparently the wording of Section 10 is quite clear; nevertheless, different interpretations have arisen, due to the fact that bonuses were paid for trans-Atlantic service, whence the question arises: Shall the standard as of August 1, 1917, be that of trans-Pacific or trans-Atlantic? In a letter dated May 14, addressed to owners of vessels requisitioned by the Shipping Board under time charter, tne San Francisco office of the board advised owners that at a recent conference in New York decisions were discussed bearing on some points raised; that a decision was rendered that increases in wages and bonuses would be paid to operators only when the increase was in excess of the schedule of wages in effect on each vessel as of August 1, 1917, plus 50 per cent, "it being stated that the feature was taken into consideration that certain operators were paying, at the time requisitioned, a 50 per cent war bonus, where the vessels were operating in the war zone, and that the charters were being made sufficiently high to cover the bonus at that time." A ruling by E. B. Burling, chief counsel, said in part: "The standard prevailing August 1, 1917, refers to the standard then prevailing in the trans-Atlantic service. It was not intended that the owners of vessels in safe trades, who receive as high a rate of hire as owners of vessels engaged in trans-Atlantic trade, should be reimbursed for any increases in wages and bonuses, except to the extent that the combined wages and bonuses may exceed those prevailing in trans-Atlantic service on August 1, 1917." As to overtime the following ruling was made: "Overtime: Interpretation has been made on Clause 26 of the time form charter to the effect that the United States will reimburse the owner only for such overtime as was necessary in connection with the loading and discharging of cargo." Members of the Pacific American Steamship Association refused to accept the ruling on Clause 10, because the clause "is very specific in stating that owners will be reimbursed for any proper increase in wages over the standard prevailing August 1, 1917." And as to overtime the association saw no reason for a different interpretation of Clause 26, inasmuch as overtime had been paid in all cases when certified by the agent or nominee of the United States or by the master. No reply was received to this letter to the San Francisco office of the Shipping Board, although the communication was forwarded to Washington; and the comptroller insisted that the operators make good the increases. A committee of owners was appointed as follows: Captain C. W. Saunders, Matson; F. S. Samuels, Oceanic; Daulton Mann, Pacific Mail; A. M. Garland, China Mail; T. W. Malmgren, Robert Dollar Company; F. L. Doelker, W. R. Grace & Company; Charles E. Brown, Swayne & Hoyt. The question continues to hang fire, although the committee is working actively in protest against the decisions of the admiralty counsel, the trustees and the director of operations. The amount involved is large, one company alone having $50,000 at stake.

OIL CARRYING BARGES

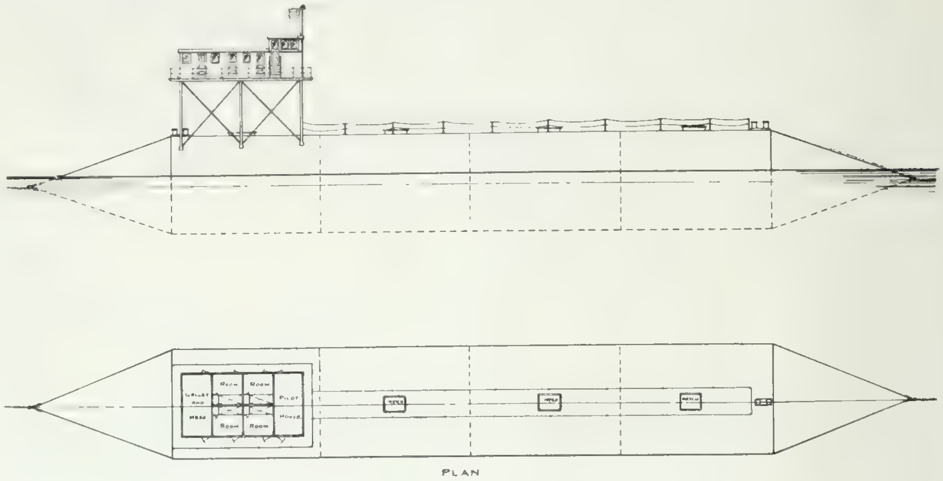
By RENWICK Z. DICKIE

THE growing scarcity of fuel oil has created an unprecedented demand for oil carriers, and as the oil has o be transported from distant points the purpose of this article is to offer a solution for the problem.

As considerable delay would be necessary to obtain power plants for new oil carrying vessels it would be probably well to consider building barges which could be towed by the present tankers, thus increasing their capacity without any extra expense of power plants and allowing for the future utilization of Diesel power for towing which will undoubtedly be the ultimate result.

The outline sketch will suggest a type of barge which can be built economically and quickly and at the same time allow for the most economical means of transportation when time will permit of the building of Diesel power tugs for towing these barges.

Several years ago Mr. Edward S. Hough, Mr. James Dickie and Captain L. P. Harvey worked up this type of barge, which can be built in large sizes, and the following description was written by Mr. James Dickie about twenty years ago. This prospectus would hold true as written, except that marine insurance underwriters demand that quarters for three men be provided. These quarters are shown in the sketch, and the beam of the barge would have to be increased amidships enough to insure the greater stability required by addition of this superstructure.



Proposed Cylindrical Towing Barge for Carriage of Fuel Oil

Herewith please find an outline sketch of a circular oil barge of the following dimensions:

Extreme length	229 feet
Length of the parallel part	155 feet
Length of each cargo hold	34 feet
Beam	25 feet
Depth	20 feet
Draft loaded with 10,000 bbls.	15 feet

We claim five distinct advantages for this form of barge for carrying oil in bulk:

1. This form of barge is easily towed, offering little resistance.
2. The barge being towed by the extreme end does not require to be steered while towing.
3. It can be operated for less cost than the ordinary ship form.
4. It costs less to build than the shipshape form.
5. It will carry ordinary cargoes as well as any other vessel and oil better.

Resistance in towing is formed of four primary elements, namely: skin resistance, bulk or displacement resistance, resistance from storm waves, and resistance from wind.

The displacement is smaller for the cargo carried than in any other form; the shell being circular, the vessel takes less material for the same strength than any other form. As less material is required the vessel is lighter, and as the displacement is less the resistance from this source is smaller.

There is less resistance from the storm waves in this form than in any other, because there are no high ends for the sea to strike against and no deck to hold large quantities of water. No matter how rough the sea is, the resistance from this cause must remain the same. On account of the shape of the barge, the ends will not rise and fall with the sea, but will go through it, thereby reducing the resistance from pitching.

Wind resistance is much less in this form of barge because there is nothing to hold the wind. Often in the ordinary form of barge the wind resistance is much greater than all others combined, while in this form it is almost eliminated.

When the barge is light the towline is out ahead of the barge in just the same manner as the pole of a wagon is out ahead of the front wheels and the principle of guiding the vessel is the same. When the barge is loaded the ends are under water and have little opposition to offer the wind and sea. Consequently the barge will follow the towline without the aid of a rudder. Having no rudder there is no necessity for a helmsman. The light is arranged so it will burn without attendance, the same as those on bar and channel buoys.

As the barge is easier to tow, it can be done with a cheaper and smaller towboat; or, if the same size of towboat is used, the distance can be covered in less time.

Does not require a crew to operate the barge.

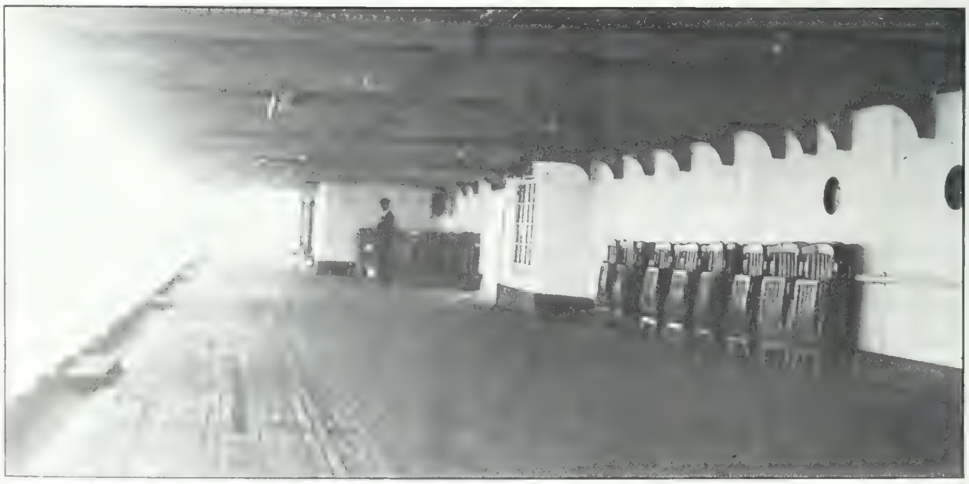
There is much less material used in its construction for the same capacity and strength and the material is in a much simpler form, consequently the barge is much cheaper to construct.

It has been estimated that these barges can be constructed for about 50 per cent of the cost of a barge of the ordinary form.

It will carry oil better and safer than the ordinary ship form, as there is no danger from lack of stability, which has always been a source of trouble. The reason for this is that the barge always has a positive meta centric height and therefore requires no center bulkhead. The stability of this form is the same transversely as the submarines and their stability can never be questioned.

If oil cargoes are to be towed in barges, which is known to be the cheapest method of transportation, this is the cheapest and best form of barge to transport it with.

If the barges are towed to a port where their cargoes cannot be pumped from shore, the tanker can discharge the cargo with its pumping plant, and if used between oil stations could be pumped out by the shore plant, thus eliminating the necessity of installing a pumping plant on each barge.



New Promenade Deck on the China Mail Liner Nanking. By Careful Measurements and Shop Fabrication the United Engineering Company of San Francisco Prepared All the Structural Members for This Work and Installed This Deck Without Delaying the Regular Schedule of the Ship.

SALVING THE ARAKAN

By ALBERT S. PETERSON

Captain Cecil M. Brown

WHEN the Dutch steamer Arakan of the Java Pacific Line went ashore six miles north of Point Reyes on August 29 and the vessel's plight became known in San Francisco's shipping circles, the "old - timers" agreed that the death-gripping sands had seized another victim. Everybody remembered that in April the barkentine Albert had gone ashore within a mile of the Arakan's position, and that before the salvors could reach the scene, this staunch sailing ship had been smashed to driftwood and strewn along the beach. "There was no adequate equipment at hand," the veterans pessimistically declared; "so the thing to do was to simply check up a $2,500,000 loss and let the marine underwriters foot the bill."

The pessimistic prophets were all wrong.

Seventy hours after she piled upon the beach, the Arakan was again in deep water. The Hanlon salvage steamer Homer had done the big job, a fleet of "Redstack" tugs acting as auxiliaries. It was a demonstration of brains, grit and preparedness. Without any one of the three the Arakan would have met a fate similar to that of the Albert.

The brains and grit were supplied by Captain Cecil M. Brown, who had charge and represented the owners, agents and marine underwriters; by Captain "Dick" Seike, of the Homer, and by Captain Louis Langren, who acted as commander in turn, on each of several tugs.

The honor for preparedness, however, is accorded Dan Hanlon, the Oakland shipbuilder, who months ago dared expend a considerable sum in equipping the Homer against the very emergency that arose when the Arakan went ashore; for, unless the Homer had been present, and her huge anchors laid in time to get a purchase on the stranded craft before she commenced to break up, nothing could have prevented a total loss of ship and cargo. This fact is thoroughly demonstrated by the official account of the salvaging operations as given out by those who participated.

Captain Louis Langren

The Arakan went ashore Sunday, August 29, at 2 p. m., and the word was immediately flashed to J. D. Spreckels & Brothers, the San Francisco agents for the Java Pacific Line, owners of the stranded ship. Fred S. Samuels, the Spreckels manager, immediately made arrangements to dispatch Red Stack tugs and Captain Louis Langren proceeded to sea in the Sea King, accompanied by the Sea Queen. Samuels also communicated with Dan Hanlon and arranged that his salvage vessel rush to the aid of the Arakan at the earliest possible moment. Captain Seike was all ready, with the exception of the supplies of food and a cook. These were secured and the Homer left for Point Reyes Monday night.

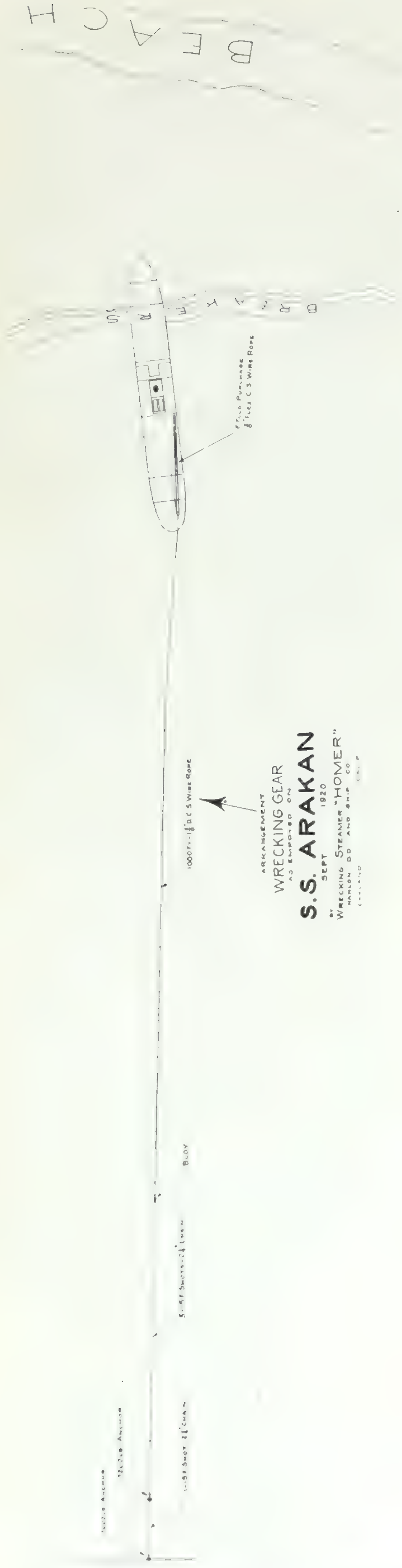
When Langren arrived at the scene he found the Arakan nearly broadside on to the beach and hawsers were passed aboard from both tugs. The tugs pulled all night and by morning the Arakan had been fairly well straightened out. As the vessel was steaming ahead at a seven-knot clip when she struck, she was well up on the beach, straddling a hump of sand, with the surf breaking against the starboard side. The accident happened during high tide, and when the water fell there was but sixteen feet of water amidships, the stem was barely afloat, and the stern was buried in four feet of sand. As time passed, the big ship snuggled down in a bed of sand amidships estimated at about eight feet. The strain was terrific on the hull and the plates in the bottom buckled badly and the boilers and engines became useless.

The prompt work of the tugs kept the ship from pounding to pieces and permitted the operations to be conducted successfully afterwards. Captain Cecil M. Brown appeared at the wreck on Monday afternoon at 4:30 o'clock aboard the Peterson tug Chief. He hoped to get aboard the Arakan, but, owning to the rough surf, dashing against the steel hull and breaking clear over the bridge, the plan had to be abandoned. In the meantime the Sea Queen and Sea King had returned to San Francisco and the tugs Sea Fox and Restless had taken the lines from the Arakan. The tugs Gleaner and Hercules had stood by for a half day, but left for the north late Monday afternoon.

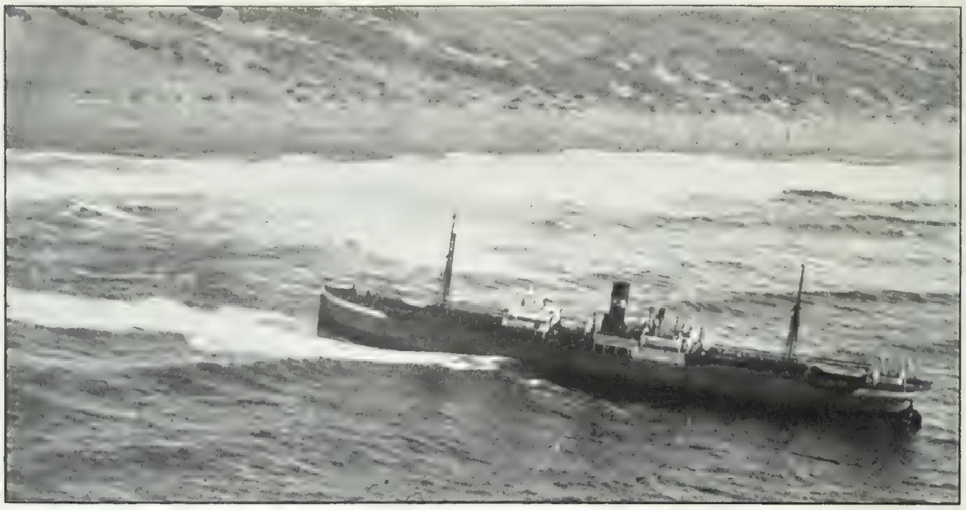
Captain Brown released the Chief that night and waited for the arrival of the Homer. Seike encountered a heavy fog at the harbor entrance and had to feel his way to the wreck. He did this by following the breaker line and anchored in a position 1000 feet from the Arakan on Tuesday at 4 a. m. In the meantime the steamer had started to broach to the beach again and there was a battle of the tugs for many hours before the hull lined out straight from the beach.

Immediately after the arrival of the Homer, Captain Brown came aboard and consulted with Captain Seike. It was decided to begin laying the moorings, includ-

Captain Dick Seike



Sketch Plan Showing Position of S. S. Arakan and Arrangement of Salvage Gear as Laid by the Hanlon Wrecking Steamer Homer.



Aeroplane View of Dutch Steamer Arakan Ashore North of Point Reyes, California Coast

ing the big anchors, immediately. Simultaneously it was agreed that it would be best to run out the anchors of the Arakan and Captain Brown and Captain Langren shifted to the wreck. Brown put the engine room crew to work repairing two of the boilers and steam connections in order to have the necessary steam for working the ship's winches. This was done in a few hours and Langren ran the anchors. The port hook was carried back astern forty-five fathoms by the Restless, but the rough sea on the starboard side made necessary the use of the pontoon from the Homer. Previously this pontoon had been used to carry to the wreck the huge blocks, wire and other gear from the Homer.

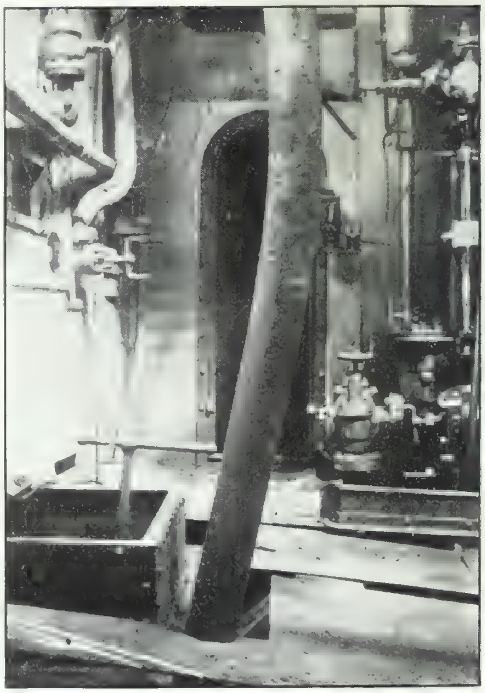
While this work was conducted aboard the Arakan, Captain Seike proceeded to lay his big anchors. As may be seen in the chart, these were laid in tandem, each being marked by a small mooring. Longshoremen brought from San Francisco came aboard the Arakan in the afternoon and prepared to jettison such cargo as was deemed necessary by Captain Brown. They started work at 7 p. m. on Tuesday, but belayed at 8 o'clock because it was deemed best to refrain from lightening ship until all the purchases could be secured and a simultaneous pull exercised.

Captain Seike completed laying the moorings on Tuesday just before midnight and all was in readiness to run the big five-inch wire from the main mooring to the Arakan. The tugboatmen refused to undertake this work until the morning because there was considerable danger that the hawsers might become fouled. Captain Langren ran the wire at 4 a. m. and Theodore Wicks, who was aboard the Arakan and in charge of the Homer share of the job, promptly made the end fast to one of the big blocks and started to take in the slack. At 7 a. m. this slack had been taken in and all was taut. The purchase on the ship's anchors had also been taken in and then the stevedores started to spill copra cake into the sea.

Captain Brown, who kept in close touch with the operations, decided that a few hundred tons of cargo over the side would suffice, and when 350 tons of cake had been jettisoned he ordered all hands to belay. The purchases on anchors and moorings had been fleeted and at 10:30 a. m. there was a total strain estimated at better than 350 tons. Captain Brown was so certain that the ship would float at noon—high tide—that he flashed a message ashore to that effect.

All about the scene was expectancy. The tugs Alert and Intrepid were stationed in readiness to take a tow when the ship slid off. No move was made until 11:30. The weather had cleared, until but little fog was in evidence. The tide rose constantly and then the hull began to grind a bit and rock as the huge pressure

(Continued on page 118)



View in the Engine Room of Steamer Arakan Showing Six-inch Stanchion Buckled Under Strain of Grounding.

PACIFIC MACHINERY

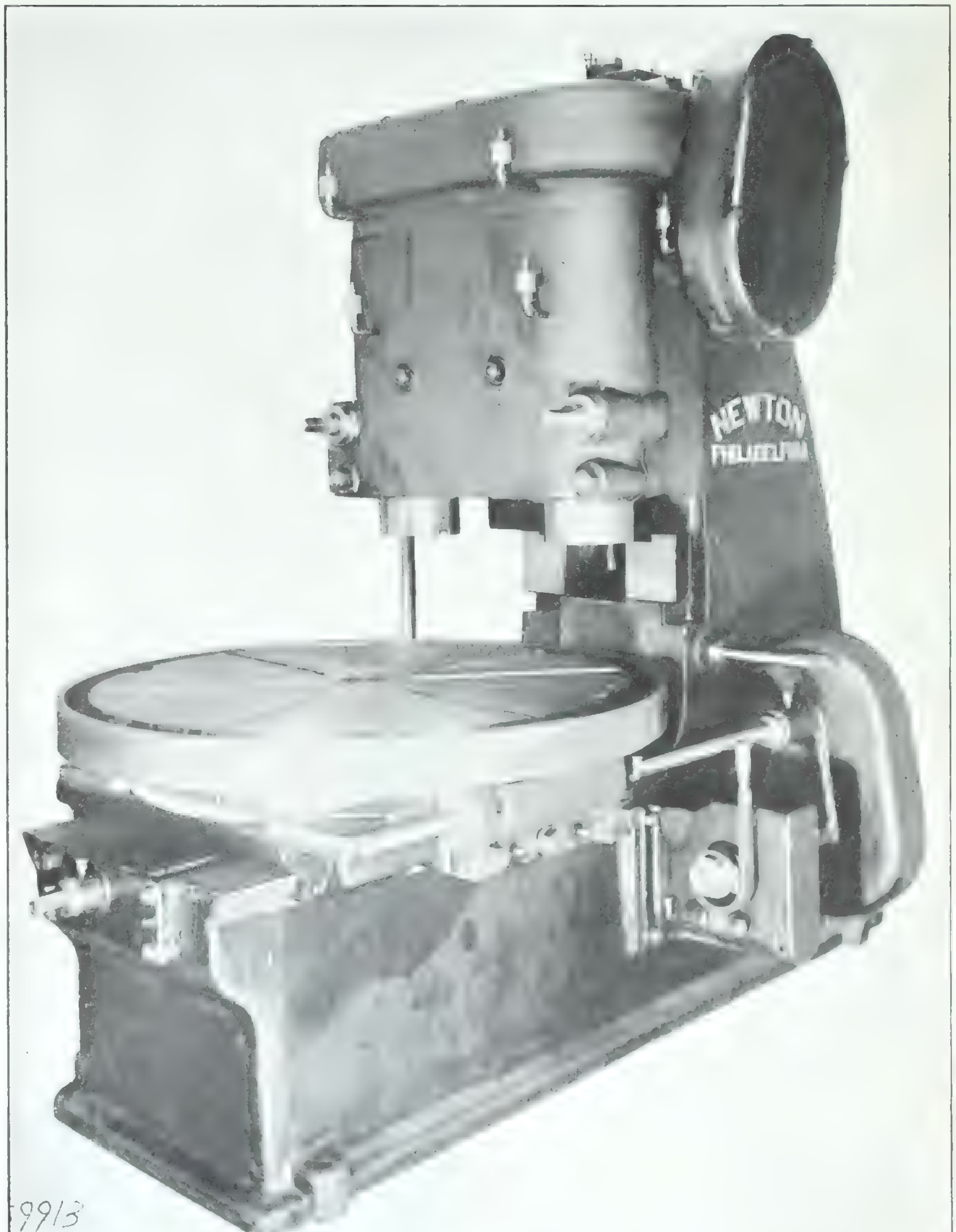
CONTINUOUS OPERATION MACHINERY

THE Newton Machine Tool Works, Inc., of Philadelphia, have designed and are placing on the market a series of machines of the continuous operation type. The principle of the operation of these machines is the continuous cycle during which a definite function has to be performed by the operator in a fixed interval of time, the machine and the chucking arrangements being designed with this end in view and the production fixed at a maximum economical man rate per hour or day. The use of these machines would thus enable the management of any manufacturing plant to increase production through fixed control of input and output of each machine. This fixed model continuous milling machine, which is illustrated in the cuts accompanying this article, has many elements of construction that are fundamental to the success and universal application of this class of machinery.

It will be noted that the column and base are cast in one piece, thus eliminating all strains connected with bolted joints and providing that rigidity which is essential to accuracy in machine tools. The table of the machine is circular in form with special provision for mounting the various forms and types of holding devices required by the parts to be machined. This table is adjustable on the base to provide for proper positioning of the work in relation to the cutters so that the particular class of work in hand may be placed upon the smallest possible radius and utilize the advantage to be gained by small diameter of cutters. This adjustment of the table also provides for positioning of the work with flat surfaces to be milled or work in which opposite parallel surfaces require gang cutters.

The rotation of the table is controlled by a fixed feed so that the operator must load a new part on to the table at a fixed interval, and his number of pieces machined per hour must be maintained at a certain maximum or some clear explanation made as to loss of time. Provision is made in this feed mechanism by which the rate may be increased or decreased to suit the particular job and locked at the required speed by the foreman.

It will be observed that the spindle head is equipped with two spindles individually adjustable for setting the cutters to gauges. This feature of these ma-



Newton Continuous Milling Machine

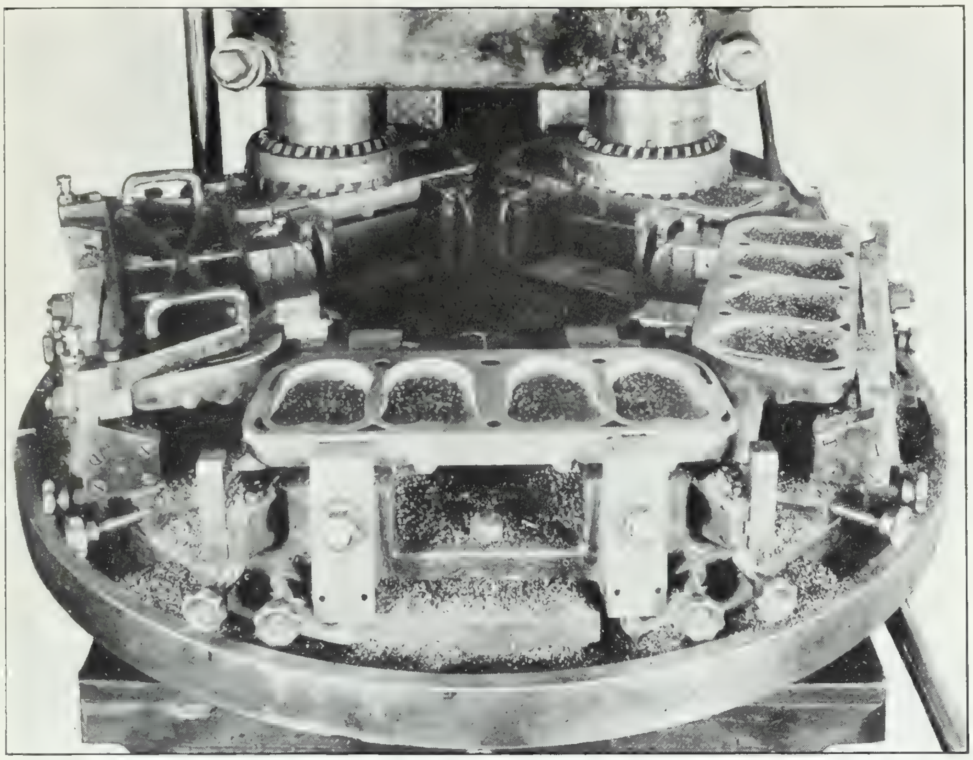


Table of Newton Continuous Milling Machine with Holding Jigs Arranged for the Machining of Cylinder Heads for Automobile Engines

chines is very important, as the left hand or first spindle is used for the roughing operation and the right hand or second spindle for finishing. This has proven to be an extremely accurate method of machining parts in quantities because any wear or variation in the machining operation, due to inequality of castings or to misuse of cutters, is absorbed in the finishing cut and on account of the very small amount of work to be performed by this finishing cutter, accuracy is maintained with very infrequent grindings. This method also permits of much higher cutting speeds and feeds than would be practical with the single spindle milling machine.

The speeds of the spindles are controlled in the same manner as is the rotation feed of the table. The worms and worm wheels used in driving the spindles are especially designed for this class of machine, as a result of very exhaustive experiments carried on by the Newton Machine Tool Works, and they attribute a large degree of the success of these tools to this design of worm drive. The spindle head housing is adjustable on the column so that the cutters on the spindles may be positioned to the best advantage for any holding jigs and work that may be in hand.

Another element of these machines which enters into the success of the high rates of speeds and feeds in cutting is that, as the work is revolving on the table, it will present a constantly changing angle to the cutter, thereby overcoming the flat, heavy resistance which obtains in operations maintained on a straight line.

All the driving gears are heat-treated, entirely enclosed, and running in an oil bath. All bearing surfaces are of very large area. The cutter spindles are large in diameter, the drive is well balanced, and a surplus of power is provided, all of which, taken together with the heavy rugged frame, means the complete elimination of vibration and the maintenance of accuracy under heavy production over long periods of time.

These machines have been used for some years in the production of multiple parts in automobile factories, and we are illustrating herewith the adaptation of the machine to the finishing of an automobile engine cylinder head which is chucked from the rough casting by the gauge, as illustrated, in such a way as to furnish each casting with a uniform volume in the combustion chambers. The machining of these pieces is at the rate of thirty per hour.

GIDDINGS AND LEWIS HORIZONTAL MILL

ONE of the several sizes of horizontal boring machines built by this company is the No. 32, shown in Figure I, which was formerly called the No. 0, but has been improved in design. The bed, which can be furnished in various lengths, on special order, is of box construction, extra strong, having trussed bottom resting on three points. The column is also of box construction, and is firmly bolted and tongued to the bed. The headstock is a single casting of unusual design, furnishing perfect support to all moving parts. The spindle is located as close to the column face as practicable, reducing the overhang to a minimum, and the head is provided with a counterbalance to offset the load on the elevating screw.

Great care is used in finishing the spindle sleeve, which is extra long, completely spanning the column walls. It is provided with taper bronze bearings of generous size, and well lubricated. The face is drilled to receive the facing attachment or milling cutters, and means is provided to take up all lost motion. The spindle is made of forged carbon steel three and one-eighth inches in diameter, the face being bored to receive a No. 5 Morse taper shank and is slotted for pull key. It is driven by two extra long opposed keys carried in the sleeve. At each end of the sleeve a take-up device is positioned to eliminate all lost motion. The spindle is controlled by an extra strong ram rigidly supported by the headstock casting, so machined as to not influence the accuracy of the spindle.

The drive gearing is wide faced and of generous size, well supported by bronze bushings. All gears are enclosed and by the use of two sets of back gears a range of sixteen speeds to the spindle are pro-

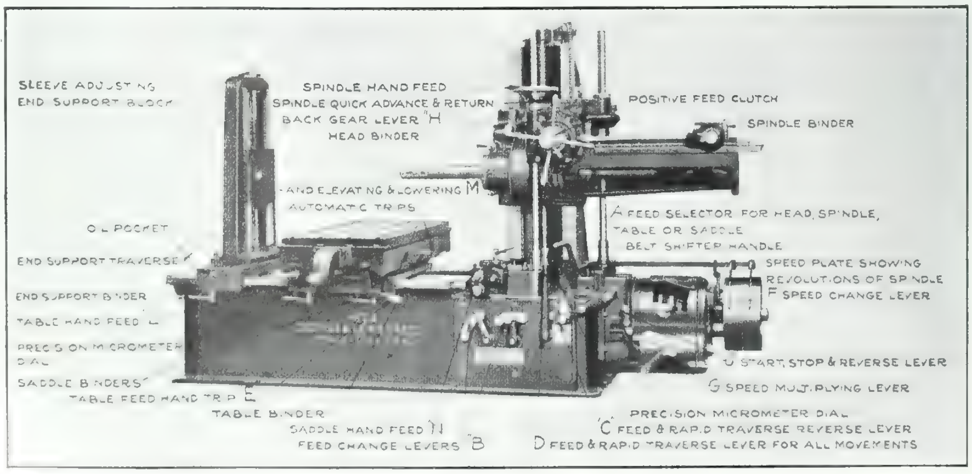

SLEEVE ADJUSTING
END SUPPORT BLOCK
SPINDLE HAND FEED
SPINDLE QUICK ADVANCE & RETURN
BACK GEAR LEVER "H"
HEAD BINDER
POSITIVE FEED CLUTCH
SPINDLE BINDER
HAND ELEVATING & LOWERING "M"
AUTOMATIC TRIPS
OIL POCKET
"A" FEED SELECTOR FOR HEAD, SPINDLE, TABLE OR SADDLE
BELT SHIFTER HANDLE
END SUPPORT TRAVERSE "K"
SPEED PLATE SHOWING REVOLUTIONS OF SPINDLE
"F" SPEED CHANGE LEVER
END SUPPORT BINDER
TABLE HAND FEED "L"
PRECISION MICROMETER DIAL
"U" START, STOP & REVERSE LEVER
SADDLE BINDERS
"G" SPEED MULTIPLYING LEVER
TABLE FEED HAND TRIP "E"
TABLE BINDER
PRECISION MICROMETER DIAL
SADDLE HAND FEED "N"
"C" FEED & RAPID TRAVERSE REVERSE LEVER
FEED CHANGE LEVERS "B"
"D" FEED & RAPID TRAVERSE LEVER FOR ALL MOVEMENTS

Figure 1

duced. The driving gearing starts at a slow rate when power is applied to the machine. When the desired speed is selected and engaged a disastrous shock is avoided.

Feeds in all directions are controlled by a single lever. Power is applied by engaging a clutch controlled by a lever which, when reversed, engages a friction producing a rapid power return. The machine is provided with safety devices to trip each feed at its extreme position and where this is impracticable an indicator shows the maximum adjustment. All movements are provided with a conveniently located clamping device.

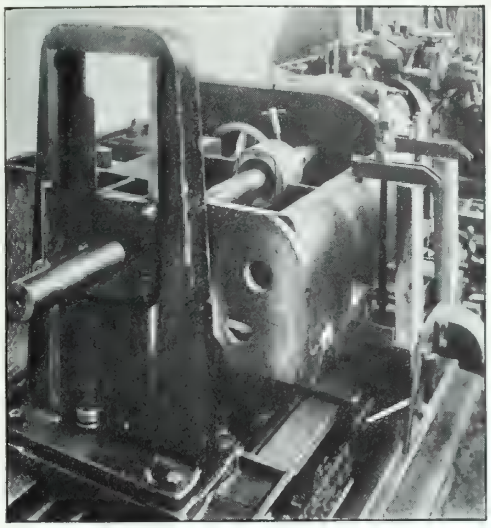


Fig. 2

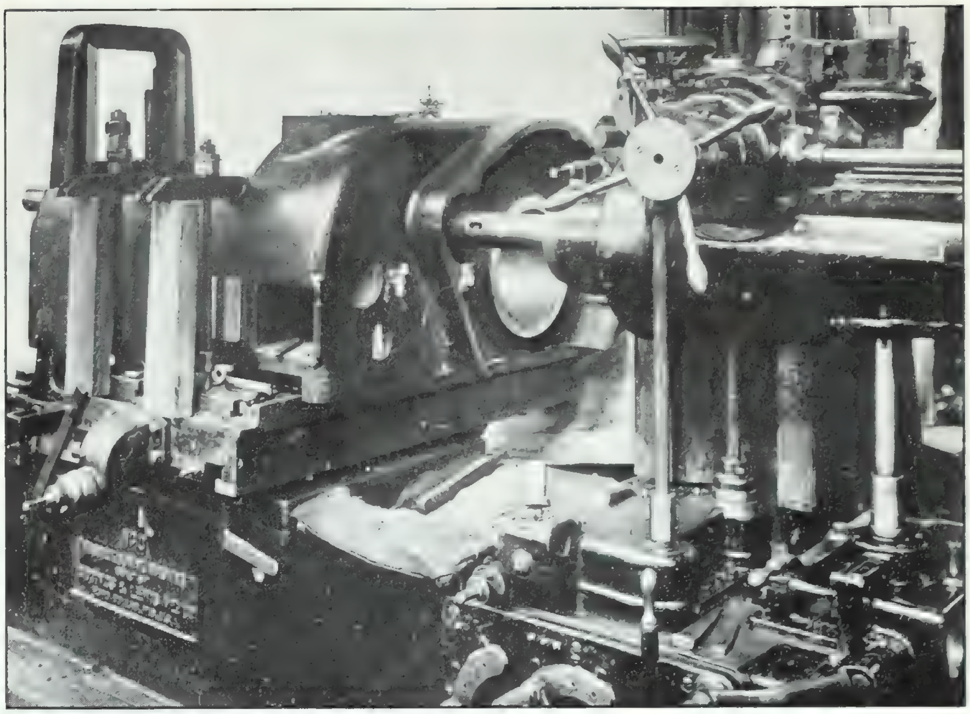


Figure 3

The gearing is of steel generated from the solid and properly supported. All high speed gears and cut jaw clutches are of hardened steel. All feeds are protected by a friction clutch that may be set to slip in case a tool is caught.

Figures II and III show this machine at work on the headstock casting of one of this company's machines, which gives an idea of its capabilities, and when it is set up on a solid foundation, accurately leveled and grouted, the closest limits may be worked to with ease.

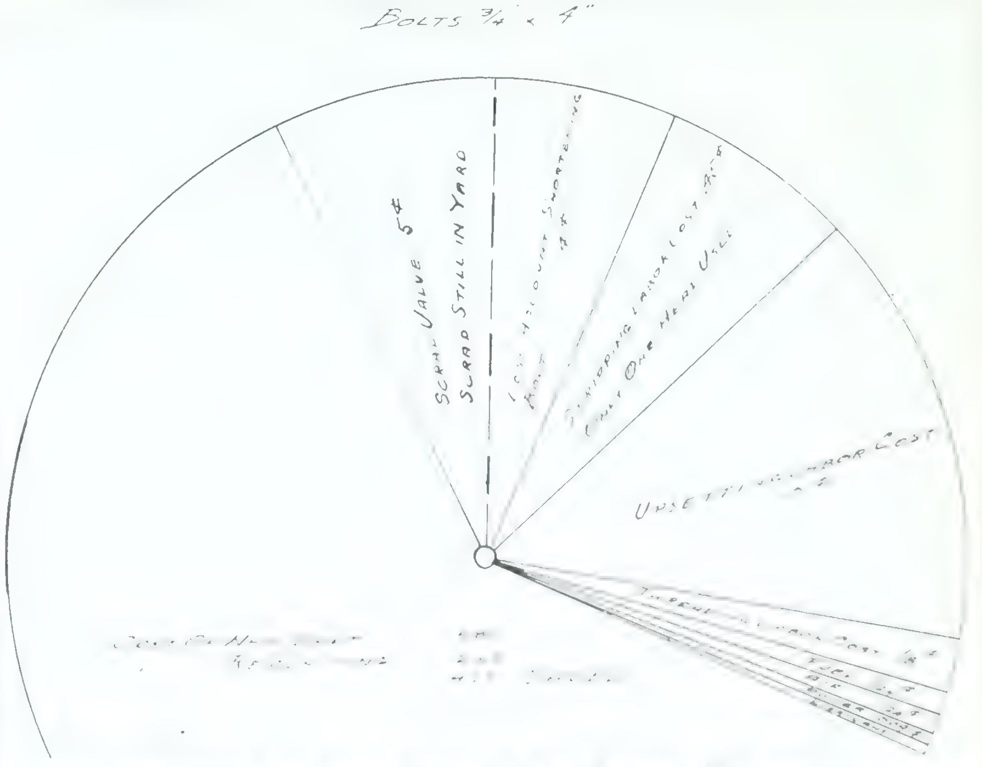
The Giddings & Lewis line of boring, drilling and milling machines is sold in San Francisco, Portland and Los Angeles by Eccles & Smith Company.

CUNNINGHAM OPENS CALIFORNIA OFFICE

The Allan Cunningham Company, well-known Pacific Coast manufacturer of marine machinery, has opened offices in the Rialto building, San Francisco, to serve better the increasing demand for its products in the San Francisco Bay and Southern California districts.

This company has been very successful in developing a complete line of both steam and electric driven auxiliaries, such as anchor windlasses, winches, capstans, steering gears, telemotors, etc., designed and constructed according to Pacific Coast standards for steamships, motorships, barges and sailing vessels. The company has outfitted many vessels built both in America and abroad.

Mr. Cunningham has sent his former assistant manager, George Swett, to take charge of the California territory. Mr. Swett, from contact with all phases of the manufacturing and shipbuilding industries, is well fitted to assume his duties. He is a native of Maine, of an old family of shipbuilders, who helped to construct the American merchant marine of the early '50's. He has been on the Pacific Coast eight years. By profession he is an electrical engineer, having served for twelve years with the General Electric Company.



Graphic Representation of the Salvage Value of Old Bolts. Diagrams of This Nature Are Much in Use in the Salvage Department of the Moore Shipyard.

SOME BOILER SHOP TOOLS

DURING the emergency shipbuilding period, the Potrero Works of the Union Plant of the Bethlehem Shipbuilding Corporation has been operating for the United States Navy the property formerly known as the Risdon Iron Works. In the boiler shop of this plant a very creditable record has been made in the construction of water tube boilers of the Yarrow type. This record has been largely due to several very efficient machine tools designed and constructed in the plant. Notable among these are the three illustrated in the cuts accompanying this article.

All of the tubes in boilers of the Yarrow type have their ends expanded into the holes in the water drum at one end and the steam drum at the other. In preparation for this their ends are faced and the edges rounded off with milling cutters. The machine shown in Figure I was devised to do this work. It consists of a lathe bed with two movable frames, each of which carries a bearing for the spindle of a milling cutter and two pneumatic rams, one of which is used to feed the milling cutter up into position at the end of the tube and the other to clamp the tube into a V-block ready for the milling operation. The tubes which were sent out for the majority of the Yarrow boilers which were installed in the destroyers built at the Union Iron Works had not been previously annealed, and this machine was arranged so that after the milling of the ends of the tubes they were fed onto an inclined frame and picked up by two endless chains and fed through the two gas furnaces shown in the illustration. It was found that when the speed of the chains was arranged so that one minute and a half was the elapsed time in traversing the length of the furnace the ends of the tubes had been heated to a proper temperature. The chains then dumped the tubes onto another inclined frame which deposited them in a lime tank for annealing.

At the present time the Yarrow boiler shop is engaged in constructing water tube boilers for the scout cruisers which are being built at Tacoma by the Todd Dry Dock & Construction Company. The tubes supplied for these boilers had previously been annealed, and the tube milling machine is now being used simply for the machining operation, the balance of the rig having been dismantled.

The drums into which the ends of these tubes are expanded in the completed boiler have to be drilled and reamed to an exact fit with all holes parallel and not radial. To do this work Mr. Frank Neitzel designed the multiple drill shown in Figure II. Two of these machines were built, and they have been kept running practically continuously for over two years. The drill spindles are carried on a sliding frame and are driven by two spiral screws which engage with spiral pinions at the upper end of each spindle. These two spiral screws have opposing threads, and they engage with alternate spindles so that the end thrust is balanced. The holes to be drilled in the drums are very close together, and in one operation the machine would drill every fourth hole in an axial row. The automatic table feed is set for the distance between axial rows, and at the end of each drilling operation it shifts the table so as to bring the next row in line with the drill spindles, the drilling operation then being repeated for the corresponding holes in the next row. When all the axial rows have been drilled for every fourth hole, the table is fed back to the first axial row and the sliding bar shifted to an amount equal to the pitch between holes in the axial rows and the operation repeated. This machine has great flexibility, almost any combination of axial or transverse pitch being taken care of very nicely.

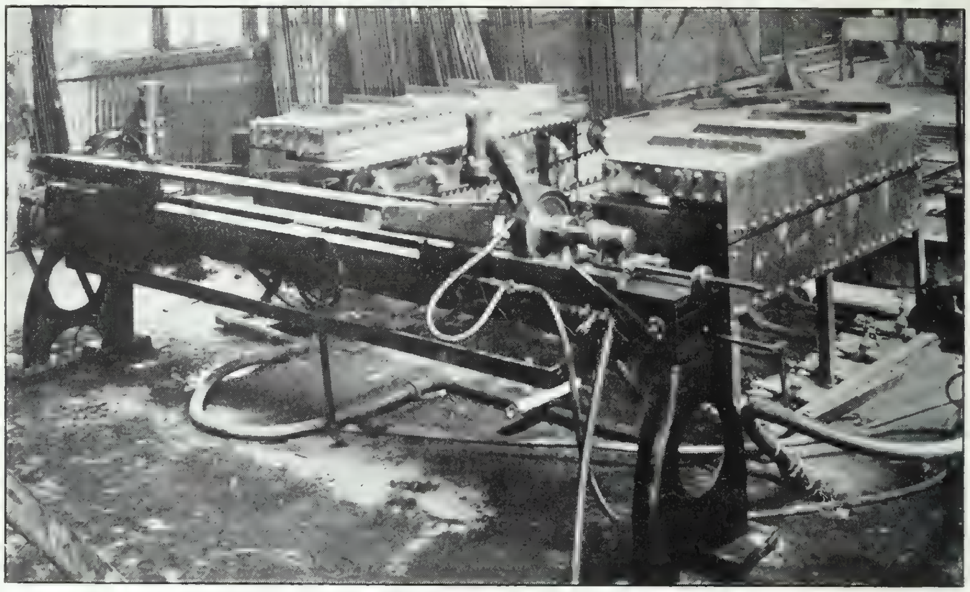


Figure 1—Tube Milling Machine and Annealing Furnace

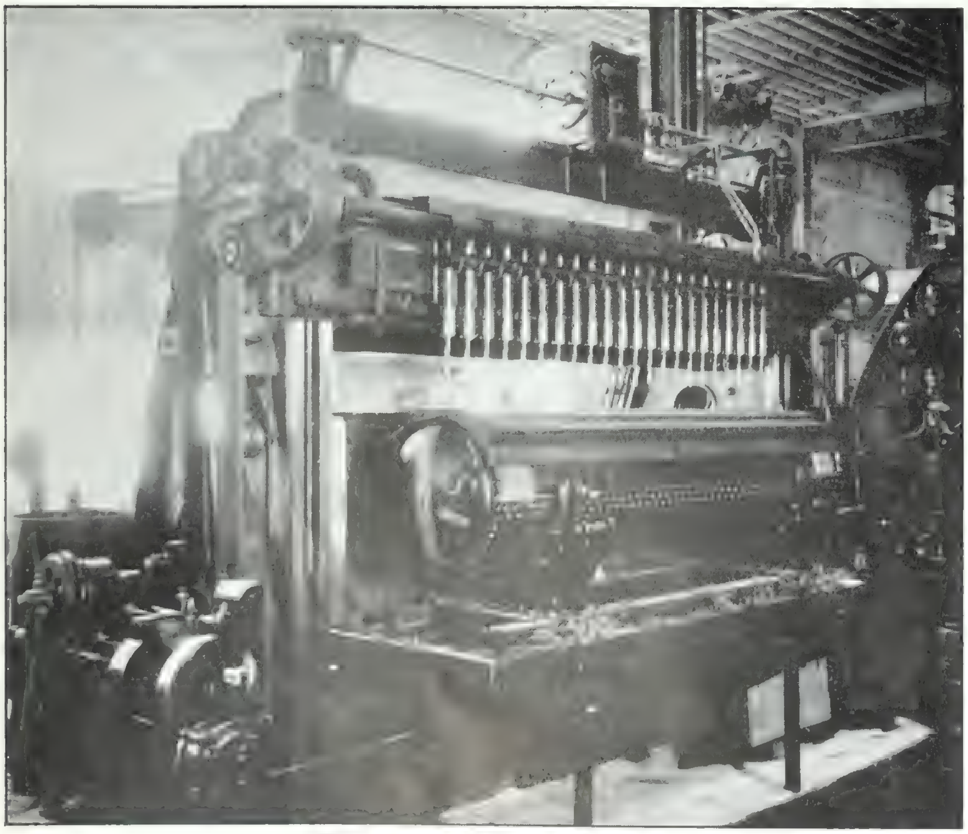


Figure 2—Neitzel Multiple Drill

For the counter-sinking and reaming of these holes the rigs illustrated in Figure III are used. These consist of two Chapman air drills mounted on trolleys which run on an adjustable track carried on ver-

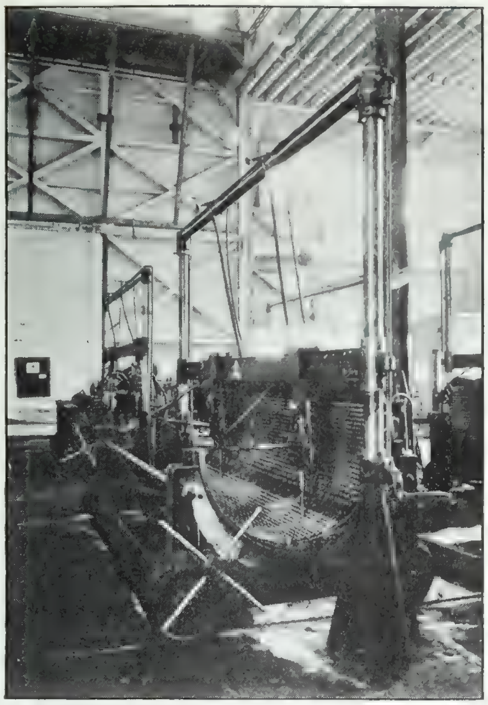
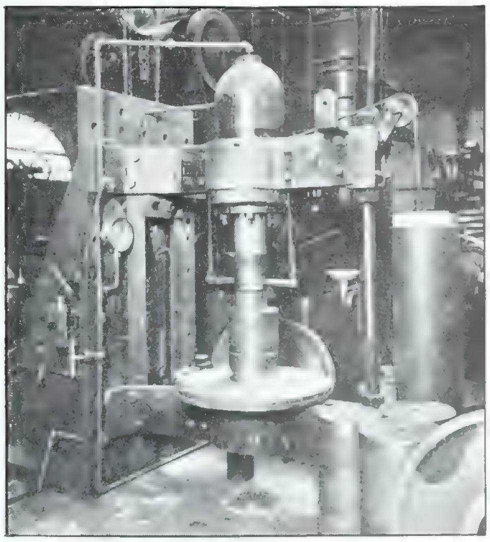


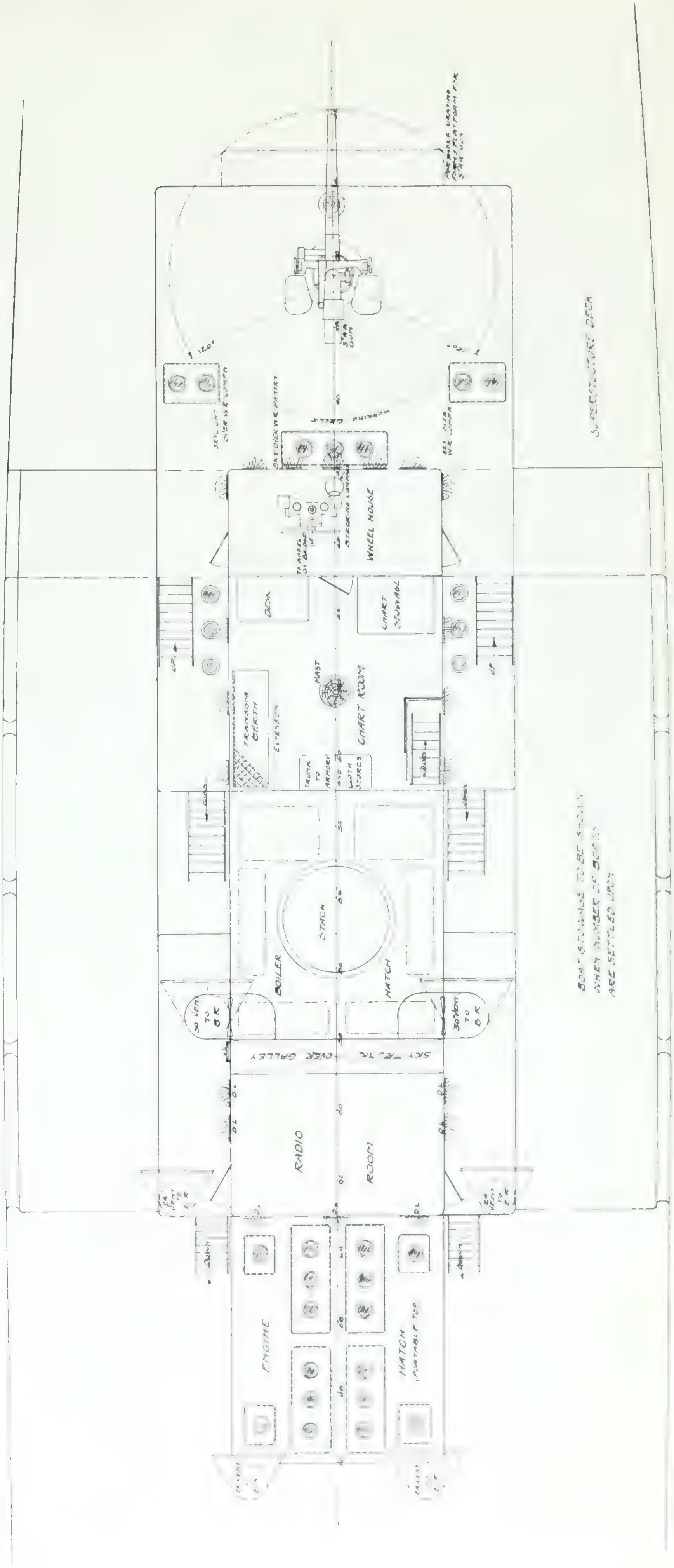
Fig. 3.—Rig Adapting Chapman Air Drills to the Reaming and Countersinking of Tube Holes in Drums for Yarrow Water Tube Boilers.

tical columns, the drum plates being carried on a rig supported by a four-wheeled cradle running on tracks between the columns. This cradle is arranged for hand feed, and the whole arrangement makes a very efficient tool for this particular work. Four of these are used in connection with the two multiple drills.

In the construction and erection of turbines for torpedo boat destroyers the Union Plant of the Bethlehem Shipbuilding Corporation developed some very interesting and efficient tools. We illustrate below a special hydraulic press which was found to be very serviceable, and in a future article we shall describe and illustrate this and some of the other tools used in this shop for expediting the machining and assembly of turbine parts.



Special Hydraulic Press Used at the Union Plant of the Bethlehem Shipbuilding Corporation for Assembling Turbine Rotor Disks on Arbors for Machining.



Plan of Superstructure Deck of New Coast Guard Cutters Building at the Union Construction Company. For Description See Page 114.

NEW COAST GUARD CUTTERS

FOUR Coast Guard cutters, the best vessels of their type ever laid down for the United States government, are building at the yard of the Union Construction Company, Oakland. The addition of these vessels to the Coast Guard fleet will be welcomed by American shipowners, who had become deeply concerned at the low state into which the service had fallen, due to the lack of vessels. Both the American Steamship Owners' Association and the Pacific American Steamship Association, the two important societies of owners and operators, had supported a movement to amalgamate the Coast Guard service and the Navy, in the belief that the union of the two closely related services would result in a marked improvement; the adjournment of Congress, without action on either of two bills providing for the amalgamation, leaves the question still unsettled; but, regardless of what Congress does in regard to the proposal, the new cutters will be a most important addition to the facilities for the protection of shipping.

AVERAGE AGE NINETEEN YEARS

At the present time, the Coast Guard service has twenty cruising vessels, the average age of which, however, is nineteen years and the average speed only twelve knots. Twelve of the vessels, says a memorandum drawn by Robert F. Hand, assistant manager of the foreign shipping department, Standard Oil Company of New Jersey, are more than twenty years old, and one vessel, the Bear, was built in 1874. When Mr. Hand drew up his memorandum (in May) five of the cutters were laid up, some because there was no money with which to make repairs, and others because of insufficient complements for their operation. During the war, too, the McCulloch, Mohawk and Tampa, all first-class vessels, were lost. All of these facts explain why the construction of the new cutters is of more than usual interest.

The four cutters will be relatively short (240 feet over-all), which permits building two on the same way. The first pair probably will be launched late this year and the second pair will follow within a few months. In the awarding of this contract to the Union Construction Company the Coast Guard service paid the yard a high compliment, because quality of work is much more important than price.

Besides the cutters, a sea-going tug also will be built by the Union Construction Company. These five vessels, and the Standard Oil Company's Diesel tanker Charlie Watson, the latter of which was launched in August, will be among the more interesting new work of the year on the Pacific Coast. The Charlie Watson was described at length in Pacific Marine Review for January, 1920.

These are the general specifications for the four new cutters: length over-all, 240 feet; length on water-line, 220 feet; beam molded, 39 feet; depth at side, amidships, top of keel to upper-deck sheer, molded, 25 feet 6 inches; displacement at about 14 feet mean draft, with 90,000 gallons of fuel oil, 24,000 gallons of fresh water and 35 tons of stores, 1600 tons; electric main drive, turbo-electric generator, single screw; estimated shaft horsepower, 2600; two watertube boilers, 200 pounds' working pressure; speed on trial, about 16 knots. The approximate cost of the four cutters and the tug will be $3,500,000.

One steam turbine, direct-connected to an alternating current generator, the generator furnishing current to drive a synchronous motor on the main shaft, make up the propelling machinery. This will be manufactured by the General Electric Company. The maximum steam pressure at the turbine will be 200 pounds' gauge, with 75 degrees superheat and exhausting at 28-inch vacuum. The main generator will be a three-phase, two-pole alternating-current generator running at about 3000 r. p. m., with an output of about 2040 kilowatts at 2300 volts. There will be one synchronous motor, 46-pole, 2600 horsepower, 130 revolutions a minute, 2300 volts, 50 cycles.

Two Babcock & Wilcox watertube boilers will supply steam for the turbine. These boilers will be constructed for a working pressure of 200 pounds a square inch and from 50 to 75 degrees superheat. Exclusive of superheaters, the boilers will have a total heating surface of 5800 square feet; will have the closed stokehole system of forced draft; a total furnace volume of 600 cubic feet; and will be fitted for burning oil, eight oil-burner units to be installed. These last will be of the mechanical-atomization type. The condenser will have 3600 square feet of cooling surface. One thousand gallons of fresh water daily will be the capacity of the evaporating plant.

The propeller will be of cast steel, four-bladed, and 13 feet in diameter.

Both the hydro-electric steering gear and the steam windlass will be built by the Hyde Windlass Company.

TO HAVE FIVE DECKS

There will be five decks in the cutters: berth, main, upper, superstructure and bridge. Over the bridge and chart room will be a platform for searchlights and the compass. For the officers and crew compartments will be provided as follows: cabin, wardroom, warrant officers' messroom, staterooms, petty officers' quarters, offices and messroom and quarters for the crew.

A 30-inch searchlight will be installed over each wing of the bridge, control being of the pilot-house type, and each searchlight being on an individual circuit direct from the switchboard in the engine-room. On the superstructure deck amidships will be two sets of swinging davits and four other sets of the rotating type will be placed aft. There will be one mast, with the aerial spreader 130 feet above the water-line; and a 26-foot cargo boom having a working capacity of 10,000 pounds. A pair of cast-steel towing bitts, 16 inches in diameter, will be located on the main deck aft.

90,000 GALLONS OF FUEL OIL

Three fuel-oil tanks will have a net capacity in service of about 30,000 gallons each, a total of 90,000 gallons. Under the boiler-room and the after end of the engine-room, in the double-bottom compartments, will be the reserve feed-water tanks, those below the boiler-room having a capacity of 11,000 gallons, and those below the engine-room, 2500 gallons; a total of 13,500 gallons. Each of the two fresh-water tanks will have a capacity of 5250 gallons. Except the portion for reserve feed-water, the double-bottom compartments under the engine-room will not be used.

A steam capstan windlass, with horizontal wildcats, will be capable of hoisting a 4000-pound anchor and thirty fathoms of chain cable at a rate of six fathoms a minute. The following anchors will be provided: stockless cast-steel bowers, two weighing 4000 pounds each and one weighing 2500; stock anchors, one 750-pound stream and one 400-pound kedge. In the upper engine-room will be the steering-engine, which will be capable of putting the rudder from hard over to hard over in twenty seconds while the vessel is moving at full speed ahead, and from hard over to hard over while she is moving at full speed astern. The rudder itself will be of a special design to withstand the shock of possible grounding while the vessel is maneuvering in shoal water, and will have a maximum swing of 42 degrees to each side.

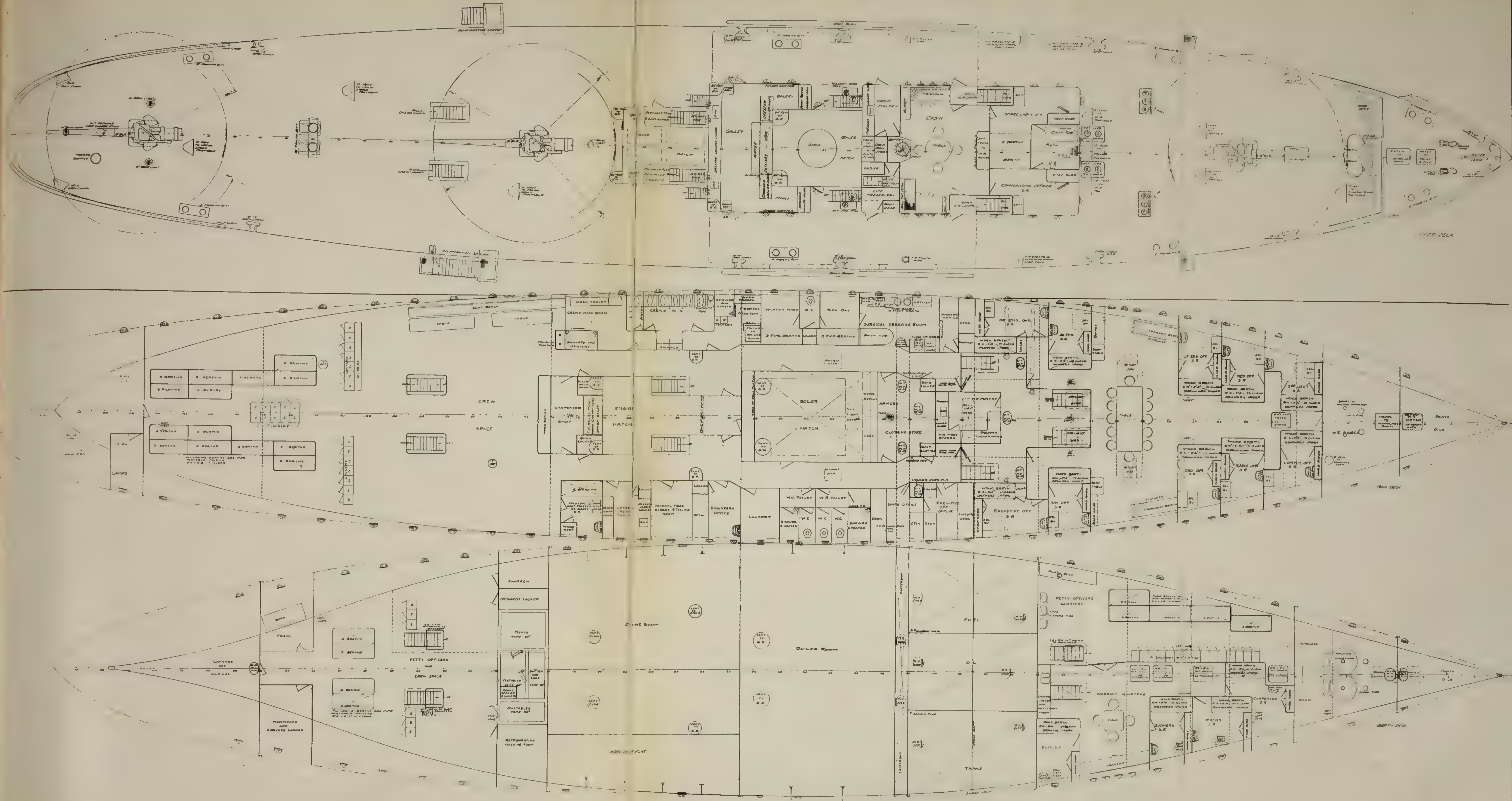
In addition to the usual equipment of voice tubes, an intercommunicating telephone system will be fitted, connecting the chart-room, engine-room, radio-room, cabin, wardroom and executive officer's office.

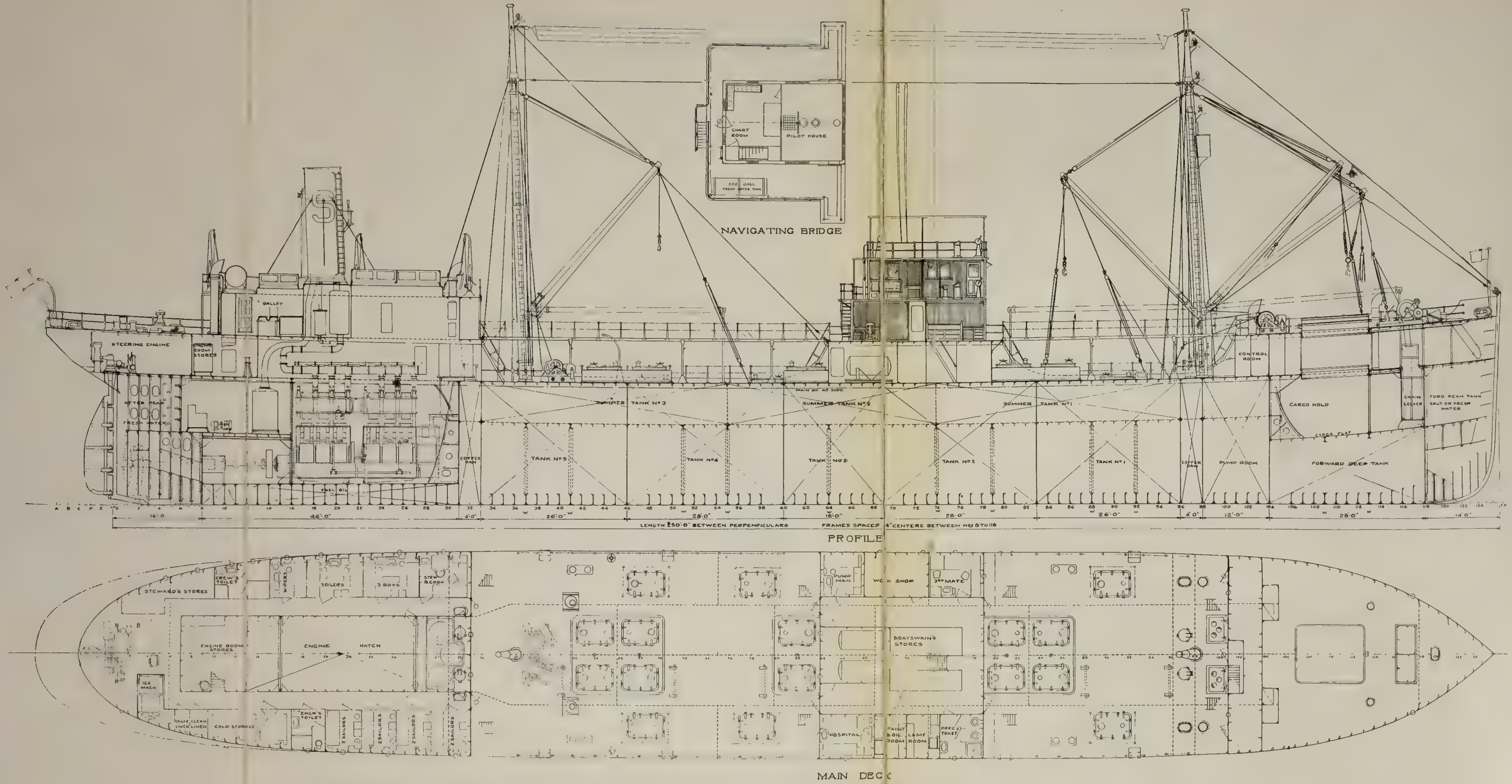
FIFTH VESSEL A TUG

The specifications require a dock trial of four consecutive hours at full power; a standardization trial of between eight knots and full speed; and a full-power trial of four hours, the weight of the vessel to be practically that in service condition.

The fifth vessel will be a sea-going tug with reciprocating engines of 1000 I. H. P.

DECK PLANS OF NEW COAST GUARD CUTTERS





INBOARD PROFILE AND MAIN DECK PLAN OF MOTOR TANKER CHARLIE WATSON

Building at Union Construction Company for Standard Oil Company of California

WITH THE EXPORTERS AND IMPORTERS

REDUCTIONS IN RAIL RATES

AFTER a month of uncertainty and seemingly fruitless conference, the import and export rail rate situation was partially cleared September 22, when three railroads, the Northern Pacific, Great Northern, and Western Pacific, announced new transcontinental import and export tariffs, subject to the concurrence of the Trunk and Central Association lines (east of Chicago), by which the transcontinental rates again are placed on a basis of equality with those obtaining in the Eastern group. With a few exceptions, the new tariffs add to the rates obtaining prior to August 26, when the blanket increases were made, the amounts of the raises in the Eastern group; so that the Pacific Coast again can compete with the ports of the Atlantic. This action is what the steamship companies desired and for which they have been fighting.

WHAT ABOUT OTHER ROADS?

What the other transcontinental railroads will do remains in question. The Great Northern and Northern Pacific enter Northern territory only, where, however, they are strong; the Western Pacific, on the other hand, is the single road in the Southern field to make concessions. The three lines, however, should be able to exert considerable pressure, not only in their own fields but throughout the entire Pacific Coast, so that the steamship companies are optimistic regarding the probability of reductions by all the railroads. The tariffs, too, are subject to the concurrence of the Eastern railroads; approval, however, is taken for granted, and the new rates probably will become effective early in October.

The effect of the reductions may be illustrated by steel. Prior to August 26 steel from Pittsburgh to the Pacific Coast, destined for transoceanic shipment, commanded a rate of $12. By the decision of the Interstate Commerce Commission permitting blanket increases in railroad rates, the inter-group rates were raised 33⅓ per cent; or, in the case of steel, $4, making the new export rate $16 a ton. Prior to August 26, again, the rate on steel from Pittsburgh to New York was $5.40, which, increased 40 per cent, became $7.16. The steamship rate from New York to the Orient was $17.85; that from the Pacific Coast, $11.25; the two totals were identical, being $23.25, so that steel could be shipped as cheaply from Pittsburgh to Kobe via New York as via San Francisco, Portland or Seattle. The blanket increases destroyed that balance, and the Pacific Coast was under a handicap of $1.84 cents on every ton of steel destined to the Far East. Now, however, under the new tariffs, the export rate via Pacific Coast ports will be 71 cents a hundred pounds, or $14.40 a ton, which represents an increase of $2.20 a ton over the rate that ruled prior to August 26, but a decrease of $1.80 a ton from the recently-imposed tariffs; the total rates via either New York or San Francisco, again, are practically the same.

OTHER EXPORT RATES

Other rates from the different breaking points are as follows, a hundred pounds: agricultural implements, $1.15; canned goods, $1.20; dry goods, $1.45; plate glass, $1.10; window glass, $1.00; iron and steel, 71 cents; machinery, $1.15; sewing machines, $1.15; paint, 80 cents; paper, $1.00; tires, $2.50; automobiles, passenger, $3.65; automobiles, freight, $3.15; cigarettes, $1.55; tobacco, $1.50; consolidated car rate, $2.00. Cotton rates are not in the tariff. Due to the heavy movement of this commodity through Pacific Coast ports, there has been much interest in it, and the rail lines are willing, according to information reaching the Pacific Coast Oriental Tariff Bureau, to make a rate of $1.50 from Texas common points, by which the Pacific would be placed on a basis of exact equality with New Orleans.

REFUSE TO ABSORB HALF

Prior to August 26, after the decision of the Interstate Commerce Commission had been handed down, but before the increases had been made effective, and also subsequent to that date, representatives of the steamship companies held frequent conferences in Seattle and San Francisco with the railroad officials. These conferences resulted at first in nothing definite. A complicating factor appeared when the Northern steamship lines heard that the Southern companies had agreed to absorb half of the increases in New York preferentials, the railroads to absorb the remainder; the steamship lines and railroads, that is, to divide the difference between the transcontinental and Eastern rates as revised, which, in the case of steel, would be an absorption of 92 cents each. These reports led to quick inquiries being made by the Northern steamship lines; in reply, the Southern companies stated that they had made no such agreement. The San Francisco companies thereupon decided that they would stand fast, absorbing nothing. In deciding upon this policy the steamship operators were actuated in part that they had made repeated concessions in the past; and, so far as this phase of the situation is concerned, one must bear in mind that the water rates have been made after the fixing of the rail tariffs; the railroads had the initiative, therefore, and the steamships accordingly made rates that would permit the Pacific to compete with the Atlantic.

SHIPS IN NEED OF CARGO

At the last meeting with the railroads, held September 7, the steamship representatives stated that all companies were urgently in need of cargo, but that no action had been taken to meet competition from New York, because, from the standpoint of the steamship companies, existing rates were not profitable. At a previous meeting the steamship companies had endeavored to demonstrate to the railroads that trans-Pacific lines were not making money at prevailing rates; and on September 7 they again insisted that business for some time had been at a standstill; that unless some change was made in the new import and export rail rates, to enable the Pacific to compete with the Atlantic in Oriental business, the steamship lines would be obliged to withdraw from the service. Little overland business was offering, in part because of the financial depression in the Orient, but to a large part because of the failure of the railroads to make prompt adjustments. These two factors had caused the steamship operators considerable worry.

For the railroads the statement was made that the movement of overland cargo for export had fallen off considerably prior to the increases in rail rates; doubt was expressed as to whether an adjustment would increase the movement of export freight; the rail lines were depicted as congested with freight, and the opinion was advanced that, if consideration were given to the differentials existing prior to August 26, such action would be to advance the interests of the steamship companies. Then followed statements by representatives of two important transcontinental railroads that the steamship companies should absorb some of the difference arising from the increases. The meeting concluded with a decision on the part of the steamship companies to confer again regarding the railroads' proposal.

RAILROADS RUSH INQUIRY

That the railroads were anxious to determine whether the steamship companies would agree to any absorption was evident also from reports of the proceedings of the Transcontinental Freight Bureau, which had adopted a rate schedule but had called upon the Western railroad representatives to ascertain whether the steamships would consent to any absorption.

After discussion, the steamship lines finally decided again that they would not absorb a portion of the increase. In arriving at this decision they were moved by the fact that, whereas the railroad rates were increasing, trans-Pacific rates had been steadily falling for some time, and had reached a low level; the steamship companies, moreover, were encountering the same increases in costs of fuel, labor, supplies, and so on, as the railroads had met. Even the readjustment requested of the railroads, that is, the same increase in cents a hundred pounds in export and import rates as had been made in Eastern rates, would not end the troubles of the Pacific shipping companies, because the competition of vessels plying from New York would remain to be met, and indications were that reductions would be forced on the Pacific lines for some time, as they were in May, when the New York steamship companies refused to raise their rates to place the two coasts on a footing of equality. Recently a large shipment of cotton (70,000 bales) was booked through Gulf ports at an ocean rate of $1.50 a hundred pounds, standard bales; and this opening rate was cut by another line to $1.45; to meet which the rate from Pacific ports was reduced to $1 a hundred pounds, standard bales, and 75 cents, high density. But this, the companies believed, was not the end, and cotton may have to be carried during the season of 1920-1921 at even lower figures, if Gulf competition were to be met. The shipping companies were quite willing to meet the competition of the water lines to the utmost of their ability, but they did not feel justified in assuming any portion of the rail rate increases.

MEMORIAL OF TACOMA CHAMBER

Further to illustrate the trend of trans-Pacific freight, reference may be made to a resolution of the Tacoma Commercial Club and Chamber of Commerce, which requests the Shipping Board to certify to the Interstate Commerce Commission that an emergency exists within the meaning of Section 1, Paragraph 15, Interstate Commerce Act, and to call upon the commission to establish an embargo against the movement of all freight through Atlantic and Gulf ports and to direct the movement of freight over transcontinental railroads to the Pacific for overseas' transportation. In letters accompanying copies of the resolution mailed to different organizations and publications, the Tacoma chamber admits that it is endeavoring to determine whether traffic can be controlled as requested, inasmuch as Admiral Benson, in discussing Section 28 of the Merchant Marine Act, had stated that the interests of the Pacific might be protected by the declaration of embargoes; aside from its bearing on the Merchant Marine Act, however, the resolution deals pointedly with the general transcontinental movement of export freight, summarizing the situation as follows: "During the past year or more there has been a constant and increasing diversion of trans-Pacific freight traffic from the route through Pacific Coast ports to Atlantic Coast and Gulf ports via the Panama Canal, until, whereas in 1916 the greater volume of trans-Pacific export and import was through Pacific ports, in 1919 at least 50 per cent of such trans-Pacific commerce had been diverted to Eastern ports of the United States, and that in February, 1920, two-thirds of the Oriental business was with Atlantic ports and only one-third with the ports of the Pacific; and the diversion of this trans-Pacific export freight to Atlantic and Gulf ports is increasing the movement of empty cars westbound, thereby increasing the operating costs of the trans-continental railroads, which increased operating costs must necessarily result in increased freight rates on necessities, causing an inevitable increase in the cost of living."

The Arakan at a San Francisco Dock With the Homer Alongside

The resolution then outlines other elements of the situation, such as congestion of Atlantic and Gulf ports, the inability of Eastern railroad lines to handle business properly, the extreme shortage of cars in the West, and the existence of ample facilities and ocean tonnage in the West; in conclusion, the Shipping Board is requested to act as outlined.

Inasmuch as the effects of Section 28 and of the increase in rail rates practically are identical in their effect upon Pacific commerce, what the Tacoma chamber has said applies with force to the railroad rate increases.

That the effect of the rail increase was quite adverse to Pacific Coast interests is proved still further by a telegram to the San Francisco Chamber of Commerce from Proctor & Gamble:

DIFFERENTIAL TOO GREAT

"We are advised by carriers that import and export rates will be advanced 33⅓ per cent under the general order of the Interstate Commerce Commission. We understand that you are aware of the danger of such a course militating against your interests and the carriers.

"While undoubtedly the effect is similar in varying degrees in all foreign shipments, it is our conviction that the present Oriental vegetable oil rate, increased one-third to $1.20 per hundred pounds, will compel our interests to turn to Gulf and Atlantic ports. The tendency of important steamer lines already strongly inclining toward such a course will receive a large impetus in this 30-cent advance.

"With ocean rates at $10 per ton to Pacific ports, a rail differential of $24 inland is out of the question, considering the water differential for additional water movement to Gulf and Atlantic ports proportionate to the $10 rate to Pacific ports.

"The present difference in the market price of oil at New York over Pacific ports of about ½ cent per pound is indicative of steamer costs. Please advise us regarding your position and what active steps you are taking."

SALVING THE ARAKAN

(Continued from page 108)

of the sea became manifest. The winchman took in just the slightest bit of slack that was now noted in the big five-inch line. Then the anchor chains were tautened a bit more. The tide was due to rise a few inches more at 11:45, when all of the lines began to sag a bit. The winchmen used a bit more of steam and then all realized that the ship was actually shifting from her sand cradle out toward the deep water. The ship moved faster, and just fourteen minutes before the noon hour and sixteen minutes after the full power of the purchases was effected, the Arakan was floating safely, ready to tow to San Francisco.

IS IT WAR?

VAGUENESS characterized the eastbound trans-Pacific rate situation in September. A series of protracted conferences had been held in Kobe and Yokohama for two months without resulting in any settlement acceptable to American Shipping Board operators. As September closed, a hope was entertained that something definite and satisfactory would eventuate soon, but there also were rumors that developments were not at all satisfactory to the American lines; details and confirmation, however, were lacking.

The Shipping Board has indicated its firm intention to put an end to rate-cutting. At one meeting, held in Kobe in August, R. C. Baker, of the Kobe office of Struthers & Dixon, chairman of the Kobe sub-committee of the Shipping Board Oriental conference, bluntly told the operators of other nations that the board was prepared to move drastically if secret rate-cutting did not cease. There is reason for believing that Admiral Benson made much the same response to the Japanese ambassador to Washington, when that diplomat approached him. Advices from Kobe, following the meeting of August, said that the French, Dutch and British lines refused to come to an agreement without authority of their head offices (if experience is a guide of any authority, that pretext wears rather a disquieting aspect); and the Japanese companies turned the discussion into lanes political by inquiring as to the intent and effect of the Merchant Marine Act, especially of Section 28. Another meeting was held in Yokohama; and Mr. Holmes, of the Shanghai office of Struthers & Dixon, for the present chairman of the general board conference in the Orient, went to Japan to take charge of the negotiations. In Japan he remained, despite a press of work in China; from this circumstance the inference was drawn that the negotiations continued critical and not without hope of settlement.

CENTRAL CONFERENCE AT SHANGHAI

When the Shipping Board directed the organization of freight conferences by operators of government vessels and also instructed its agents to work in conjunction with American private owners, the board companies in the Orient organized a central conference with headquarters at Shanghai and sub-committees in Kobe, Hongkong, Manila and Singapore. Prior to that time there had been conferences in Hongkong and Shanghai; rates from Japan had been unstable, but not without uniformity of a sort, inasmuch as the subsidized liners of the Japanese lines had been subject to government supervision. The American operators, having formed their conference, were approached by some of the important Japanese lines with proposals looking toward an understanding.

At that time eastbound rates were as low as $4; an increase to $10 was proposed; but, due to the delay incident to approval by the Japanese government, $6 became the going rate of the day. What followed is not altogether clear; nothing detailed has been made public; but that quiet rate-cutting was practiced became evident to the Americans. Different elements made for an unsettled situation: the panic in Japan made cargoes few but more eagerly desired; and to this factor was added the throwing upon the market of thirty vessels, built in Japan for the Shipping Board for delivery in the States, which sailed during the last half of 1919 and the first nine months of 1920. Any cargo for these eastbound voyages that cost less than ballast was profitable.

PROPER EXPENSE FOR COUNTRY

In deciding to wage a rate-war, if necessary, the Shipping Board has regarded the loss involved as a proper expense in behalf of American shipping and foreign trade. In these days of small cargoes the loss due to low rates unquestionably would be less than it would be were rates at high levels. But there are other elements to be considered, which cause operators to hope that there will be no war: from a purely selfish point of view, they realize that not all the losses by any means would fall upon the Shipping Board, for the operators of government vessels also would earn less; and the private American steamships, such as those of the China Mail and Pacific Mail, would be hit practically as hard as those of foreign companies. Perhaps not altogether so hard, because some privately-owned American vessels have been able to command better than market rates, even in Japan, and Shipping Board vessels at times have refused to meet Japanese quotations and yet have secured business. But the securing of these relatively good rates is becoming increasingly difficult.

During September the Shipping Board operators reduced the trans-Pacific lumber rate from $25 to $17.50. As late as June the rate was $40; it fell to $35; then to $25 at the Vancouver meeting of the Pacific Coast Oriental Tariff Bureau in June. Now comes another reduction, due to the action of Japanese carriers in cutting the $25 rate by $5 to $7, or perhaps even more. This situation bears the earmarks of a little rate-war in itself.

DOMESTIC RATES UP

ALTHOUGH offshore rates generally are unstable and weak, coastwise and intercoastal rates increased during September, following the lead of the railroads.

Eastbound and westbound intercoastal rates went up early in the month. Announcement was made in San Francisco by Williams, Dimond & Company, operators of the European - Pacific Shipping Board line, of an increase in westbound rates to approximately 85 per cent of the rail rates that obtained prior to August 26, which, according to some estimates, was an advance of about 10 per cent. This basing of rates directly on those of the railroads was accompanied by adoption of class rates, in addition to the customary commodity schedules. Should no special commodity rate be fixed, class rates, according to the railroads' Western classification, will rule as follows: 1st class, $4; 2nd, $3.50; 3rd, $3; 4th, $2.50; 5th, $2; A class, $2; B, $1.75; C, $1.50; D, $1.25; E, $1.10. The establishment of water rates on this classification is entirely new steamship practice, which not only will cause less confusion to the shipper, but also will enable the steamship lines promptly to make quotations.

Regarding the new rates Williams, Dimond & Company issued a statement as follows: "The differential between the new water rates and the rail rates at first sight appears to be considerable, but when local rates and marine insurance are considered, the differential in the new arrangement in favor of the steamer lines will practically equal what they were previous to the advance in rates. Therefore shippers will still have the same opportunity of a saving in freight, in addition to the assured regular schedules and deliveries by the steamers."

Eastbound rates also were raised, announcement being made by the United States Shipping Board Intercoastal Conference. The increase approximated 20 per cent.

U. S. S. B. Building.—On September 1, thirty-seven steel vessels, of an aggregate deadweight tonnage of 345,400, and four concrete vessels, of an aggregate deadweight tonnage of 30,000, were under construction for the Shipping Board in Pacific Coast yards. All this building was in California, the work on Puget Sound and the Columbia River having been completed. Delivery of fifteen of these vessels will be made in 1921; the others will be delivered this fall.

SHIPOGRAMS

MICHAEL P. GRACE

MICHAEL P. GRACE, one of the founders of W. R. Grace & Company and chairman of the board of directors, died in London in September. Mr. Grace was one of four brothers, the others being W. R. Grace, John W. Grace and the Honorable Count Grace, of New Zealand. From the beginning of the firm Mr. Grace was connected with it, having become a partner of W. R. Grace, in 1867, when the name of the Bryce house in Peru was changed to Bryce, Grace & Company. At that time Mr. Grace became active in the affairs of the company as partner and manager, and since then he had been closely connected with virtually all of the manifold activities of the company. He founded the London house, funded the Peruvian debt, organized the Peruvian corporation and completed the Central Railway of Peru to Oroya, where the road crosses the Andes—to mention only his more important business achievements.

Burgin Goes to U. S. S. B.—C. O. Burgin, agent of the Pacific Coast Oriental Tariff Bureau, San Francisco, has become the conference secretary, Shipping Board freight conferences, San Francisco. In this capacity he will be in charge of the different conferences organized by Shipping Board operators at the direction of the board. W. C. Norton, who was secretary of some of the conferences, has sailed for the Orient to act for a few months as supercargo of vessels of the Pacific Mail feeder service in the Orient, with a view to mastering the details of actual operation aboard ship.

535's for Pacific Mail.—The Pacific Mail Steamship Company has been advised that the Golden State, the first of the 535's allotted by the Shipping Board to the company for trans-Pacific service, would be delivered late in February. The Empire State will be delivered in April, and three other vessels later. In the shuffle of Shipping Board allocations, a touch of sentiment creeps out in that the Golden State will ply from the state for which she is named. These large vessels are urgently needed, and will be welcomed by the traveling public, which finds itself unable to get adequate accommodations to and from the Orient. The Golden State, of 14,300 tons gross, was built at Newport News.

New Luckenbach Service.—The Luckenbach Steamship Company has announced the opening of a regular cargo service between New York and Hamburg in October. Two vessels, the Harry Luckenbach and Walter Luckenbach, will be used at first; others will be added if business warrants. This will be the fourth service maintained by the Luckenbach Line, the others being New York-Rotterdam, Philadelphia-Rotterdam and the intercoastal service via the Panama Canal. The Luckenbach will be the fifth American service to Hamburg; the others are Kerr, United American, Barber and I. M. M.

Sailings to Far East.—W. T. Sexton, traffic manager of the Columbia Pacific Shipping Company, Portland, operating the North China Line to Yokohama, Kobe, Shanghai, Tsingtau, Tabu Bar and Dairen, has announced sailings from Portland as follows: West Keats, October 9; West Nivaria, November 3; Bearport, November 12; Sinasta, December 16.

Foreign Trade Manager.—Clarence A. Matson assumed the management of the foreign trade department of the Los Angeles Chamber of Commerce September 1.

Ferris Barkentine Arrives.—One hundred and twenty-five days from Vancouver, B. C., the barkentine Alicia Haviside, a Ferris-type wood hull rigged as a barkentine by the Haviside Company, San Francisco, and owned by the Pacific Freighters Company, arrived at Durban September 1. She sailed from Vancouver April 29. Although the log of the vessel has not been received in the States, the distance run probably exceeds 12,000 miles, which was covered at a speed of about 100 miles a day, a highly creditable performance.

New Service Begun.—Swayne & Hoyt dispatched the steamship Iris, recently conditioned at the yard of the Long Beach Shipbuilding Company, on the first eastbound sailing of the new Pacific-Caribbean-Gulf Line in September. She loaded at Los Angeles, San Francisco and last on Puget Sound. Her ports of call, other than those named, will be Salina Cruz; Balboa; Cartagena, Colombia; Neuvitas, Cuba; and New Orleans. The steamship Alvarado was scheduled to depart from New Orleans about October 1 for San Francisco and way ports, on the first westbound sailing. The steamship Pallas, the first vessel dispatched on the Pacific-Argentine-Brazil service of Swayne & Hoyt, is due at Los Angeles and San Francisco about the middle of October on her return from the River Plate.

Douglas Fir Pushed.—L. E. Force, foreign exploitation agent of the Douglas Fir Exploitation & Export Company, for the last six years Seattle manager of Hind, Rolph & Company, departed in September for Europe, where he will stimulate the sales of Douglas fir.

New Pacific Mail Office.—A new building at Market and Montgomery Streets, San Francisco, will be used by the passenger department of the Pacific Mail Steamship Company, the head office building on California Street having become overcrowded. H. J. Naughton, formerly passenger agent of the Pacific Mail at Honolulu, has been appointed assistant general passenger agent, with headquarters at San Francisco. W. W. Campbell, general agent in Japan, with headquarters at Yokohama, is on leave of absence, part of which he will spend in Europe.

Request Tonnage Figures.—A resolution adopted by the Seattle Port Commission requests the Department of Commerce to compile and issue statistics of the imports and exports by customs districts in terms of tonnage as well as of value. "The value statistics obtained and published by the Department of Commerce have little or no value as an index as to whether the actual tonnage is increasing or decreasing," said Secretary C. J. France of the commission. Ship operators probably will agree with Mr. France's statement. The Shipping Board, on the other hand, has published worth-while statistics of tonnage, which show that, during the first six months of 1920, 60 per cent of the cargo carried in vessels entering and leaving American ports was carried in American vessels. Included in the summary were 15,558 vessels, which carried 37,398,184 tons; of this aggregate tonnage, American vessels transported 22,724,217. American vessels were loaded to 44 per cent of capacity and foreign vessels 43 per cent. In general, foreign vessels took more export cargo proportionately than did American vessels.

Frequent Intercoastal Sailings.—Sailings of Luckenbach steamers between the Atlantic and Pacific are increasing in frequency since the restoration of the service. Eastbound vessels during September departed at intervals of a week, and during October will maintain sailings at intervals of two weeks or less. Westbound sailings are approximately at two-week intervals.

Blaatind Is Bought.—The four-masted schooner Blaatind, sold by judicial order to the Scandinavian-American Bank, Seattle, at auction, has been sold by the bank to the recently organized Commodore Shipping Corporation, Seattle, and has been changed from Norwegian to American registry under the name of Commodore. She was drydocked and cleaned at the Heffernan yard. The vessel will be operated by the Universal Shipping & Trading Company.

Represents Holland-America.—A. M. Gillespie, Inc., Seattle shipping company, has been appointed Puget Sound agent of the Holland-America Line, which has allotted three 12,000-ton steamships to the Pacific Coast-Europe trade, in conjunction with the Royal Mail Steam Packet Company, London, which will place two vessels in the same service.

Seattle's Trade Grows—In August, 1920, Seattle's overseas' trade was served by 139 steamships of 1,003,200 deadweight tons, as compared with sixty-five steamships of 560,500 tons in August, 1914. When the war broke out, the regular lines operating to Seattle were the Blue Funnel, Royal Mail Steam Packet, Harrison Direct, W. R. Grace, Matson, N. Y. K., O. S. K., Hamburg-American, Kosmos, East Asiatic and Great Northern. Of these companies the following ceased operations: Hamburg-American, Kosmos, East Asiatic Steamship, Great Northern and Royal Mail, although the latter will resume its service soon. New Shipping Board lines are: European-Pacific, Waterhouse, Pacific Steamship, Struthers & Dixon, all to the Orient; A. M. Gillespie, Inc., to the River Plate; General Steamship, to Australia, New Zealand and South America; Pacific Mail, around the world. New private lines are: Pacific Motorship, to West Coast; Rolph Mail Steamship, to West Coast; Norway-Pacific and Johnson Line, to Scandinavia; French Line, to Europe; Java-Pacific, to the Orient; Holland-America, to Europe; Pacific-Caribbean-Gulf, Mitsui, Ocean Transport and Suzuki, all to the Orient.

To Use Parr Terminal.—The Atlantic, Gulf & Pacific Steamship Company, which recently opened an intercoastal service, will make Oakland a regular port of call, using the new Parr Terminal. All vessels will call at San Francisco as well as Oakland. The steamship Cape Romain called at San Diego in September, but regular calls will not be made. On the Gulf every other westbound steamship will touch at Mobile; eastbound vessels will not stop there.

For Passenger Liners Only.— The Seattle Port Commission has decided that Smith Cove Pier B will be used exclusively by passenger steamships. Preferential agreements have been made with the Nippon Yusen Kaisha for the use of the west side and with the Pacific Steamship Company for the use of the east side. The pier is 2580 feet long and 367 feet wide.

Canadian Government Expansion.— A Canadian government service between Vancouver, Shanghai, Hongkong, Singapore, Colombo, Calcutta and Rangoon has been announced. At least one sailing a month, with 8300-ton vessels, will be maintained.

Eastern Soldier to General Steamship.— The 10,500-ton freighter Eastern Soldier, built by the Harima (Suzuki) yard, Japan, has been allotted to the General Steamship Corporation by the Shipping Board. She will take canned salmon and other freight from the Pacific Coast to Philadelphia and New York on her first voyage.

Manages Union Line.— Richard Welsford, of Liverpool, son of J. H. Welsford, a British shipowner, has been appointed resident managing director of the Union Steamship Company of British Columbia, with headquarters at Vancouver. Mr. Welsford succeeds E. H. Beazley, who was killed in an airplane accident. Mr. Welsford will take up his residence in Vancouver January 1. John Barnsley, assistant to Mr. Beazley, has been appointed manager of the company.

Shipping Companies Combined.— Announcement has been made that the Los Angeles-Pacific Navigation Company and the Los Angeles Steamship Company have been consolidated. The former company operates four Shipping Board steamships between Los Angeles and the Far East; the latter corporation, of more recent formation, purchased the steamships Yale and Harvard (Charles) from the United States government. These vessels will be reconditioned at the plant of the Los Angeles Shipbuilding & Drydock Company, and probably will be operated in a fast passenger service between Los Angeles and San Francisco. Fred L. Baker, president of the Los Angeles Steamship Company and of the Los Angeles Shipbuilding & Drydock Company, was elected president of the Los Angeles-Pacific Navigation Company, succeeding L. D. Sale; and A. J. Frey, recently of the Pacific Coast district, United States Shipping Board, and assistant general manager of the old Pacific Mail Steamship Company, will act as general manager of both companies. Plans are being made to increase the capital stock of the Los Angeles-Pacific Navigation Company so that vessels may be purchased and larger terminal facilities obtained. This consolidation will be an important agency in increasing the offshore trade of Los Angeles. Main offices of both companies will be at Los Angeles harbor instead of in the city proper.

T. K. K. Portland Service.—Details of the new Portland service have been made public by the San Francisco offices of the Toyo Kisen Kaisha. The T. K. K. established this service at the solicitation of a Japanese importing company, which has contracted for a large amount of phosphate rock from the interior of the United States. The South American liner Seiyo Maru made the first call at Portland in September and loaded several hundred tons of phosphate and a large shipment of lumber. Following the Seiyo Maru will be the Choyo Maru, a freighter of the Orient-Panama-Atlantic line of the T. K. K., and the service will be maintained by the Choyo, Koyo, Kaisho and probably the Neiyo Maru of the Atlantic line, none of which has accommodations for passengers. When the T. K. K. resumes its normal schedule, disarranged by the grounding of the Koyo Maru and the fire aboard the Kiyo Maru, the four freight vessels will maintain approximately monthly sailings to Portland. For the time being the Kaisho Maru is on the South American route in place of the Kiyo; and the Koyo Maru is at Balboa for repairs. A phosphate rock movement from the United States to Japan probably means that Japan will draw less on the deposits of the South Seas, such as those of Nauru and Ocean Island, whence much rock has been taken of late. Although the Portland service was begun primarily for the transportation of the phosphate, other cargo probably will be offering to a degree to warrant making the service permanent.

Apples for Europe.—Pacific Coast fruit shippers are taking immediate advantage of the refrigerator space offered by the two steamships of the Holland-America Line on the Coast-Europe service, the first of which, the Eemdyk, arrived in September to load at Vancouver, Puget Sound, Portland, San Francisco and Los Angeles. The Earl Fruit Company, of Sacramento, took space for 1500 tons, half of which will be filled with apples at Seattle and half at San Francisco, a total of 37,000 boxes in all. These apples will be put into London at a cost of $5 a box. Lack of cars and high overland rail rates had been discouraging shipment of fruits overland, so that the new Holland-America and Royal Mail Steam Packet service offers a distinct improvement.

Ferris-type Steam Schooner.—The steam schooner Egeria, a Ferris-type wood hull completed as a steam schooner, had her trial trip at Portland in September, averaging 10.53 knots. She will carry 1,700,000 feet of lumber. The Columbia Pacific Shipping Company will operate her.

To Convert Coal-burner.—A contract was awarded in Seattle to the Pacific Coast Engineering Company for the conversion of the Japanese-built steamship Eastern Leader from a coal-burner to an oil-burner for $82,500. The time guarantee was fourteen days

On Mexican Run.—The Admiral Line steamship Admiral Farragut will be placed on the Mexican service about the middle of December, replacing the Curacao, which will be placed on the San Francisco-Portland service with the Topeka.

Expect Additional Vessel.— The North Atlantic & Western Line, represented on the Pacific Coast by the Admiral Line, expects to add another vessel to the four vessels now engaged in the Boston-Philadelphia--Pacific service.

WITH THE SHIPBUILDERS

Despite protests by private shipbuilding companies of all parts of the country, the Navy Department accepted the report of a special committee on wages and put increases into effect September 16. All classes of civilian employes receive increases of at least 5 per cent; virtually all the clerical force and four mechanical branches, die-sinkers, molders, anglesmiths and patternmakers, received considerably more. The working week was reduced to forty-four hours.

$240 A YEAR BONUS

Civil employes of the Navy Department, says the bulletin of the Atlantic Coast Shipbuilders' Association, already were receiving a bonus of $240 a year granted by the last Congress, and the board's report to the Secretary of the Navy declares that the scale of pay in the naval establishment was found to be "5 per cent higher, bonus considered, than the wage scale of any other industry, without the present increase included." The increase was awarded despite this fact, because under the terms of the original award of the Macy Board readjusting navy yard pay, the navy "is pledged to the workers to make a decision on the basis of change in the cost of living." In this connection the board recommended that future readjustment of wages be made "in accordance with the law of 1862 upon the basis of current wages in similar private establishments."

Scores of private shipyards and other business houses and organizations protested against the increases. A statement issued by the New York section of the Atlantic Coast Shipbuilders' Association summarizes the views of the shipbuilders:

"Manufacturing plants as well as shipyards are greatly disturbed over the report that the Navy Department has under consideration the subject of raising the wages in the navy yards. The private shipyards have taken the stand that the wages paid by the navy yards are ample at the present time, particularly in view of the bonus of 76 cents per day now paid all navy yard workmen over and above their regular wage, the thirty-day vacation each year with pay, pay for all holidays and for Saturday afternoons during June, July and August, when the workmen do not work.

"Special rates are given to foremen. The shipyards believe that an increase in wages in the navy yards will impose a corresponding increase in the private shipyards and result in a substantial loss due to the increase in the cost of ships now under construction for private owners, based on the present wage schedules. It will place them under a handicap more serious than that endured now in competition with foreign shipyards. Shipyards are paying the highest wages that are being paid to mechanics in any manufacturing industry. If men will work steadily in the shipyards, their returns are far in excess of the demand of the present cost of living.

DEMAND INCREASES OF YARDS

"In anticipation of the proposed raise in wages of the navy yards, labor unions are now presenting demands to private shipyards for an increase in wages, with threats of strikes to enforce them. The proposed action of the Navy Department has already commenced to upset the shipbuilding industry at a time when every effort is being made to conserve this industry as one of the basic factors in maintaining a successful and an adequate merchant marine.

"Shipbuilding touches almost every other mechanical industry, including the manufacture of boilers, electrical equipment, transmission machinery, and foundry products. Manufacturers in these industries feel that their plants will also be affected by any increase in the navy yards. All manufacturing plants in the vicinity of navy yards will be subject to agitation and unrest, followed by cessation of work in the event that the navy yards increase their wages."

WHAT THE ENGINEERS WISH

Marine engineers of the Atlantic and Gulf have demanded increases of about $25 a month and modifications of the working agreement. Wages now range as follows: chief engineer, $387.50 to $305, depending upon size of vessel; first assistant, $241.25 to $216.25; second assistant, $212.50 to 187.50; third assistant, $188.75 to $163.75; fourth assistant, $165 to $158.75; junior, $135 flat. They ask also that a new Class AA be created for larger vessels, the wages to range from $500 to $160, the last for juniors. A long list of modifications of the working agreement also was presented.

Besides the engineers, the International Longshoremen's Association has demanded an increase from 80 cents to $1 an hour, which the shipowners rejected; and the United Radio Operator's' Association also is continuing to work for more pay.

NEW CONSTRUCTION

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Alameda Works

Halway, hull 5271, tanker for U. S. S. B., keel laid May 17/20; launched July 1/20; delivered September 30/20; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; Rec. engines, 2600 IHP; 3 Scotch boilers, 15 x 11-9.

Hambro, hull 5272, tanker for U. S. S. B., keel laid September 10/20; launching January 15/21, estimated; delivery April 15/21, estimated; dimensions, etc., same as Halway.

Hamer, hull 5273, tanker for U. S. S. B., keel laying October 3/20, estimated; launching February 15/21, estimated; delivery May 15/21, estimated; dimensions, etc., same as Halway.

Hammac, hull 5274, tanker for U. S. S. B., keel laying October 30/20, estimated; launching March 1/21, estimated; delivery May 29/21, estimated; dimensions, etc., same as Halway.

Franklin K. Lane, hull 5302, tanker for Pan. Amer. Pet. Co., keel laid April 5/20; launched August 31/20; delivery October 12/20, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; Rec. engines, 2700 IHP; 3 Scotch boilers, 15 x 11-9.

Crampton Anderson, hull 5303, tanker for Pan. Amer. Pet. Co., keel laid June 11/20; launching October 15/20, estimated; delivery November 12/20, estimated; dimensions, etc., same as Franklin K. Lane.

Algonquin, hull 5304, tanker for Stand. Trans. of Del., keel laid December 24/19; launched August 23/20; delivery October 29/20, estimated; dimensions, etc., same as Franklin K. Lane.

W. S. Miller, hull 5305, tanker for Standard Oil Company of California, keel laid April 26/20, launching October 3/20, estimated, delivery November 15/20, estimated; dimensions, etc., same as Franklin K. Lane.

K. R. Kingsbury, hull 5306, tanker for Standard Oil Company of California, keel laid July 2/20, launching December 15/20, estimated, delivery March 4/21, estimated; 440 LBP; 58 beam; 28 loaded draft; 11 loaded speed; 12,500 DWT; Rec. engines, 3200 IHP; 3 Scotch boilers, 15-6 x 12-1.

Yorba Linda, hull 5307, tanker for General Petroleum Company, keel laid May 17/20; launching October 30/20, estimated; delivery January 27/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 11,100 DWT; Rec. engines, 2700 IHP; 3 Scotch boilers, 15 x 11-9.

Potrero Works

Hanley, hull 5276, freighter for U. S. S. B., keel laid June 26/19; launched September 20/20; delivered September/20; 440 LBP; 56 beam; 28-6 loaded draft; 10½ loaded speed; 12,000 DWT; Rec. engines, 2600 IHP; 3 Scotch boilers, 15 x 11-9.

Hannawa, hull 5277, freighter for U. S. S. B., keel laid June 26/19; launched May 11/20; delivered October/20, estimated; dimensions, etc., same as Hanley.

William H. Doheny, hull 5301, tanker

for Pan. Amer. Pet. Co., keel laid February 24/20; launched August 20/20; delivery October 10/20, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; Rec. engines, 2700 IHP; 3 Scotch boilers, 15 x 11-9.

CROWLEY LAUNCH & TUGBOAT CO., SAN FRANCISCO

Three cargo barges, 125 LBP; 42 beam; 12 loaded draft.

HANLON DRYDOCK & SHIPBUILDING CO. OAKLAND

Derblay, hull 85, freighter for U. S. S. B., delivered September 15/20; 305 LBP; 46 beam; 22-5 loaded draft; 10½ loaded speed; 5350 DWT; 1800 IHP engines.

Jeptha, hull 86, freighter for U. S. S. B., delivery October 15/20, estimated; dimensions, etc., same as Derblay.

Medon, hull 87, freighter for U. S. S. B., delivery November 15/20, estimated; dimensions, etc., same as Derblay.

Memnon, hull 88, freighter for U. S. S. B., launching September 28/20, estimated; delivery January 15/21, estimated; dimensions, etc., same as Derblay.

LONG BEACH SHIPBUILDING CO., LONG BEACH

Edythe, hull 142, motor yacht for Mr. J. F. Craig; 105-3 LBP; 21 beam; 8-10 loaded draft; 12 loaded speed; New London engines, 360 BHP.

Casco, hull 145, coaster for Cal. Mex. S. S. Co.; 119 LBP; 24 beam; 10 loaded draft; 9 loaded speed; 350 DWT; semi-Diesel engines, Fairbanks-Morse, 200 BHP.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., SAN PEDRO

Culberson, hull 27, steel cargo for U. S. S. B., keel laid February 19/20; 410 LBP; 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE engines, 3500 IHP; 3 watertube boilers.

West Honaker, hull 28, steel cargo for U. S. S. B., keel laid March 22/20; dimensions, etc., same as Culberson.

West Cusseta, hull 29, steel cargo for U. S. S. B., keel laid April 19/20; dimensions, etc., same as Culberson.

West O Rowa, hull 30, steel cargo for U. S. S. B., keel laid June 14/20; dimensions, etc., same as Culberson.

West Lewark, hull 31, steel cargo for U. S. S. B., keel laid July 30/20; 430 LBP; 54 beam; 2802 loaded draft; 10½ loaded speed; 11,000 DWT; TE engines, 3500 IHP; 3 Scotch single end, 15-9.

MAIN IRON WORKS, SAN FRANCISCO

Outfitting four tugs for Shipowners' & Merchants' Tug Boat Co., 150 over-all; 30 beam; 16 loaded draft; TE engines, 1000 IHP; 2 Scotch marine boilers, 11-6.

MOORE SHIPBUILDING CO., OAKLAND

Jalapa, hull 2233, freighter for U. S. S. B., keel laid April 28/19; launched December 20/19; 402-6 LBP; 53 beam; 26-4 loaded draft; 9400 DWT; Parson Comp. engines; 3 Scotch Marine boilers, 15-2 x 11.

Janelew, hull 2235, freighter for U. S. S. B., keel laid June 11/19; launched December 20/19; dimensions, etc., same as Jalapa.

Mursa, hull 2236, freighter for U. S. S. B., keel laid July 7/19; launched July 3/20; dimensions, etc., same as Jalapa.

Narbo, hull 2237, freighter for U. S. S. B., keel laid August 12/19; launched April 16/20; dimensions, etc., same as Jalapa.

Narcissus, hull 2238, freighter for U. S. S. B., keel laid December 31/19; launched August 28/20; dimensions, etc., same as Jalapa.

Stockton, hull 2229, tanker for U. S. S. B., keel laid December 24/19; launched August 28/30; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; Rec. engines; 3 Scotch Marine boilers, 15-2 x 11.

Three tankers, no names, hulls 2862, 2863, 2864, for U. S. S. B.; dimensions, etc., same as Stockton; keels not laid.

No name, hull 158, freighter for Matson Navigation Co., keel laid August 5/20; 480 LBP; 62 beam; 30 loaded draft; 14,000 DWT; Parson engines; 5 Scotch marine boilers, 15-6 x 12-3½.

No name, hull 159, freighter for Matson Navigation Co., keel laid August 17/20; dimensions, etc., same as hull 158.

S. C. T. Dodd, hull 160, tanker for Standard Oil Co. of N. J., keel laid April 27/20; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; Rec. engines; 3 Scotch marine boilers, 15-2 x 12.

M. F. Elliott, hull 161, tanker for Standard Oil Co. of N. J., keel laid July 2/20; dimensions, etc., same as S. C. T. Dodd.

Tho. H. Wheeler, hull 162, tanker for Standard Oil Co. of N. J., keel laid July 28/20; dimensions, etc., same as S. C. T. Dodd.

F. H. Hillman, hull 163, tanker for Standard Oil Co. of Calif.; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engines.

No name, hull 164, tanker for Vacuum Oil Co., keel laid September 13/20; 425 LBP; 57 beam; 2603 loaded draft; 10,100 DWT; Rec. engines; 3 Scotch marine boilers, 15-2 x 12.

Tamihua, hull 165, tanker for S. P.-Atlantic S. S. Co.; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; Rec. engines; 3 Scotch marine boilers, 15-9 x 12.

No name, hull 166, tanker for Vacuum Oil Co.; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; Rec. engines; 3 Scotch marine boilers, 15-2 x 12.

PACIFIC MARINE & CONSTRUCTION CO., SAN DIEGO

Cuyamaca, hull 1723, concrete oil-tanker for U. S. S. B., keel laid November 12/18; launched June 12/20; 420 LBP; 54 beam; 26 loaded draft; 10½ loaded speed; 7500 DWT; TE engines; 2800 IHP; 3 Foster boilers, 1000 HP each; delivered September 18/20.

San Pasqual, hull 1724, concrete oil-tanker for U. S. S. B., keel laid December 9/18; launched June 12/20; delivery October 15/20, estimated; dimensions, etc., same as Cuyamaca.

W. F. STONE & SON, OAKLAND

Sea Lion, tug for S. O. & M. Tug Boat Co., delivery December 1/20, estimated; 150 LBP; 30 beam; 16 loaded draft; 12 loaded speed.

Sea Monarch, tug for S. O. & M. Tug Boat Co., delivery January 1/21, estimated; dimensions, etc., same as Sea Lion.

Sea Ranger, tug for S. O. & M. Tug Boat Co., delivery February 1/21, estimated; dimensions, etc., same as Sea Lion.

Sea Scout, tug for S. O. & M. Tug Boat Co., delivery March 1/21, estimated; dimensions, etc., same as Sea Lion.

No name, aux. schr. for Fanning Island Trading Co., keel laid June 28/20; launching October 30/20, estimated; delivery November 15/20, estimated; 136 LBP; 32 beam; 12½ loaded draft; 6 loaded speed; 500 DWT; gas engine, 150 IHP.

SKANDIA PACIFIC OIL ENGINE CO., OAKLAND

Two 850 BHP Werkspoor Diesel engines building for Standard Oil Co.'s MS Hillman; 6 cyl., 135 RPM; delivery about October 1/20.

Ten 850 BHP Werkspoor Diesel engines building for U. S. S. B.; 6 cyl., 165 RPM; delivery November 1 to April 1/21.

Two 550 BHP Werkspoor Diesel engines building for Standard Oil Co.'s MS Charlie Watson; 6 cyl., 165 RPM; installed in September.

SAN FRANCISCO SHIPBUILDING CO., OAKLAND

Peralta, hull 1662, tanker for U. S. S. B., keel laid October 10/18; launching October 25/20, estimated; delivery January 15/21, estimated; 420 LBP; 56 beam; 26 loaded draft; 10½ loaded speed; 7500 DWT; Rec. engines, 2800 IHP; 3 watertube boilers, 21,000 sq. ft.

Palo Alto, hull 1663, tanker for U. S. S. B., keel laid October 20/18; launched May 28/19; delivered 9/16/20; dimensions, etc., same as Peralta.

SOUTHWESTERN SHIPBUILDING CO., EAST SAN PEDRO

No name, hull 23, Isherwood tanker for Union Oil Co., keel laying December/20, estimated; delivery July/21, estimated; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engines; 2800 IHP; 3 Scotch boilers, 14x12.

No name, hull 24, Isherwood tanker for Anglo-Saxon Pet. Co., keel laying November/20, estimated; delivery March/21, estimated; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engines, 2800 IHP; 3 Scotch boilers, 15-6 x 11-7.

No name, hull 25, Isherwood tanker for Anglo-Saxon Pet. Co., keel laying December/20, estimated; delivery April/21, estimated; dimensions, etc., same as hull 24.

No name, hull 26, Isherwood tanker for Anglo-Saxon Pet. Co., keel laying January/21, estimated; delivery May/21, estimated; dimensions, etc., same as hull 24.

Mary Luckenbach, hull 19, transverse tanker for Luckenbach Co., keel laid February 24/20; launching September 30/20, estimated; delivery October/20, estimated; 410-5½ LBP; 54 beam; 23-11 loaded draft; 10¾ loaded speed; 8450 DWT; TE engines, 2800 IHP; 3 Scotch boilers, 14-9 x 11.

Montebello, hull 21, Isherwood tanker for Union Oil Co., keel laid April 20/20; launching November/20, estimated; delivery December/20, estimated; 440 LBP; 58 beam; 29-2 loaded draft; 11 loaded speed; 12,000 DWT; QE engines, 3300 IHP; 3 Scotch boilers, 15-6 x 12-1.

La Placentia, hull 22, Isherwood tanker for Union Oil Co., keel laid May 20/20; launching January/21, estimated; delivery February/21, estimated; dimensions, etc., same as Montebello.

SCHAW-BATCHER CO.'S SHIPWORKS, SOUTH SAN FRANCISCO

West Canon, hull 1156, cargo for U. S. S. B., delivered August 25/20; 410 LBP; 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE engines, 2800 IHP; 3 Scotch boilers.

West Camargo, hull 1157, cargo for U. S. S. B., launched September 2/20; delivered September 25/20; dimensions, etc., same as West Canon.

G. M. STANDIFER CONSTRUCTION CORPORATION, VANCOUVER, WASH.

John Worthington, hull 16, shelter-deck oil-tanker for Standard Oil Co. of N. J.; 11,740 DWT; V. Q. M. engines, 2800 IHP; 3 Scotch marine boilers, 14-4 diameter.

W. H. Libby, hull 17, shelter-deck oil-tanker for Standard Oil Co. of N. J.; dimensions, etc., same as John Worthington.

Livingston Roe, hull 18, shelter-deck oil-tanker for Standard Oil Co. of N. J.; dimensions, etc., same as John Worthington.

Calgarolite, hull 19, shelter-deck oil-tanker for Imperial Oil, Ltd.; dimensions, etc., same as John Worthington.

Albertolite, hull 20, shelter-deck, oil-tanker for Imperial Oil, Ltd.; dimensions, etc., same as John Worthington.

UNION CONSTRUCTION COMPANY, OAKLAND

Heber, hull 10, cargo for U. S. S. B., 402 LBP; 53 beam; 27-4¾ loaded draft; 11 loaded speed; 9400 DWT; geared turgine engines, 2900 SHP; 3 water tube boilers.

Charlie Watson, hull 11, oil-tanker for Standard Oil Co. of Calif., 250 LBP; 37 beam; 15-6 loaded draft; 11 loaded speed; 2000 DWT; 2 500-BHP Diesel engines.

Liebre, hull 12, oil-tanker for General Petroleum Co., 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; Rec. engines, 2700 IHP; 3 Scotch marine boilers, 15-3x10x11-9.

R. J. Hanna, hull 14, oil-tanker for Standard Oil Co., Calif., 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; Rec. engines, 2700 IHP; 3 Scotch marine boilers, 15-2x10x11-6.

No name, hull 15, oil-tanker for Anglo Saxon Petroleum Corp., Ltd., 412 LBP; 53-5 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; Rec. engines, 2800 IHP; 3 Scotch marine boilers, 15-6x10x11-7.

No name, hull 16, cutter for U. S. Coast Guard, 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engines, 2600 IHP; 2 watertube boilers.

No name, hull 17, cutter for U. S. Coast Guard; dimensions, etc., same as hull 16.

No name, hull 18, cutter for U. S. Coast Guard; dimensions, etc., same as hull 16.

No name, hull 19, cutter for U. S. Coast Guard; dimensions, etc., same as hull 16. Guard; dimensions, etc., same as hull 16.

No name, hull 20, cutter for U. S. Coast Guard; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; Rec. engines, 1000 IHP; 2 watertube boilers.

No name, hull 21, oil-tanker for Anglo Saxon Petroleum Corp., Ltd., 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; Rec. engines, 2800 IHP; 3 Scotch marine boilers, 15-6 C 10x11-7.

No name, hull 22, oil-tanker for Anglo Saxon Petroleum Corp., Ltd.; same dimensions, etc., as hull 21.

No name, hull 23, oil-tanker for Anglo Saxon Petroleum Corp., Ltd.; same dimensions as hull 21.

Note: Heber was last ship on original contract for ten with U. S. S. B.

DRYDOCKING AND REPAIRS

BETHLEHEM SHIPBUILDING CORPORATION, LTD.

Potrero Works

Drydocked and repaired: Strs. Hayne, Curacao, Royal Arrow, Enterprise, Atlas, Shabonee, Tachee, Col. E. L. Drake, Hollywood, West Harts, Ferry Str. Solano, Str. Capt. A. F. Lucas, Bk. Gladbrook, Strs. Newport, West Canon, Richmond, Bark Daylight, Strs. Sonoma, Marama, Tug Priscilla, A. T. Sheridan, Topa Topa, Makura, John Poulsen. Drydocked: M. S. Borgland. Repaired: Barge Olinda, Barge No. 3 Union Oil, Tugs Elizabeth, Wyadda, Strs. Acme, Tofua, San Juan, Pearl Shell, Santana, Delwyn, J. A. Moffitt, Whittier, Maui, Ventura, Crown of Galicia, Bandon, Steel Trader, Wilhelmina, Astral, Mont Conis, Venezuela, Lyman Stewart, Fred Luckenbach, Bondowoso, Ventura, D. G. Scoffield, West Sequana, Colombia, U. S. A. T. Madawaska, Ferry Str. San Pedro, Schr. H. D. Bendixon, S. Sch. F. S. Loop.

Alameda Works

Drydocked and repaired: M. S. Kern, S. Sch. Carlos, Gas S. Benecia, Tugs Standard No. 2, Gov. Markham, Standard No. 1, State Dredger No. 3, Ferry Str. San Jose, Schr. Caroline, S. Schs. Wahkeena, La Primera, Arctic, Bee, Ferry Str. Issaquah, Str. Iris, Bark Dartford, Yachts Ma Pe, Trident, Launch Dispatch No. 3. Repaired: M. S. Babinda, Str. Halsey, Barge Erskine M. Phelps, M. S. George Washington, S. Sch. Idaho.

HERZOG ELECTRIC AND ENGINEERING CO., SAN FRANCISCO

General overhauling: Strs. Eastern Trader, Colorado Springs. General repairs: Strs. West Nilus, Mohinkis, Archer, Western Knight, Hattie Luckenbach. Repair work: Strs. Eastern Glade, Eastern Guide, Justin. Electric Steering gear: Str. Mazatlan. Wiring: Gas Schooner. Wireless equipment: Str. Rose City.

MOORE SHIPBUILDING COMPANY, OAKLAND, CAL.

Dry dock, clean, paint and miscellaneous repairs: Barge Ruth, Sch. Philippine, Gas S. Elkhorn, Strs. San Francisco, Ecuador, Barge James Nesmith, Str. Brave Coeur, Barge Diamond, Str. Cuba, Motorship Lassen, Strs. Senator, Point Bonita, Carmel, Sausalito, Oregon, Palo Alto, West Selene, Coalinga, Elkhorn, Barge Melrose, Strs. Lyman Stewart, Jalapa, Iris, Asuncion, West Katan. Dry dock, clean and paint: Strs. Olen, Dewey, Salina, Quillwark, West Selene, West Hesseltine, Forester, Water Barge Seminole, Strs. Orani, West Cactus, Los Vegas, Mevania, Dutch Str. Batoe, Strs. Meton, Westport, Water Barge Diamond, Strs. West Henshaw, Venezuela, West Holbrook, Yacht Martha, Launch Scout, Bktn. City of Sydney, Str. Lavada, Barge Jas. Nesmith, Str. Anne Hanify. Dry dock, clean, paint, two coats: Strs. Vacuum, City of Reno, Isaac Reed, Bakersfield, Lt. House Tender Madrona, Strs. Sapulpa, Mosella, Schr. Muriel, Strs. Hayman, West Cayote, Senator, Point Bonita, Barge Ruth, Motorship Lassen, Schr. Lamar, Motorboat Oregon. Dry dock, clean, paint, cement and keel work: Str. Solano. Dry dock, clean, paint and rebush gudgeons: Ferry Str. Tamalpais. Dry dock, clean, paint, caulk butts and new piece shoe: Schr. Golden Shore. Dry dock, clean, sandpaper and paint: Yacht Westward. Dry dock, clean and paint, two coats, rudder and bilge keel: Str. Haxtum. Dry dock, clean and paint, two coats, renew shoe and trim keel: Str. Rainier. Dry dock, clean and paint, two coats, test tanks and renew bushings: Str. Paraiso. Dry dock, clean, paint, keel work and miscellaneous engine and hull repairs: Str. Oregon. Dry dock, clean and paint, two coats, draw tail shaft: Str. Edna. Dry dock, clean and paint, fit new propeller, etc.: Str. Chehalis. Dry dock, cement and paint where necessary: Ferry Str. San Francisco. Dry dock, clean and paint, renew keel aft and renew shoe the whole length, two coats of paint: Str. South Coast. Dry dock, clean and cement: Santa Fe Barge No. 2. Dry dock, clean, paint, cement, caulk, etc.: Prentiss. Dry dock and hull repairs: Ferry Str. Yerba Buena. Dry dock, clean and paint, etc.: Sinasta. Dry dock, clean and paint, two coats, rebush rudder gudgeons: Str. Point Adams. Dry dock, clean and paint, caulk and miscellaneous repairs: Str. Carmel. Dry dock, pull tail shaft, reset propeller blades, paint, etc.: Str. Ecuador. Dry dock, clean and paint, two coats, draw tail shaft, renew lignum vitae, etc.: Str. Cuba. Dry dock, pull tail shaft, etc.: Tug Crolona. Dry dock, remove propeller blades: Str. San Jose. Dry dock, clean and paint, caulk and cement: Barge Big Bonanza. Dry dock, clean and paint, two coats, pull tail shaft and reline stern bearings: Ferry Str. Ed. T. Jefferey.

HANLON DRYDOCK & SHIPBUILDING CO., OAKLAND

General repairs and dry docking: Strs. Eastern Belle, Washington. Installation of new boilers and general overhauling machinery: Str. Asuncion. Renewing various sections of hull: Str. Forrester.

LONG BEACH SHIPBUILDING CO., LONG BEACH, CALIF.

General overhauling and reconditioning vessel for freight service: Str. Iris. Rebuilding dredger: Dredger J. E. Upson.

PACIFIC COAST ENGINEERING CO., SEATTLE, WASH.

Installation of oil-burning systems in Japanese-built vessels, and reconditioning: Strs. Eastern Soldier, Eastern Temple, Eastern Leader. General repairs: Str. Wheatland Montana.

W. F. STONE & SON, OAKLAND, CAL.

Installation of 85 H. P. Union engine and overhauling: Schr. Tagua.

YARROWS, LTD., VICTORIA, B. C.

Docked for cleaning and painting and minor repairs: Str. Canadian Exporter. Docked for cleaning and painting, installation of new stern tube, repairs to propeller, machinery and deck: Str. Mattawa. Docked for repairs to propeller and cleaning and painting Str. Princess Charlotte. Docked for repairs to propeller: Str. Princess Adelaide. Docked for cleaning and painting and repairs to propeller: Str. Princess Maquinna. Docked for cleaning and painting, general overhaul and new main mast installation: Str. Princess Victoria. Docked for cleaning and painting: Str. Mount Etna. Machinery repairs: Str. Tahiti. New main mast, foremast, yardarms for aprons and rigging renewed: Bktn. Puako. Docked for extensive repairs to forward end of vessel: Bktn. Alta. Docked for extensive repairs to bow and bottom, damage due to stranding: Str. Pacific. Docked for cleaning and painting and painting, extensive overhaul, and No. 3 Survey: Str. El Lobo.

NOTES FROM THE YARDS

Tanker Has Trial.— The trial trip of the United States Shipping Board concrete tanker Cuyamaca, built by the Pacific Marine & Construction Company, San Diego, was run in early September, and the vessel was turned over to the France & Canada Steamship Company for operation. The dock trial of the San Pasqual, a sister ship, was held the middle of September. Both vessels are 7500-tonners. The San Pasqual will complete the yard's work for the Shipping Board.

Los Angeles Drydock Completed.—The first drydock of Los Angeles has been placed in operation by the Los Angeles Shipbuilding & Drydock Company. Four pontoons, having a combined lifting capacity of 8000 tons, have been placed in operation and two more probably will be completed by November 1. The six pontoons will have a capacity of 12,000 tons. Los Angeles long has desired drydocking facilities; and the installation of the new dock is expected to result in bringing much repair work to the port. The dock has been in practically continuous operation from the beginning.

First Passenger Vessel.—The Panhandle State, the first of twenty-six combination vessels ordered by the Shipping Board, has been completed and delivered by the Camden yard of the New York Shipbuilding Company. She was allotted to the United States Mail Steamship Company for operation and sailed on her maiden voyage from New York to Queenstown, Boulogne and London.

Last Tug Launched.—The Sea Scout, the last of the four sea-going tugs built by W. F. Stone & Son, Oakland, for the Shipowners' & Merchants' Tugboat Company, was launched September 2. The Main Iron Works, San Francisco, is installing engines and boilers. Deliveries of these vessels will be made probably monthly, beginning December 1. An auxiliary schooner for the Fanning Island copra plantation, the keel of which was laid June 28, probably will be launched October 30 and delivered November 15. She will have three masts and a three-cylinder, 150-horsepower Union engine.

Shipping Board Sued.—Suit has been brought in Portland by the Astoria Marine Iron Works against the Emergency Fleet Corporation for $428,053, which is sought in settlement of a contract made by the Astoria Marine Iron Works and the government for the construction of a drydock at Astoria. Work was begun, but the government canceled the contract in October. Of the sum for which suit was entered, $275,000 was for damages for failure to live up to the contract.

Duthie Launchings.—The 2250-ton steamship Griffco, built by J. F. Duthie & Company, Seattle, for the Coastwise Steamship & Barge Company, a subsidiary of James Griffiths & Sons, was launched August 18, and a sister ship, the Griffdu, September 10. Both vessels will be operated by the Coastwise Steamship & Barge Company in the coastwise trade between Puget Sound, British Columbia and Alaska as freighters and also as towing vessels for barges. The Griffco, however, has been chartered by W. R. Grace & Company for a voyage to Callao with lumber. On this voyage she will tow the barge Griffson.

Building at Coughlan.—The eighteenth vessel to be built by the Coughlan yard, Vancouver, B. C., was launched September 10 and christened City of Vancouver. She is an 8800-ton vessel, owned in Vancouver.

Three for Anglo-Saxon—Contracts for three additional oil-tankers for the Anglo-Saxon Petroleum Company have been awarded to the Union Construction Company, Oakland. These new vessels will be sisters to hull No. 15, also for the Anglo-Saxon, the contract for which had been announced previously. All will be of 8400 tons deadweight and will be delivered next year. The Isherwood system of longitudinal framing will be employed. Dimensions are as follows: length over-all, 427 feet; between perpendiculars, 412 feet; beam molded, 53 feet 1 inch; depth molded to upper deck, 31 feet; to main deck, 23 feet; mean draft, 24 feet 9 inches; speed, 11 knots; classed 100 A1 Lloyds'.

Make Terminal of Yard.—As Skinner & Eddy have done with their dismantled yard at Seattle, the city of Wilmington, North Carolina, will do with the Liberty shipyard of that city; that is, convert it into a terminal. The plant was purchased by the municipality from the Shipping Board for $37,500.

Board Approves Plans.—Under the provisions of Section 23, Merchant Marine Act, which exempt net earnings of vessels engaged in foreign trade from war-profits and excess-profits taxes, provided that an amount equivalent to the war-profits and excess-profits taxes otherwise payable be invested in the construction of new vessels, the Shipping Board has approved the plans of a number of vessels. In order for shipping corporations to be eligible for the exemptions, amounts equivalent to the taxes must be invested, or set aside in a trust during the taxable year for investment. Two-thirds of the cost of any vessel must be paid from the ordinary funds of the operating company. The board has passed a resolution providing that vessels built under Section 23 shall conform to rules of the American Bureau of Shipping. The Merchant Marine Act recognizes the American Bureau as the government classification society. Vessels approved under Section 23 prior to September 1 must conform to the bureau's rules.

Todd to Build Motorship.—A contract has been awarded by the Alaska Steamship Company to the Todd Drydock & Construction Corporation, Tacoma, for the construction of a 6500-ton steel motorship, 360 feet long over-all; 49 feet 6 inches in molded beam; 26 feet 9 inches in molded depth, and drawing 22 feet loaded. The propelling machinery will be two McIntosh & Seymour full Diesel four-cycle engines, each having six cylinders and developing 1200 indicated horsepower at 140 revolutions a minute. For the hull the Isherwood system of longitudinal framing will be used. The double-bottom tanks will be used for the storage of fuel oil, for which there will be a storage capacity of 6000 barrels. All the auxiliary machinery and equipment will be electrically driven.

Yards Turned Back.—The old Risdon Iron Works property, situated near the Union Iron Works of the Bethlehem Shipbuilding Corporation, San Francisco, and taken over during the war by the navy and operated by the Bethlehem Corporation in the construction of destroyers, is being turned back to the United States Steel Products Company, which had used the property for storage. Structures that were raised for use as sheds over the building ways have been lowered. All sections of the drydock bought by the Bethlehem Corporation of the Ames Shipbuilding & Drydock Company, Seattle, have been received in San Francisco, and the work of dredging a slip and constructing piers is going forward rapidly.

San Diego Ferryboat Built.—The ferryboat Morena, built by the Ralph J. Chandler Shipbuilding Company, Wilmington, for the San Diego-Coronado service, has been completed and delivered. She is 170 feet long over-all and has a beam of 65 feet.

Los Angeles Improvements.—The Los Angeles Harbor Commission has asked for expressions of opinion on the following projects: widening of the main channel; construction of three boulevards; West Basin dredging; cargo-handling machinery for Pier 1, outer harbor; wharf on east side of Pier 1, outer harbor; widening of outer harbor pier for railway track; improvement of Watchorn Basin; ferry between San Pedro and East San Pedro; transit freight shed for Pacific Steamship Company; new dock for Pacific Mail Steamship Company; extension of municipal belt line tracks; purchase of Southern Pacific wharves. Soon after asking for expressions of opinion as to these improvements, the commission ordered that a dock for the Pacific Mail be constructed at the foot of Canal Street, Wilmington. Long Beach is considering dredging the main channels of the harbor to a depth of thirty feet.

Anemone IV Sold.—The yacht Anemone IV has been sold by E. A. Sims, of Port Townsend, to E. A. Salisbury, of Los Angeles, and rechristened Wisdom IV. She is 120 feet long over-all, and was built in England in 1899. Mr. Salisbury is making plans for a trip around the world.

Drydock for Portland.—The first section of a floating drydock being built by Cornfoot & McIntosh for the Port of Portland has been launched. The new dock, when completed, will be moored near the present dock.

Concrete Tankers.—The concrete tanker Peralta, building at the concrete shipyard, Government Island, Oakland, for the Shipping Board under the supervision of the San Francisco Shipbuilding Company, will be launched late in October and delivered about January 15. Her sister ship Palo Alto was delivered in September. The vessels are of 7500 tons' deadweight capacity. Although bids were asked for the two vessels they have not been sold by the Shipping Board. When the Peralta has been completed the yard probably will be dismantled. The equipment is owned by the government, but the site is municipally owned.

Diesels for Sale.—Ten 850 B. H. P. Werkspoor Diesel engines, being built by the Skandia Pacific Oil Engine Company, Oakland, for the Shipping Board, are for sale. The engines are six-cylinder, 135 R. P. M., and will be delivered from November 1 to April 1.

Repairs at Long Beach Yard.—The dredge of J. E. Upson, owned by the Los Angeles Dredging Company, which was burned to the water-line at Newport, was taken to the yard of the Long Beach Shipbuilding Company for repairs estimated at $75,000. Her new superstructure will be of steel.

Launchings by Moore.—Two Shipping Board vessels, the 9400-ton freighter Narcissus and the 10,0000-ton tanker Stockton, were launched by the Moore Shipbuilding Company, Oakland, August 28. Both vessels were endangered by the action of a tug captain, although fortunately no damage resulted. After the Narcissus had been launched and drawn from the estuary, she was towed directly across the Stockton's slip, without warning, when the tanker was ready to slide down the ways. Had the Stockton been launched on schedule both vessels would have been seriously damaged. The launching of the Stockton was delayed still more by the steam schooner Yosemite, which refused to heed signals.

Algonquin Takes Water.—The tanker Algonquin, 10,100 tons, built by the Alameda plant of the Bethlehem Shipbuilding Corporation for the Standard Transportation Company, was launched August 23. She was the first vessel for private account launched by the Alameda plant.

Building During August.—During August, 178 vessels of 259,210 gross tons were numbered by the Bureau of Navigation. Forty-six vessels of 226,428 gross tons were of steel; and 52 vessels of 232,628 tons were sea-going. The tonnage of vessels numbered during February, March and June surpassed the tonnage of those registered during August; March, with 279,709, being the highest of the year; and May, with 185,145, being the lowest. The tonnage of twelve-month periods shows a decline, however, from 4,247,475 gross for the twelve months ending with January, to 3,358,224 for the twelve months ending with August.

Japanese Building.—During the first six months of 1920 Japanese shipyards launched fifty-six vessels of more than 1000 gross tons. The aggregate gross tonnage was 266,695. By months the vessels launched and the tonnage were: January, six of 25,605; February, seven of 41,415; March, thirteen of 58,330; April, twelve of 56,725; May, ten of 51,850; June, eight of 32,770. Early estimates of the probable launchings of 1920 were 800,000 and later 600,000; but the tonnage launched in the first six months of the year, considered with the financial situation, indicates that both were too great. Last year's output was about 600,000 tons. Japan is reported to have cancelled contracts for more than 300,000 tons of steel in the States.

SHIPBUILDING SHOPS—III

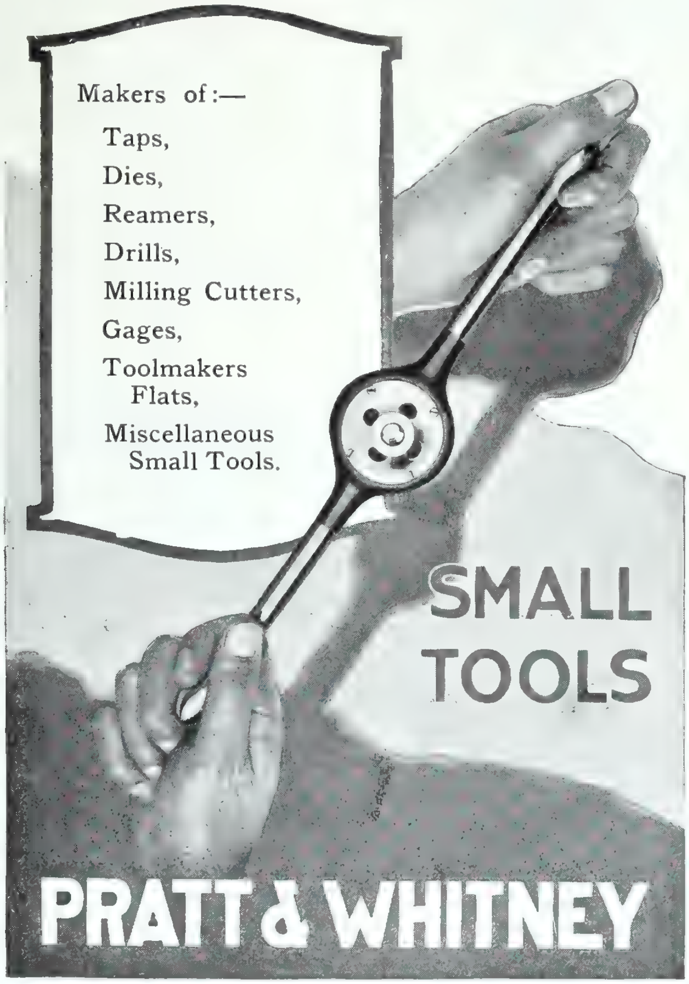
This page is the second of a series devoted to the application of NILES-BEMENT-POND MACHINE TOOLS and allied products to marine engineering practice in every department and shop that the modern shipyard comprises.

In the Pipe Shop

IN most yards it is quite a walk from the pipe shop to the ship. The fewer trips that the pipefitter is required to make, the better is his chance of finishing the job in a hurry. After he has set up his bench in the 'tween decks, there is one way of making return trips few and far between and that is to supply him with tools that hold their cutting edges. The cutting of outside pipe threads is the job that occupies most of his time. With this in mind, P & W Die-Stocks have been designed with replaceable chasers, so that when the edges are worn down on a long job, the pipefitter can select a sharp set from his kit and be back at it again without needless delay. A man in the pipe-shop assigned to the care and sharpening of spare chasers for replacement purposes is a real economy.

The smooth, easy, cutting qualities of our special "interrupted thread" pipe tap is a pleasing surprise to the pipefitter who has not yet tried it. This design eliminates the jamming action caused by the accumulation of cuttings.

Pratt & Whitney Products of interest to the man in the pipe shop include Dies, Die-Stock Sets, Pipe Reamers, Pipe taps, Pipe Thread Gages, etc., all in conformity with Briggs' Standards, taper or straight for plugs, right or left handed.



Makers of:—
Taps,
Dies,
Reamers,
Drills,
Milling Cutters,
Gages,
Toolmakers Flats,
Miscellaneous Small Tools.

Pipe tools are only part of the complete line of small tools for mechanics that bear the Pratt & Whitney name.

127

NILES-BEMENT-POND CO.
GENERAL OFFICES, 111 BROADWAY, NEW YORK

CRANE'S MARINE DEPARTMENT

THE name "Crane Company" has in America become almost synonymous with valves. The house organ of Crane Company is known as "The Valve World." The branch houses, factories, and warehouses owned and controlled by this company are dotted all over the United States. Everything in the line of valves and fittings and sanitary plumbing fixtures is handled from the smallest details of the ordinary domestic equipment to the largest fittings required by the great central stations of the power companies. The Crane Export Corporation handles the foreign work of Crane Company. An independent corporation known as Crane Limited has been established to take care of the Canadian demand for Crane goods, with a separate factory at Montreal. The reputation built up by the Crane products in the United States is establishing for this brand of fittings and fixtures a steadily increasing market in many foreign countries. For many years Crane Company has maintained a very extensive and efficient marine department, and consequently they were in a position to take every advantage of the great revival in American shipbuilding which has come about during the past few years.

The San Francisco branch of Crane Company has greatly enlarged and developed its local marine business. Quite recently Austin W. Sperry, who has been connected with the San Francisco branch of Crane for the past fifteen years, was put in charge of marine business in this territory. We are glad to extend our congratulations to Mr. Sperry on this well deserved promotion and are sure that under his able management this department of the San Francisco branch of Crane Company will show a very healthy growth.

Austin W. Sperry, in Charge of Marine Department of the San Francisco Branch of Crane Company

THE JENKINS-MILLER COMPANY

THE Jenkins-Miller Company, manufacturers' agents, have opened an office at 48 Clay street, San Francisco, and will act as representatives of the V. S. Jenkins Company, of Seattle, Wash, which is controlled by the same partnership as the Jenkins-Miller Company, and also as representatives for the Commercial Boiler Works and Doran Brass Foundry Company, both of Seattle, and for Eastern manufacturers.

V. S. Jenkins and D. W. Miller form the partnership controlling the two companies. Mr. Miller was chief engineer on ocean-going steamships, and later was marine representative at Seattle of the Standard Oil Company. For five years Mr. Jenkins has been with the V. S. Jenkins Company, and prior to the organization of that firm he was a marine engineer.

Besides acting as manufacturers' agents, the V. S. Jenkins and Jenkins-Miller companies manufacture the Sturrock wall bridge furnaces, which have been installed in more than 100 Shipping Board and privately-owned vessels on the Pacific. The Sturrock bridge walls do not require any studding of the furnaces; are removable and replaceable. They are made of the best cast-iron sections and it is said for them that they do away with brick work in furnaces, increase combustion and decrease fuel costs.

G-R STRAINER

Strainers are required on the suction and discharge lines of lubricating oil, fuel oil and quenching oil systems, for the removal of solid foreign material in suspension.

The G-R Strainer is of the single type and may be installed either as a single unit or as the G-R Strainer Set. This G-R Strainer Set consists of two of these strainers connected, complete, including two three-way valves and necessary connecting elbows, unions and nipples. This set permits the cleaning of either of the two units without interruption of the service. The manufacturers have published Form Sheet No. 168 describing this apparatus.

V. S. Jenkins of the Jenkins-Miller Company, San Francisco

The Dutch steamship "Arakan" and the American tank steamship "Lyman Stewart" on railway drydocks at the Moore Shipbuilding Company. These ship repair facilities and other equipment and structures at the Moore Plant were designed by the Leland S. Rosener organization.

This organization with a staff of civil, electrical and mechanical engineers, specializes in the design of complete industrial plants, cargo handling equipment, harbor improvements, etc.

Your inquiry will receive personal attention. Write, wire or telephone.

LELAND S. ROSENER

Consulting Engineer

INSURANCE EXCHANGE BUILDING SAN FRANCISCO

"DOLLAR LINE"

S. S. M. S. Dollar, 14,000 tons deadweight, leaving Vancouver with largest cargo ever carried from that port.

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PACIFIC COAST ENGINEERING COMPANY

SOME very excellent work has been done by the Pacific Coast Engineering Company on their contract with the United States Shipping Board in alterations to the Japanese-built freighters which had been delivered at Seattle. Eight of these vessels, the Eastern Cloud, Eastern Glade, Eastern Maid, Eastern Mariner, Eastern Moon, Eastern Pilot, Eastern Sailor, and Eastern Soldier, have been altered to suit American requirements and fitted with additional equipment.

The illustration accompanying this article shows the Eastern Sailor at the company's dock, which is provided with an electrical shear leg crane of 50 tons capacity. This ship, in addition to other changes, was fitted with the White system for burning fuel oil in marine boilers.

United States Shipping Board Steamer Eastern Sailor at the Outfitting Dock of the Pacific Coast Engineering Company, Seattle

All of the eight ships were equipped with refrigerating machinery and cold storage space. The boilers of four vessels were converted for the burning of fuel oil, and the necessary structural changes made, and piping and pumps installed to fit the tanks in the double bottoms as fuel oil bunkers. In two of the vessels the Coen mechanical system of oil burning was used, and the furnace fronts and fittings for this were supplied by the V. S. Jenkins Company of Seattle.

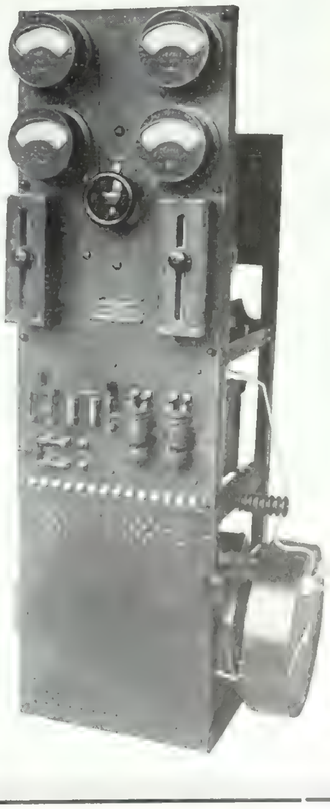
The plant of the Pacific Coast Engineering Company is under the active charge of Mr. A. F. Marion, vice-president and general manager, who has held that position since the reorganization of the company in 1918. Prior to that time Mr. Marion had been chief engineer of this and associated companies.

The plant of the Pacific Coast Engineering Company is very well equipped to take care of all classes of construction and repairs on marine machinery.

The outfitting dock provides space for three large vessels simultaneously, and its 50-ton shear legs makes possible the prompt installation or removal of heavy boilers or engines.

This dock is connected by industrial trackage to the machine and other shops. The machine shop has a very fine equipment of modern machine tools of large capacity and in sufficient variety to handle almost any work within the ordinary range of marine engineering. The forge shop houses several steam hammers, and is equipped with a number of oil furnaces. In addition to these departments, the company maintains a boiler and pipe shop, an electrical shop, a sheet metal shop, and a coppersmith shop.

Undoubtedly the Pacific Coast Engineering Company will play a large part in the task of keeping fit the great fleet of steamers which call Seattle their home port, or make Seattle a port of call.



do you know

that the Independent Wireless Telegraph Company operates and controls the radio equipment on more vessels under the American flag than any other wireless company.

that the Independent has the most up-to-date commercial radio station in the U. S. from ship to shore communication.

that Independent equipment has been designed by pioneer radio engineers.

that Independent apparatus gives greater efficiency in proportion of power input than any other similar wireless equipment.

that the Independent was organized by leading steamship owners who realize the value of efficient and reliable radio service.

that the Independent will lease or sell outright wireless equipemnt for vessels. The Independent offers to ship owners a service that will take over the entire operation and maintenance of wireless equipment regardless of type or manufacture.

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GENERAL OFFICES—42 BROADWAY, NEW YORK
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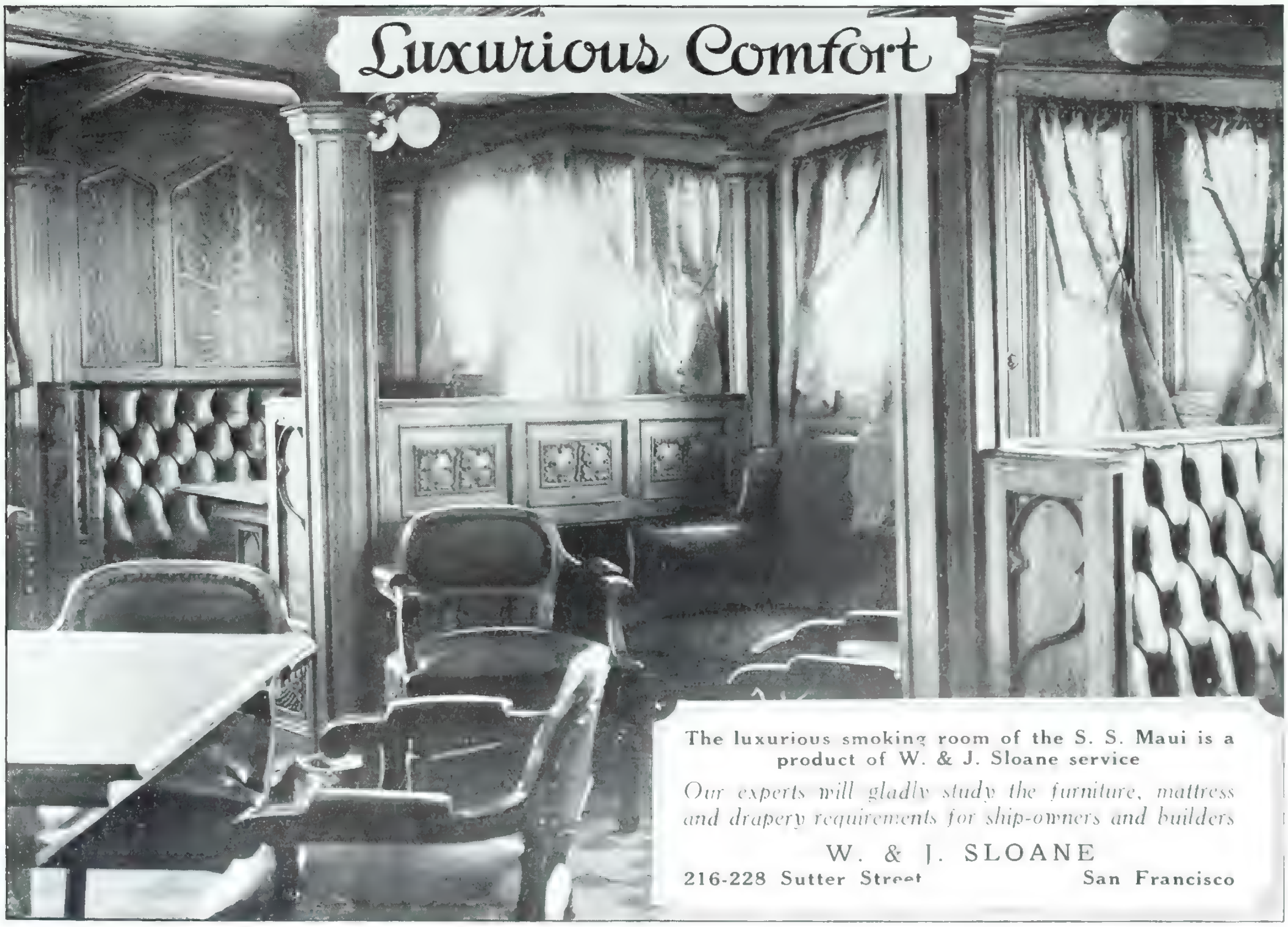

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The luxurious smoking room of the S. S. Maui is a product of W. & J. Sloane service

Our experts will gladly study the furniture, mattress and drapery requirements for ship-owners and builders

W. & J. SLOANE
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LUDLUM STEELS

THE Ludlum Steel Company of Watervliet, New York, have recently opened new sales offices in the Rialto Building, San Francisco. These offices will handle the Ludlum steel products for the Pacific Coast and are in charge of Mr. Thomas S. Hutton. Mr. Hutton has handled the sales for the Ludlum Steel Company for a considerable time, and his success in distributing the Ludlum products is due in a great measure to his study of the particular requirements of steel consumers.

To more thoroughly study modern methods in high-grade steel production, Mr. Hutton recently made a trip to the eastern plant and received first hand information as to the production of the big line put out by the Ludlum Steel Company. In connection with the sales offices in the Rialto Building, Mr. Hutton has recently opened a steel warehouse in San Francisco where a complete stock of the various grades of steel will be carried for prompt deliveries to Ludlum customers.

Some of the leading lines produced by Ludlum include Mohawk extra high speed steel and Seminole chisel steel. These steels are making great records in production work for their consistently uniform characteristics in a great number of machine shops, shipyards, etc., where they are used.

Four new Ludlum steels have been recently put on the market. Neva-Stain is a non-corrosive steel of high silicon and chromium. It is found that this steel is especially adapted for resistance to acids and for exposed surfaces which have to withstand the combined action of salt water and the atmosphere; also for cutlery and surgical instruments. It is found that this steel does not warp, crack or check and when hardened it is file hard.

Delhi Rustless Steel is a high silicon chromium alloy steel intended to be used in the soft condition. It is claimed that the Delhi is more rust-resisting than any other metal yet produced. It can be forged with ease and when annealed can be easily machined. Delhi is highly resistant to acids and high pressure steam and will not corrode or erode.

Silcrome, another new Ludlum steel, is heat resisting and can be heated for months up to 1800 degrees Fahrenheit without any appreciable scale forming on the surface. It is very resistant to the action of acids, organic or inorganic, and is particularly adaptable for resistance wire elements, carburizing boxes, automobile valves, etc., etc.

Sicro, a heat resistant alloy, is non-erodable, non-corrodable and non-oxidizable. It can be heated at 2000 degrees Fahrenheit for months without any material scale forming. It is particularly adapted for electrical resistance elements and can be readily hot rolled, cold drawn and machined.

USED MACHINE TOOLS

Part of the Showroom of the California Machinery Company, San Francisco

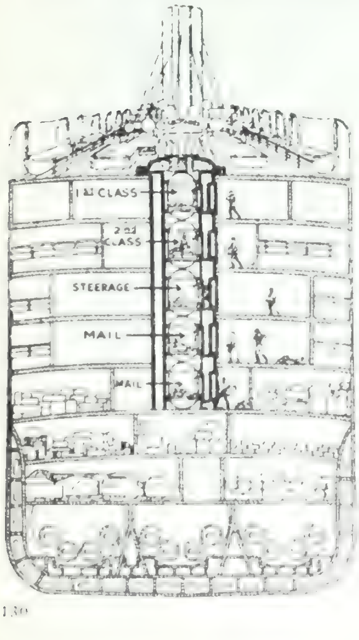
THE California Machinery Company, located at 125 Beale Street, San Francisco, California, of which the accompanying cut shows a partial interior view, is by far the largest concern in the West dealing exclusively in **used machinery.**

This concern started business at its present location in the early part of 1916 and through honest and conscientious efforts has established and developed a large business.

They buy and sell machine shop equipment, woodworking machinery, and supplies of all kinds, and all sales are made with a full and positive **guarantee** that the tools sold will perform satisfactorily the work for which they are intended.

They respectfully solicit inspection and investigation of all prospective purchasers of machinery.

A FLOATING SAFE

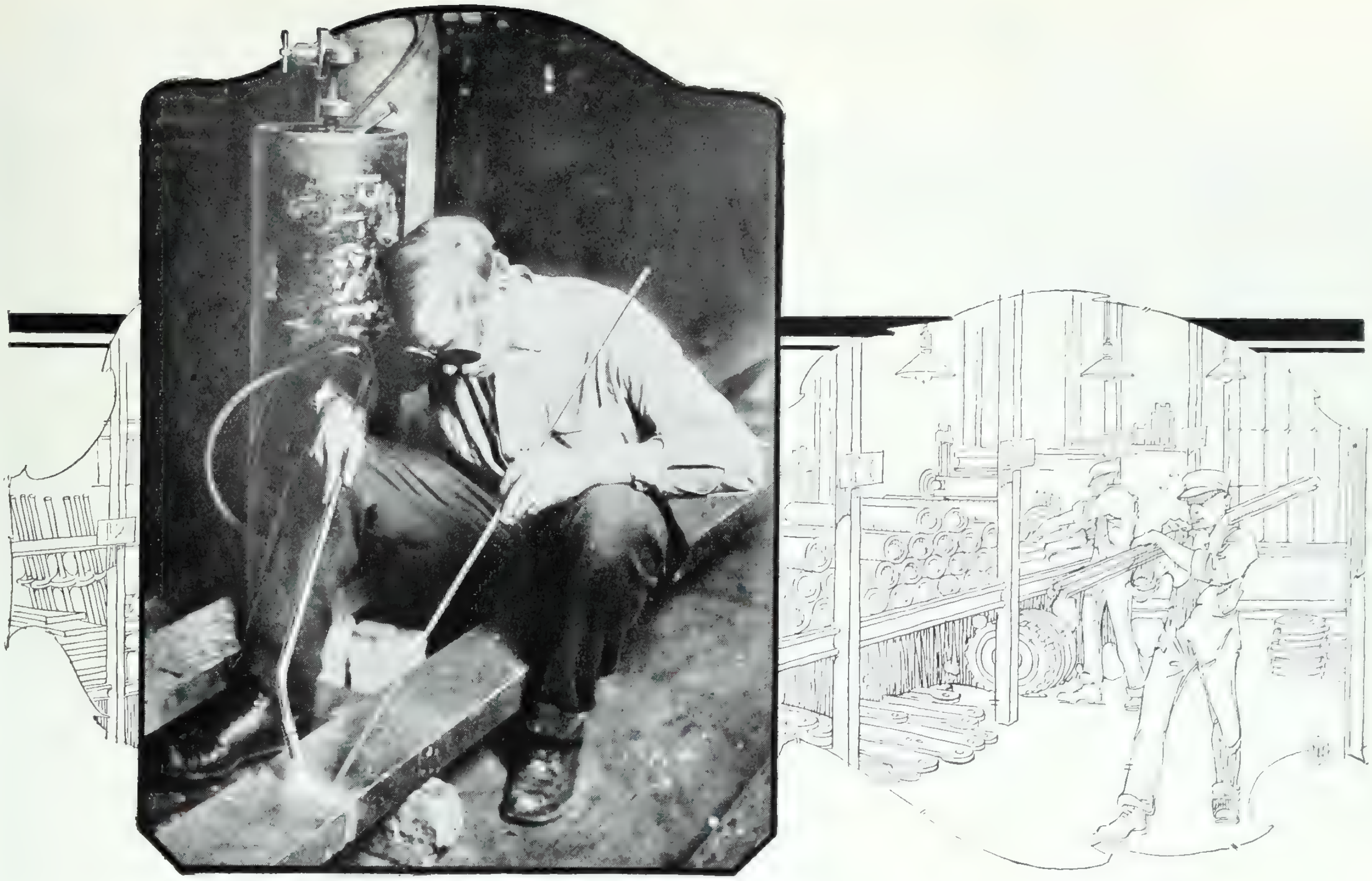


Drawing Showing Arrangement of the Installation of the Nanni Floating Safe as Supplied by the Ocean Floating Safe Company of Chicago.

PRACTICALLY every ship that sails the seas is to some extent a treasure ship. Especially is this true of passenger vessels, but to a limited extent it is true of every freighter. Many individuals in the crew and among the passengers will have valuables in their possession, and the purser of the ship or the supercargo is often in charge of much money or other very valuable merchandise.

Shortly after the Titanic disaster Menotti Nanni was inspired with the idea that it was better to prevent the sinking of treasure than to try to salve it afterwards, and working on that idea he has designed a non-sinkable safe and an equipment system for carrying a number of these safes on passenger liners. The system provides a cylindrical metal receptacle of sufficient size to provide ample storage for registered and ordinary mail, gold, jewels and valuables, and to have these vaults contained in a cylindrical well located as nearly as practicable amidships and having, as indicated in our illustration, one vault for each deck with a means of access to that deck. The top of the well containing the vaults will be covered with a loosely fitting, easily removable cap so that as soon as water entered the steel casing it would force the safes to rise to the surface.

These safes and the arrangement of their stowage on board ship have gained considerable favor with large ship operating companies in Europe, and several new liners are to have this equipment installed. The Ocean Floating Safe Company of Chicago, Illinois, are distributors of this invention for the United States and are placing it upon the market.



Cutting and Welding in the Stock Room

THE biggest stock room cannot carry every size and length of metal.

It is easy though for any intelligent workman to master oxy-acetylene welding and cutting and thus without waste lengthen or shorten, to any length, any stock metal on hand.

Prest-O-Lite makes it possible to perform these operations *anywhere*.

Let us tell you *all about* Prest-O-Lite, the Universal Gas with the Universal Service, and how our forty plants and warehouses can serve you.

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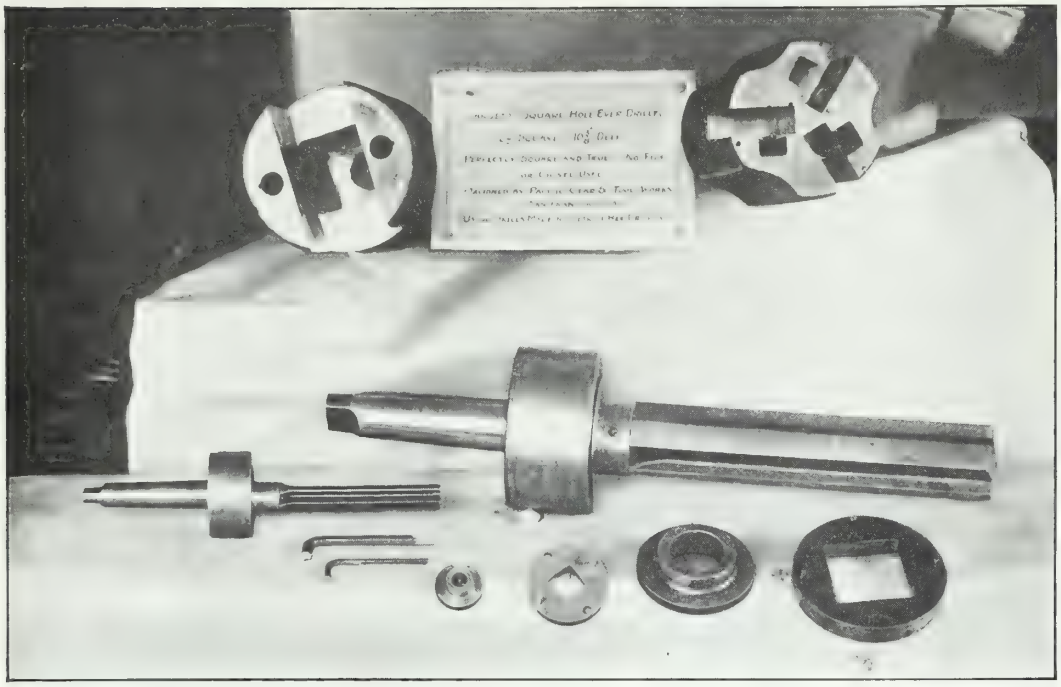
PW-521

"HEX." DRILLS

By T. J. McCORMICK
Chief Engineer Pacific Karns Company


Square Hole Ever Drilled
Perfectly Square and True No File
or Chisel Used
Machined by Pacific Gear & Tool Works

THE latest advancement in machine shop practice is a simple and efficient method for drilling angular holes. Several methods by which this could be accomplished have been advanced in the past, but these were both costly and inaccurate. With "Hex." drills it is possible to bore **square** or **hexagon** holes with no more trouble than round ones are drilled.

To sink a **hexagon** or **square** hole one-half inch across the flats and two inches deep would require three hours' work of a good mechanic. By using a "Hex." drill the same job can be done in six minutes.

There are many instances where angular holes are more advantageous than round, and manufacturers can, by the use of "Hex." drills, make their product more substantial and at a reduced cost. **Hexagon** or **square** drills cut clean and accurate holes with sharply defined corners. If the driving mechanism be running absolutely true, it is not uncommon to get holes that are not more than .002 inch out in any respect. By the use of "Hex." drills it is possible to cut angular holes as easily and nearly as low in cost as round ones. This is the greatest advance made in machine shop practice in many years. These tools are not an experiment. They have been in use for the past three years and have given perfect satisfaction. They are built to drill every conceivable substance that a twist drill will cut.

The accompanying picture was taken in the shops of the Pacific Gear & Tool Works, San Francisco, California, and shows the largest square hole ever drilled, 2½ inches square by 10⅝ inches deep. This machine work was done for the Pacific Drill Company, now putting on the market an underreamer and oil well drill invented by the author, who is glad to commend the progressiveness of the Pacific Gear & Tool Works in adopting the "Hex." drills as part of their equipment.

The advantages of "Hex." drills are many. It is impossible to broach a blind hole. "Hex." drills cut them more quickly and cheaply than any other method. The bottom is always square to the sizes; the walls smooth and highly burnished. "Hex." drills will drill square and hexagon holes in any drill press, lathe or screw machine, thereby saving the time required to change the work from one machine to another. If a broach is broken, it is ruined; if a drill is broken, all that is necessary is to re-sharpen it. The only loss is the time required to re-sharpen it.

The power required to drive a broaching machine is about double and the equipment costs about twice as much and takes up a great deal more space. No new equipment of any kind is needed to drive this full floating chuck and the drills. The floating chuck is a mechanical device so arranged as to allow the drills perfect freedom in turning the corners in the guide plate. The drill is of such construction that, as it rotates in the guide plates, its center will not follow a circle, but a series of cycloidal curves which will be concentric with the hole being drilled. The full floating chuck is so constructed that it takes up this motion and allows the drill to operate as freely as an ordinary twist drill.

The **square** drill has three flutes and three cutting edges. The cutting edges of the drill do not extend to the center of the drill; therefore, it is necessary for a lead or clearance hole to be drilled first so that the center of the drill will be free to float.

The **hexagon** drill is adapted for drilling hexagon holes. It has five flutes and five cutting edges, and it cuts about as fast as a twist drill.

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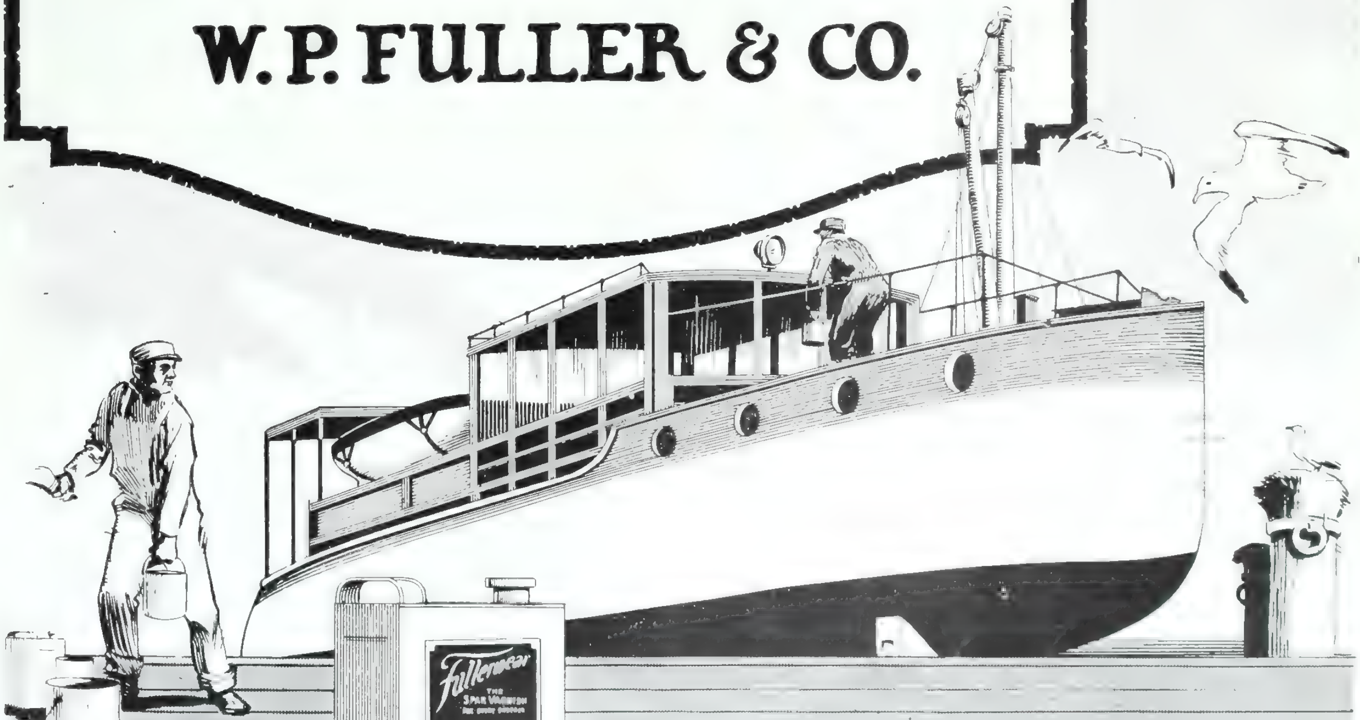
THE
SPAR VARNISH
FOR EVERY PURPOSE

Our experience of
over 70 years
is behind this varnish

W. P. FULLER & CO.



TRADE LITERATURE

Foster Marine Boilers—Catalog No. 51 of the Foster Marine Boiler Corporation. A profusely illustrated, very neat booklet of 64 pages, three of which are devoted to a consideration of the evolution of the modern marine boiler, twenty are devoted to a description of the Foster marine water tube boiler, four pages to the application of super-heat to marine boilers, and two pages to the Foster super-heater, eleven pages describe tests of Foster marine boilers in modern steamships, and a list of vessels fitted with Foster boilers covers two pages. Then follows a section of ten pages giving excellent suggestions for installation, operation and maintenance of water tube boilers in marine work, and a section of eight pages with useful miscellaneous data, including the properties of saturated steam, properties of super-heated steam, relative fuel values, steam consumption of ships, steam carrying capacity of pipes, various conversion scales and tables, the advantage of high vacuum, and tables of diameters and areas of circles.

Thor Catalog No. 11 of the Independent Pneumatic Tool Company—An 80-page booklet, attractively bound in stiff board describing the Thor line of tools, including pneumatic piston drills in various types, pneumatic grinders, pneumatic chipping, calking and beading hammers, pneumatic riveting hammers, pneumatic holders-on, pneumatic turbine drills, pneumatic motor hoists, pneumatic sand rammers, various fittings for pneumatic hose, electric drills and various attachments therefor, and pneumatic rivet-heating forges. The last eight pages of the book are devoted to a treatise on care and operation of pneumatic tools and to tables of weights and dimensions of the various types of Thor pneumatic tools and to a very convenient table of equivalents in fractional and decimal inches in millimeters.

Saving Lives at Sea—A pamphlet published by the Welin Marine Department of the American Balsa Company, Inc. This very attractive booklet is devoted to the discussion of a number of disasters at sea in which Welin equipment was responsible for the saving of a very high proportion of the lives involved. The booklet is profusely illustrated with pictures of modern vessels equipped with Welin davits and life boats and A, B, C rafts.

Spraguelets—A pocket size brochure of 31 pages published by the Sprague Electric Works of the General Electric Company, describing the simplified conduit fittings which are marketed under the trade name of Spraguelets. The Spraguelet combination consists of conduit box bodies in three forms only, with two standard couplings, these box bodies being readily adaptable to any standard make of wiring device through special combinations of the boxes and a line of cover fittings. Spraguelets are especially adaptable to machine shop and other industrial wiring where exposed exterior conduits have to be rigidly attached to the conduit box bodies without other support.

The Universal Key—Published by the Sprague Electric Works of the General Electric Company. This ingeniously arranged pamphlet provides a quick cross reference for matching any standard wiring device to any desired box or cover.

Sprague Flexible Steel Armored Hose—Bulletin No. 44-553.1 of the Sprague Electric Works of the General Electric Company. This booklet of twenty pages describes the use of armored hose in railroad service and especially in the connection of cars for pneumatic braking. It is referred to here because it has seemed to Pacific Marine Review that there might be many uses for steel armored air hose in the pneumatic lines in shipyards.

Tumbling Mills Catalog No. 153 of the Whiting Foundry Equipment Company—a 25-page profusely illustrated circular describing the various forms of tumbling mills for cleaning castings, which are manufactured by the Whiting Foundry Equipment Company, and various devices and appliances which are supplied with these mills as extra equipment.

Briggs Bituminous Coatings—Published by the Briggs Bituminous Composition Company, 17 Battery Place, New York. This new bulletin treats very exhaustively the subject of protecting metal surfaces from corrosive action in general, and in particular deals with the corrosive actions met with in the holds and on the outside surfaces of steel ships. The Briggs Bituminous Composition Company have back of them the experience of fifty years in the manufacture of anti-corrosive coatings for steel and iron, and their products have demonstrated over long periods their absolute reliability in the services for which they were manufactured. It is in the interior compartments of ships and particularly in those which, on account of location and structural difficulties, are hard to inspect that corrosive action first starts and is latest discovered, and it has become almost standard practice to completely coat the interiors of such spaces with a heavy covering of bituminous compounds so that they may be completely protected from corrosive influences. The Briggs Bituminous Composition Company have through a long series of experiments perfected solutions of bitumen which, when applied according to directions, form very tough and hard coatings which are still sufficiently elastic to accommodate themselves to the expansion and construction of the metal due to differences in temperature and to the ordinary weave which takes place in all marine structures subject to flotation stresses. This firm is thus able to prescribe for any particular surface a coating best adapted to withstand all usage connected with that surface. Specifications are outlined in the pamphlet for proper solutions covering all marine requirements from a cellular double bottom to refrigerated cargo spaces and exposed steel decks.

Catalog No. 27 of the Northern Engineering Works, Detroit, Michigan—This 32-page profusely illustrated pamphlet describes the Northern line of electric, hand and pneumatic cranes and hoists and is largely devoted to pictures of various types of installations of these material handling machines. The Northern Engineering Works have been manufacturing cranes principally for the railway trade for the last eighteen years, and many of their installations are to be found in the repair shops and round houses of some of the largest railway systems in the country. Their type E electric traveling crane makes a specialty of safety devices and a large factor of safety in all the design. There are no open and no overhung gears anywhere on this crane, which is made in capacities of from 3 to 150 tons with single or double trolley and for any width of span desired. Gantry cranes are also manufactured in a large variety of forms, and many special types of hand and electric pillar and pillar jib cranes are described.

Catalog No. 43 of the Northern Engineering Works, Detroit, Michigan—This 16-page bulletin is devoted principally to the standard portable electric hoists manufactured by the Northern Engineering Works. Many applications of this hoist are illustrated. The hoist is made in sizes with a capacity of from one-quarter to ten tons, and dimensions are given for the various sizes.

Welding and Cutting Outfits—Catalog of oxy-acetylene welding equipment, supplies and accessories manufactured by the Waterhouse Welding Company, Boston, Massachusetts. An attractive, handy booklet gotten up on the loose-leaf style, which has become so popular recently for this class of catalog work. Many combinations of welding and cutting outfits are described and priced, and the book should prove a very convenient guide to many users of this apparatus.

Thermit Pipe Welding—The Metal & Thermit Corporation, 120 Broadway, New York. A 25-page bulletin describing in detail the thermit process of welding pipes and giving the result of a number of tests of pipe welded by this process. Detailed directions for making the welds are given, and all of the necessary apparatus is described and directions given for obtaining the same.

Delco-Light Electricity—The Delco-Light Company, Dayton, Ohio. A very convenient condensed textbook covering the theory, design and construction of the Delco electric light units which have recently become so popular for small commercial and pleasure craft. The Delco-Light marine set is a complete electric plant entirely independent of any other machinery and consisting of a gas engine driven generator and storage battery with complete switchboard so arranged and connected that the operation is entirely automatic, the set being self-cranking, self-running,

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Lighting Data — The Edison Lamp Works of the General Electric Company, Harrison, New Jersey. The Lighting Service Department of the Edison Lamp Works of the General Electric Company has recently issued fourteen bulletins, Nos. L. D. 101 to L. D. 114, inclusive, covering industrial and commercial lighting systems and various corollary subjects, such as light and safety, the effect of the color of walls and ceilings on illumination, and the effect of illumination on production. Our readers will be especially interested in bulletin L. D. 111, covering the lighting of piers and warehouses. These bulletins are all compiled by the engineering staff, and each of them is a complete treatise on its particular line and is concluded with a bibliography referring the reader to the most notable contributions to its particular topic in current technical periodicals.

Simmons Unit Pole Magnetic Chucks — Bulletin 107 of the Taft-Pierce Company, Woonsocket, Rhode Island. A 30-page booklet describing this electro-magnetic work-holding chuck which has been perfected after fourteen years of experience with this class of apparatus. The principles upon which the chuck works are set forth in considerable detail. The construction is illustrated and described and about twelve pages in the rear of the book are devoted to accounts of practical applications of the chuck in machine shop practice.

No. 3, Volume 5, of Yale Hoisting Hints — Published by Yale & Towne Manufacturing Company. A machine shop issue of this attractive periodical is devoted almost exclusively to various applications of the Yale spur-geared chain blocks in machine shop practice

Marine Glue, What to Use and How to Use It — A pocket size 18-page booklet, published by Jeffery's Marine Glue of London and distributed in the United States by L. W. Ferdinand & Company, Boston, Massachusetts. Directions are given for the preparation and application of Jeffery's marine glue in the paying of decks, in the joining of canvas or cotton covering to decks, and in the joining of timbers. The subject of the use of waterproof liquid glue between the double diagonal planking of yachts and small boats is also thoroughly covered, as is its use for rendering air-tight the joints in the construction of cold-storage rooms. Many very useful "kinks" will be found in this little booklet for the preservation of woodwork in all marine structures and particularly in small motorboats and pleasure craft.

Marine Hardware and Yacht Supply Catalog No. 103 — George B. Carpenter & Co., Chicago, Ill. George B. Carpenter & Co. have been in the marine supply business for sixty years, and in the compilation of this marine catalog they are confessedly taking the position of adviser, standing between the consumer and the producers of the various articles listed in the book, and they are therefore including only such articles as their long experience leads them to believe worthy and safe for marine purposes. The book has 350 pages of closely printed matter, well illustrated and conveniently indexed, with a special section of fifty-four additional pages devoted to motorboat law, a treatise on the installation and operation of the modern marine gasoline engine, and a thesis on practical sailing for the amateur. The catalog proper covers practically everything that would be used in the way of marine fittings and supplies for power boats in all classes of commercial and pleasure craft.

Shelby Seamless Steel Tubes and Their Making — National Tube Company, Pittsburgh, Pa. The National Tube Company in this excellently edited booklet describe the manufacture of seamless steel tubing by the Shelby process as carried on at their Ellwood Works at Ellwood City, Pennsylvania. Seamless tubular products embrace boiler tubes, mechanical tubing, cylinders, and special hollow forgings made by piercing solid billets or bars of steel or by cupping and drawing thick steel plates of carefully calculated proportions. Seamless steel tubes should be carefully differentiated from welded tubular products which are made up from long flat plates or strips of metal called skelp, which is by a variety of processes rolled into the hollow cylindrical shape and its edges brought together and welded. There are four distinct classes of the Shelby seamless steel tubular products. One of these consists of boiler tubes, another of tubing for general mechanical purposes, another embraces cylinders and flasks for the confinement of gas or liquids under pressure, and the fourth includes various types of hollow forgings. The present booklet is divided into chapters, each of which describes in detail the different processes employed in the manufacture of these various classes of seamless steel tubular products. The chapter treating of the process of the cold drawing of seamless steel tubes should prove of great interest, for the fact that steel tubing can be drawn through a die with almost the same facility as brass or copper is not at all universally realized by engineers. The first attempt to make seamless steel tubes was in England in 1837, but it was not until less than twenty-five years ago that seamless steel tubing from the first operation to the finished tube was attempted in the United States.

Flanges and Fittings—Catalog No. 1 of the Reading Valve & Fittings Company, Reading, Pennsylvania. For thirteen years the Reading Valve & Fittings Company have produced unfinished steel castings for valves, flanges and fittings. The present catalog is the announcement of their entrance into the realm of the manufacture of finished valves, flanges and fittings, and they are making a specialty of Reading open hearth cast steel for this purpose. They are prepared to and will make cast iron flanges and fittings where these are specified, but they recommend, at the present costs of production, the adoption of steel in practically every use to which their valves and fittings would be put. The company claims during the last thirteen years to have produced about 75 per cent of all the rough steel valve, flange and fittings castings produced in the United States for high pressure and super-heat steam purposes. They are therefore in a position to place before their present and prospective customers an immense amount of very valuable experience in the valve line.

Encyclopedia of Marine Appliances, 1920 Edition — Compiled by Alexander McNab, M. I. N. E. Published by the McNab Company, Bridgeport, Connecticut. A very ambitious book, describing the various marine appliances handled by the McNab Company, including everything from running lights to steering engines, not omitting galley ranges and ship's berths and including all fittings connected with boiler and engine room, and concluding with a new type of keel structure known as the Duct Keel, which has recently come into favor in Great Britain.

The Radiagraph No. 1-A— Davis - Bournonville Company, Jersey City, New Jersey. The Davis-Bournonville radiagraph, as described in this eight-page pamphlet, is a machine specially designed for the mechanical guidance and speed control of gas cutting torches. No. 1-A of this machine is the size used most generally in shipyards in cutting steel plate and is especially useful in the cutting of circular paths. These machines are of great value where a large amount of cutting is done, as the metal saved in the clean, narrow kerf left by the torch when guided by the machine and the ability to cut almost exactly to dimensions, thereby saving machining, will effect economies that very quickly pay large dividends on the initial investment in the apparatus.

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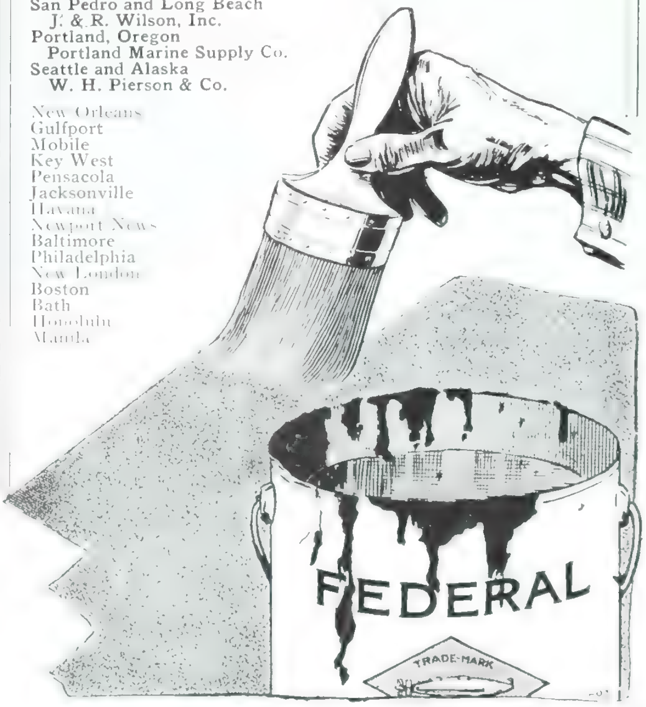

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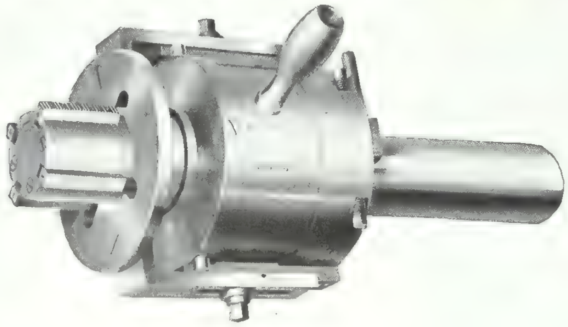

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BOOK REVIEWS

MOTOR BOATS AND BOAT MOTORS—Edited by Victor W. Page, M.E. 524 pages, 372 illustrations, including many engravings and complete working drawings for boatbuilders. Price $4. Published by The Norman W. Henley Company, 2 West 45th Street, New York.

This is a complete handbook on the design, construction, operation and repair of motorboats and their machinery. Its several sections were written by experts and edited under the direction of Victor W. Page, whose handbook for automotive engineers entitled "The Modern Gasoline Automobile" has come to be standard in its class. The present book was written especially for the purpose of giving a complete handbook for motorboat owners and operators whose experience and education are not sufficient to enable them to understand the more technical works on the subject. Two very complete chapters are included on the seaplane and flying boat, and complete specifications and working drawings are appended with full instructions for building five classes of boats, ranging from a general utility 16-foot model to a 25-foot raised cabin cruiser. These designs are by A. Clark Leitch, naval architect and boatbuilding expert of wide experience.

OCEAN STEAMSHIP TRAFFIC MANAGEMENT—By G. G. Huebner, Ph.D., Professor of Transportation and Commerce in the University of Pennsylvania. 280 pages, with numerous diagrams and charts. Price $3 net. Published by D. Appleton & Company, New York.

This volume is the first of a shipping series which was begun under the auspices of the United States Shipping Board and which was edited by Emory A. Johnson, Ph.D., S.C.D., Dean of the Wharton School of Finance and Commerce of the University of Pennsylvania, and Roy S. MacElwee, Ph.D., Assistant Director of the United States Bureau of Foreign and Domestic Commerce, who were appointed by the Shipping Board for that purpose. The text of this volume is divided into three parts. Number one deals with traffic organization of ocean shipping and the organization and functioning of the various types of ocean services. Traffic agencies are classified and defined in this section of the book. The second section is largely devoted to shipping documents. The content form and use of all important marine shipping documents are described and many of the most standard are reproduced. Section three deals with ocean freight rates, regulation, freight classification, rate tariffs, marine rate-making, and governmental regulation of steamship services and rates.

The book embodies all the principal changes that have recently occurred in regulations and legislation affecting the ocean-going vessels of all the principal maritime countries. The purpose for which it and the series of which it is the first were written was to form a body of text manuals to assist young men in training for the shipping business, and more especially for the export and import shipping, and undoubtedly it will prove very useful to many young men who are trying to get ahead in our foreign trade houses.

MARINE ENGINEERS' HANDBOOK—1480 pages, attractively bound, profusely illustrated, splendidly indexed, and typograhpically perfect. Published by McGraw-Hill Book Company.

This is the first edition of a marine engineers' handbook prepared by a staff of specialists and edited by Frank Ward Sterling, Lieutenant-Commander U. S. N., Design Division of the Bureau of Steam Engineering of the Navy Department.

This book is very conveniently arranged, being divided into fifteen sections, some of which are very complete. Section 1 is devoted to mathematical tables and analytic mechanics. Section 2 covers metals and various processes of working metals, and also includes a very complete 40-page section on heat phenomena. Section 3 is devoted to fuels and combustion. Of the eighty pages in this section, seventy-one are devoted to oil fuel and oil fuel burning and only six pages to coal. Section 4 covers the development, design, construction and installation of marine boilers. Section 5 is devoted to turbines and mechanical reduction gears. This section also covers electric gearing and hydraulic gearing as used in marine propulsion in reducing the turbine speed to a speed suitable for propeller design. Section 6 covers reciprocating engines, and Section 7 marine Diesel engines. This section 7 is rather disappointing, only eighteen pages being devoted to the entire subject of Diesel engines, which is now so prominently before the marine engineering world, while 118 pages are devoted to reciprocating steam engine section. Section 8 devotes forty pages to vacuum theories, condenser design and construction, and various forms of air and condensate pumps. Section 9, which provides the connecting link between the naval architect's work and that of the marine engineer, describes ship forms and their relation to power required, and explains the theory and design of the screw propeller. This section, it seems to us, is the most important section in the book and should be placed logically between Section 3 and Section 4. Section 10 is devoted to auxiliary machinery, Section 11 to various piping systems, Section 12 to marine electrical installation, Section 13 to lubrication, Section 14 to power measurement for marine engines, and Section 15 to machinery tests and trials and to the rules and regulations of the various classification societies.

OUR ECONOMIC AND OTHER PROBLEMS—By Otto H. Kahn. 420 pages. Published by George H. Doran Company, New York.

Otto H. Kahn, New York banker, international financier, and keen student of sociological and economic problems from his own point of view, has during the last ten years delivered a number of addresses on economic and financial topics and has written a number of articles for popular and technical magazines. The present volume is a compilation of a few of the best of his efforts. These lectures, if we may call them such, cover a very wide range, beginning with an appreciation of Edward Henry Harriman as a constructive railroad builder and ending with a resolution "that the mayor's honorary committee and the New York City Shakespeare Tercentenary Celebration Committee constitute themselves a permanent organization . . . . to serve the cause of art . . . . and to foster and give expression to the community spirit and the community effort in art."

Between these two extremes the railroads are saved from death by strangulation, government ownership of railroads is condemned, public opinion and the New York Stock Exchange are reconciled, the need for national efficiency and the menace of paternalism are demonstrated, the task ahead is outlined, and a section is devoted to the late war and foreign relations from a banker's point of view. It will be very evident that he must be an exceedingly narrow-minded reader indeed who could not find in this volume some one topic of interest to himself.

THE PORT OF LIVERPOOL—150 pages and many illustrations, portraits and maps. Published under the authority of the Mersey Docks and Harbor Board by Littlebury Brothers, Liverpool.

A very complete handbook on the Port of Liverpool, covering its organization, early history, engineerings works and commerce. Railway and canal facilities are also described in detail, and much very interesting material is included concerning the early history of the great shipping firms and insurance companies whose headquarters are at this British port.

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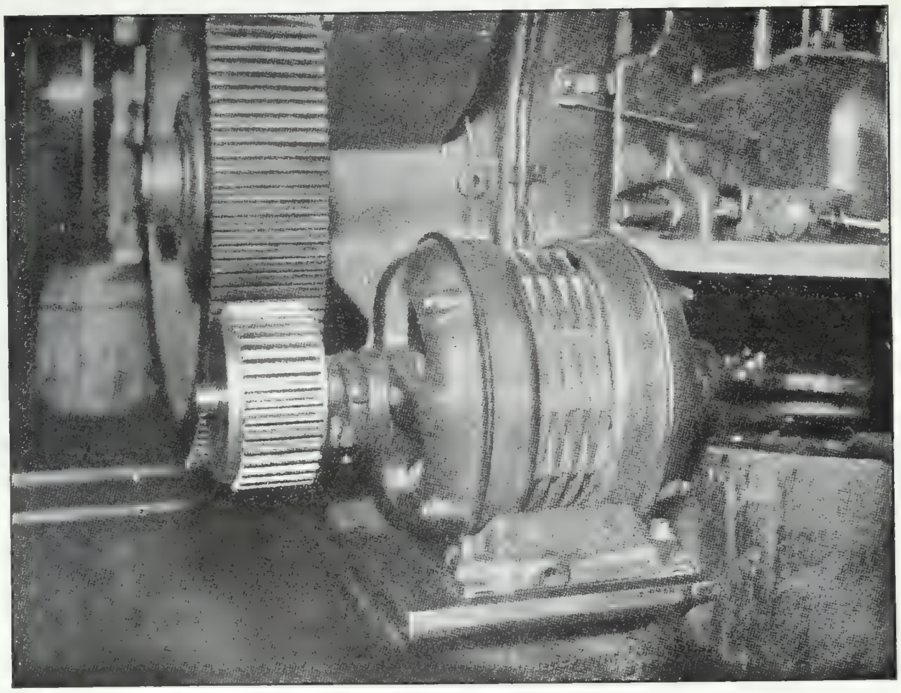

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A. C. CALLAN

Mr. Callan is one of Portland's business leaders and a pioneer in this city's foreign trade. Among various commercial and foreign trade connections he is prominently active as president of the Pacific-International Company, a fast growing organization of importing and exporting interests, headquarters at Portland and as vice-president of the National Foreign Trade Council. Besides these important duties Mr. Callan conducts and personally directs a general iron and steel business in his own name and is a senior member of the firm of Callan & Fortier of Seattle, Washington. Mr. Callan is an enthusiastic booster for Portland and the Pacific Coast, and anything making for a greater development of West Coast resources and industries invariably has his ardent and able support.

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Pacific Marine Review
The National Magazine of Shipping
November, 1920

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LIABILITY AT SEA

Recent Changes in the Maritime Law of Death

By HAROLD M. SAWYER

THE recognition of legal liability for death caused by negligence is a distinctly modern concept. The common law rule was that all rights of action for negligence perished with the victim, and it remained unchanged until Parliament in 1846 adopted Lord Campbell's act. The purpose of this act was to create a liability where none had previously existed, and to vest a new cause of action in certain designated persons. Statutes similar to Lord Campbell's act are found in many of our own states, including California. In others the same result is reached by a statutory declaration that the liability for negligence shall survive the death of the victim and can be enforced by his executors and administrators. Statutes of this type merely abrogate the common law rule, and do not, as was the case in Lord Campbell's act, create a new liability. For practical purposes the distinction is of no consequence. As the result of the adoption by the several states of one or the other of these two types of death legislation, liability for death caused by negligence is generally enforcible at law by the heirs, next of kin or legal representatives of the deceased.

But owing to the constitutional division of legislative power between the states and the Federal government, serious difficulty has been experienced in applying state death statutes to cases which would undoubtedly have been within the scope of a Federal death statute had one existed. It was not until 1908, however, that Congress saw fit to enact any legislation of this character. In that year Congress passed the second Employers' Liability Act, which, in its relation to this discussion, is a statute of the Lord Campbell type, but applicable only to railway employes engaged in interstate commerce.

Thus far we have considered only the common law rule and its statutory modifications. But there is another system of law, known as the general maritime law, which also denied the existence of liability for death caused by negligence. None of the state death statutes attempted in so many words to abrogate this rule of the maritime law. Such an attempt would probably have failed, because, broadly speaking, Congress alone can change the general maritime law. So until Congress acted, as it ultimately did this year, no express statutory amelioration of the harsh maritime rule was possible. Yet the humanitarian reasons which forced the abrogation of the common law rule, clearly justified similar abolition of the maritime rule. The need for remedial legislation was just as great in the one case as in the other. Indeed, it was so apparent that the Federal admiralty courts administering maritime law made every legitimate effort to recognize the liability which the law flatly denied. Consequently each case involved a desperate struggle in which the humanitarian instincts of the judges locked horns with their judicial temperament and principles.

This struggle has given birth to some curious decisions. Not only has there been complete disagreement between different courts, but in several instances the same court has at different times reached entirely different decisions and unblushingly ignored its own indistinguishable precedents.

Ultimately, however, it was generally agreed that the state death statutes could be enforced in admiralty if the death resulted from an injury received within the territorial limits of the particular state. If the statute was a plain death statute, the suit in admiralty was necessarily in personam and the recovery took the form of a personal decree for the payment of money. If, on the other hand, there was also any other statute which could reasonably be construed to create a lien against the ship, there seemed to be no reason why the suit might not be in rem against the ship as an offending thing, in which case the ship, or its proceeds, would stand as security for the payment of the decree.

These principles have been roundly criticised as fundamentally unsound, and there is no denying the fact that the attempt to apply them to some cases, coupled with a refusal to consider them in others, has led the courts into some astonishing inconsistencies. No matter how plausibly it may be disguised, the jurisdiction of an admiralty court in a death case must in the last analysis rest upon the state statute, for in the absence thereof there is no liability and consequently no jurisdiction. Yet the very courts which entertain jurisdiction and enforce the liability stoutly deny the power of a state to modify maritime law, or enlarge admiralty jurisdiction. Of course, much of the difficulty would have been eliminated if Congress, the only legislative body that could constitutionally pass a maritime death statute, had done so. But there was no Federal death statute until this year, and the admiralty death cases represent the conscientious attempt of the courts to supply a legislative lack without appearing to exercise legislative power. Such an attempt, though usually prompted by the best of motives, seldom achieves success.

At last, however, Congress has enacted the necessary legislation which should rescue the courts from some, if not all, of the inconsistencies into which they have been forced.

The first of this new legislation, adopted at the last session of Congress, is the act of March 30, 1920.(1) This statute is of the Lord Campbell type and creates liability for death caused by negligence on the high seas—that is, beyond the international three-mile limit. The liability may be enforced in the Federal courts in admiralty, either by suit in personam against the person who would have been liable had no death ensued, or in rem against the ship. If the suit is in rem the jurisdiction of the Federal courts in admiralty is exclusive, but if in personam the jurisdiction is doubtless concurrent with that of the state courts.

Obviously the act can apply only to vessels of American registry, enrollment and license, for Congress has no power to fasten such liability on a foreign vessel while on the high seas. But provision is made for the enforcement in the Federal courts in admiralty of any similar liability created by foreign law.

By express declaration the act is made inapplicable to the Great Lakes or to waters within the territorial limits of any state, and it is provided that state death statutes shall be unaffected by its passage.

The act applies to every one, passengers as well as crew, on board an American ship while on the high seas and provides for enforcement of whatever may be the law of the flag of any foreign vessel. It has long been needed and will afford redress in cases where liability has heretofore frequently been denied or successfully evaded.

Of perhaps greater importance is the death legislation found in Section 33 of the Merchant Marine Act of 1920 (Jones bill).(2) This section, operating as an amendment to the Merchant Seamen's Act of March 4, 1915 (La Follette act), adopts the death provisions of the Federal Employers' Liability Act of 1908(3) and extends them so as to include seamen.

The effect of the section is to create liability for death of a seaman, caused by negligence, to be enforced in accordance with the statute "conferring or regulating the right of action for death in the case of railway employees." It is provided in the Seamen's Act that the liability may be enforced in an action at law with jury trial, the jurisdiction of which is by implication vested in the Federal courts. It does not, however, make their jurisdiction exclusive, and doubtless the provisions of the railway act giving concurrent jurisdiction to both state and Federal courts will be read into the Seamen's Act.

The statute says nothing about jurisdiction of the admiralty courts, but if death resulted from an injury of such character as to bring the case within the admiralty jurisdiction, the liability could probably be enforced in admiralty as well as at law. Such is quite obviously the intent of the declaration that there is an election to sue at law, even though only one of the two courses is mentioned, between which an election could be made.

Unlike the high seas statute, the Seamen's Act does not create any lien against the ship nor authorize a suit in rem in admiralty. The method of enforcing the liability is purely in personam. Suppose, however, there is also a state statute creating a lien, and that it would be applicable had no Federal legislation been adopted. It can be argued that the Federal statute having created the liability and the state statute having created the lien, the situation is no different from that existing when both liability and lien are the result of the latter. Under such circumstances admiralty courts have, in the absence of Federal legislation, recognized the liability and permitted enforcement of the lien by suit in rem against the ship. On the other hand, it can be said with at least equal force that the failure of Congress to create a lien is equivalent to a declaration that there shall be no lien, and sufficient reason for denying the enforcement of one dependent on state statute. Such a suggestion gains additional weight from the fact that the underlying theory of the enforcement of state liens in admiralty rests on an unsatisfactory foundation at best. Either view is plausible and it is certainly an open question at present.

Another extremely serious problem is squarely presented by the Seamen's Act and by the high seas act as well. Pursuant to the Federal statutes a ship owner may, under certain circumstances, limit his liability for negligence to the value of his ship and pending freight. In cases of collision and wreck, where the value of the ship may be seriously impaired or entirely destroyed, the right to limit liability is of the utmost importance.

It has already been suggested that the railway act itself has modified the right to limit liability, at least as far as railway employes are concerned. Judge Chatfield, sitting in admiralty in the District Court for the Eastern District of New York, was inclined to agree with the suggestion, but did not squarely decide the question.(4) On appeal, the Circuit Court of Appeals for the Second District held unequivocally that no modification of the right to limit liability had been effected.(5) Nevertheless, the difference of opinion between at least two courts is obvious. In two subsequent cases the question has again been raised. The District Court in New Jersey found it unnecessary to express an opinion,(6) and the Circuit Court of Appeals for the Third Circuit followed the decision in the Second Circuit, but without critical analysis of the reasoning upon which it was based.(7) The opportunity to raise the question under the railway act will seldom arise, as limitation of liability is an admiralty procedure exclusively, and injuries to railway employes are not generally within the admiralty jurisdiction.

But the question can, and doubtless will, be raised whenever there is an attempt to limit liability under either the Seamen's Act or the high seas statute, and much protracted litigation is inevitable until the matter is eventually set at rest by a decision of the Supreme Court. Judge Chatfield's argument in support of his opinion is entirely plausible, and the reasoning of the Court of Appeals for the Second Circuit, which overruled him, leaves much to be desired. Of course, the case in the Third Circuit is also an authority against Judge Chatfield, but it is of little value, as it follows the case in the Second Circuit without any independent examination of the principles involved. This question must also be regarded as open with perhaps the weight of authority opposed to the contention that the Federal death statutes modify or repeal the acts authorizing limitation of liability.

The new death statutes have, however, entirely overlooked one important and numerous class of maritime workers. Stevedores do not seem to be covered by either. They are clearly outside the protection of the high seas statute, as their occupation rarely if ever takes them beyond the three-mile limit. It is equally clear that they are not seamen. So, unless they chance to be railway employes engaged in interstate commerce, and hence within the terms of the railway act, liability for causing their death must, if it exists at all, depend on the state statutes. Stevedore death cases will therefore remain clouded by uncertainty and deprived of the clarifying influence of the new Federal death statutes. But with the trend of Federal legislation clearly defined by these new acts, remedial measures in their behalf will doubtless engage the early attention of Congress.

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(1) An Act relating to the maintenance of actions for death on the high seas and other navigable waters. Approved March 30, 1920.
(2) Merchant Marine Act of 1920. Approved June 5, 1920.
(3) U. S. Compiled Statutes of 1918, Sections 8657-8667.
(4) The Passaic, 190 Fed. 644.
(5) The Passaic, 204 Fed. 266.
(6) The Erie Lighter No. 108, 250 Fed. 490.
(7) Erie R. Co. vs. Hansen, 260 Fed. 100.

Scenes near Honolulu. Upper left: Black Point and, in the distance, the two craters of Koko Head, as seen from Diamond Head. Upper right: Waimanalo Beach, Oahu, as seen from Makapuu. The Manchuria grounded here several years ago. Lower left: Makapuu Light, reputed to be the most powerful in the United States. Lowerright: a natural rock formation near Makapuu Point.

ISLAND WRECKS VII

By ANDREW FARRELL

WHEN the British ship Dunnotter Castle was lost on Ocean Island in June, 1886, her chapter appeared at an end. The wreck, lying between two reefs, defied salvage; and within a few months doubtless would disappear in the sands. The men no less would vanish, some here, some there, leaving only a story behind them. The incident of the Dunnotter Castle appeared rounded off fairly and completely; but it was not; it formed, in fact, the first link of a peculiar chain of circumstances, for a boat from the wreck happened to drift to Midway Island and there lay awaiting the coming and the destruction of the General Seigel.

Under charter for a six-month sharking expedition to French Frigate Shoals, the General Seigel departed from Honolulu September 1, 1886, under command of Captain Asberdine, alias Sanders. (Why he had an assumed name, whether it had aught to do with what followed, are questions that cannot be answered now.)

ANOTHER ONE-HANDED MAN

Having accumulated a full cargo of shark fins and oil on her cruise among the leeward islands, the General Seigel anchored in the lagoon of Midway. Now, when the winter winds blow, the lagoon of an atoll is a devourer of ships, for there is no shelter, and every reef and sandspit is a potential lee shore. This fact the General Seigel discovered. Dragging her anchors or parting her cables, she piled up on a reef, where she broke to pieces. All hands made shore; (perhaps had landed before the storm broke); at any rate, there they were, eight men in all, soon to be reduced to seven by one of those mishaps so common to those who fish in a certain and now a tabued manner: to-wit, with dynamite. While thus engaged, Peter Larkin of Honolulu lost a hand, and after fifteen days of agony gave up the ghost from his maimed body.

On Midway the seven survivors found the Dunnotter Castle's boat. This they decked over, with the purpose, according to the genial irony of a contemporaneous account, of "making a voyage to some more populous region of the Pacific." The work having been done, Captain Asberdine, alias Sanders; the mate, Jorgensen, and a third man, Brown, crossed the lagoon to gather provisions preparatory to sailing. And on a certain islet Asberdine and Brown remained; they are, in fact, there to this day, their bones, I suppose, scarcely distinguishable from the coral clinkers.

THE FLESH-POTS OF HONOLULU

One story says that Asberdine and Jorgensen had quarreled as to whither they should go: Jorgensen held out for the flesh-pots of Honolulu (a city not without attractions for a man); whereas Asberdine wished to make for some of the simpler and more primitive islands to the southwest. Whatever the truth of the matter (and he who searches for the whole truth in this affair is undertaking the hopeless), Jorgensen alone returned, and (doubtless with a childlike, open countenance) told how Asberdine had murdered Brown and thereupon had committed suicide. Never were two dead men accounted for with more admirable simplicity and dispatch. Cain's reply to certain inquiries regarding his brother was not more final.

Despite the straightforwardness of his narrative, Jorgensen, to his grieved surprise, found himself tabued by his mates. Yet he must have been a berserk person of parts, for the others feared that he would make way with the Dunnotter Castle's boat, although they were four to his one; so they stove in the craft on which they lately had labored. That done, they may be pictured as sitting down idly and waiting for rescue, quick or tardy. Not so; in this adventure craft come in answer to a call, as a dog to his master's whistle; and so naturally there was a second boat. For this the castaways were indebted to Captain Paul Bohm, master of the schooner Kaulilua, who, lately fishing in these grounds, had left behind him a Japanese sampan. To that boat the four men fitted outriggers and a spar and sail.

A VOYAGE TO THE MARSHALLS

And then, without nautical instruments, each man Jack utterly ignorant of navigation, they sailed for the Marshall Islands, 1500 miles distant; and after a voyage of twenty days, on the Marshall Islands they landed. From Jaluit two of the four took passage in the Hawaiian bark Lilian and arrived at Honolulu December 6, 1887.

Ridiculous though this voyage from Midway across 1500 miles of open sea may appear, facts tend to explain its success, but not to lessen our admiration for the stupid daring that inspired the crew. About Midway variable winds from several quarters may be met, for the island lies near the (theoretical) northern limit of the northeast trades; a few hundred miles south the trades bluster hard, blowing from virtually two directions only, northeast and due east; and the current has a not unfavorable westerly set; so that a boat, running before the northeast winds, would be heading straight as an arrow for the Micronesian atolls.

JORGENSEN LEFT ON MIDWAY

On these atolls landed the four; four only, because Jorgensen had been left on Midway, presumably marooned for life, and that life destined to be short, for his wits were wandering when the sampan left him on the beach. But in these waters the strange is commonplace. And now appears the Wandering Minstrel.

She always was a hoodoo ship, was the Wandering Minstrel. "She ruined her builders," wrote Captain F. D. Walker, her last owner; "everyone that owned her regretted it; and when I purchased her, the money paid was to satisfy a mortgage." Operated then by the Shark Fishery Company, of Hongkong, the Wandering Minstrel capped her history by sailing from that port October 13, 1887.* Under such auspices, what but ill luck could follow? Gales, and a stray typhoon or two, and a mutinous crew forced the vessel into Honolulu; repairs were made and officers changed; and, some of the Malay sailors having deserted and others being in irons, the Wandering Minstrel sailed on her last voyage. Bad weather continued to track her. On arriving off Midway she lay outside three days waiting for the wind and sea to moderate; once she was in the lagoon, the winter gales again set in; when the reefs were white with foam she tugged at her anchors, parted her cables and ended on a patch of coral February 3, 1888.

LEFT WITHOUT FOOD

With great difficulty the crew and Captain Walker's family, twenty-nine persons in all, got ashore. "The following morning the wind was still blowing furiously," said Captain Walker's account. "The remains of the wreck, consisting of a portion of the stern, with the mizzenmast lying upon it, was visible through the blinding spray. The rest was taken out to sea by the strong current, and we were thus without food. Some clothes and a few tins of provisions were washed ashore. In about two months' time part of the stern was washed upon the beach opposite the Hut, from which we secured some clothing and a chest containing some valuables."

On Midway was Jorgensen, the marooned murderer. He was mad indeed, as the Wandering Minstrel's crew discovered, for he walked on the beach, raving wildly, when the moon was full. Several times Captain Walker was about to shoot him, but each time mistakenly listened to Mrs. Walker's pleas that he be spared.

HANG TOGETHER OR SEPARATELY

All the newcomers, however, were not of Captain Walker's mold. In Cameron, the first mate of the Wandering Minstrel, Jorgensen found a kindred soul, the Jonathan to his David. Cast down at the end of the earth; crushed, on that flat atoll, between the twin infinities of sky and sea; dogged, on that desert island, by death and the fear of death, these two noble natures made common cause, shoulder to shoulder, against the universe. As they stood together in the midst of the Pacific, so I trust they stood together afterward; although their black caps were individual, and individual their resined ropes, they deserved at least a single scaffold from which to make their plunge into another world. For even on Midway it was quite evident that if they did not hang together they were most certain to hang separately.

Having spared Jorgensen and Cameron, when he might have rid the earth of both, Captain Walker crowned his folly by lending them a compass. They desired that instrument for exploring purposes. How admirable is man's thirst for knowledge! Explorers, these two mates? Indeed yes; so was Sir Harry Morgan an explorer when he pushed forward to the sack of Panama, and in his capacity as a fellow of the Royal Geographical Society, left a heap of smoking ruins to mark the site of the city. Bully Hayes was fired with scientific zeal when he set two persons on an uncharted, desert reef, for he wished to ascertain how long human beings could exist without food and water.

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*Captain Walker said Friday, October 13, 1887, but the calendar does not bear him out.

But Midway was too narrow a field for Columbus Jorgensen and Magellan Cameron. The Scot and the Scandinavian added to their company a Chinese boy; stole the best boat; and sailed into the southwest. They also arrived at the Marshalls, quite as they should have done; but, suffering from an unfortunate lapse of memory, failed to report the presence of twenty-seven persons on Midway Island, they asserted that they were the only survivors of the Wandering Minstrel; and the marooned colony continued its merry if monotonous existence until chance should send a vessel to the island.

Three months after the loss of the Wandering Minstrel, six of her crew, tiring (as usual) of Eden, took the best remaining boat and crossed the lagoon by night to Green Island. The next morning they sailed away; but the castaways had tempted the sea once too often: a great gale arose, and the six disappeared into the profound silence of the Pacific.

For fourteen months, in all, the others remained on the island, their life "one continual hunt for food." Several fell ill of scurvy, so monotonous was the diet of fish, birds and eggs. At length the fishing schooner Norma found the colony, and after remaining at the island eleven days, in order that the sick might recuperate sufficiently to go on board, sailed for Honolulu March 29, 1889, and arrived April 6, with sixteen of the original twenty-nine aboard. Scurvy and sea had done for the rest.

DRIVEN EASTWARD BY GALE

Reference has been made to Captain Paul Bohm, of the schooner Kaulilua, who, by leaving a Japanese sampan on Midway, made possible the escape of the four men of the General Seigel after they had stove in the Dunnotter Castle's boat. The story of Captain Bohm's first arrival at the island is a fitting part of the Midway cycle.

The Mary C. Bohm, a schooner of between sixty and seventy tons, sailed from Yokohama August 17, 1885, on a three-months' fishing and hunting expedition among the neighboring islands. In addition to Captain Bohm, his wife, four children and two Japanese nurses, the vessel had a crew of sixteen Japanese and three "Manila" sailors. In October Captain Bohm decided to continue his voyage eastward to some of the uninhabited islands of Japan; but the schooner lay becalmed for many days; a strong westerly gale followed upon the calm and carried the Mary C. Bohm eastward, far out of her intended course; and thereafter she began to leak and the water supply ran low.

In November she arrived at Midway. On attempting to enter the harbor she touched the reef; but set sail and got off within a few minutes, and a boat was lowered and sent ahead to find a passage into the lagoon. For the second time the schooner attempted to enter; for the second time she grounded, and again was got off safely and anchored in a good berth, where she hove to for repairs.

Five days were spent in this work. When it was nearly done a heavy swell turned the vessel on her beam-ends in ten feet of water. The mainmast was cut away and she righted, remaining filled with water, however, so that the crew took to shore. When the weather moderated next day Captain Bohm prepared to get the vessel in a seaworthy condition; but the sailors, believing that it was useless to attempt to repair her, refused duty. On the next day, after she had drifted into shallower water (seven feet forward and nine aft), all hands did set to work with the pumps and at bailing, and soon had her dry and moved into a deep anchorage.

LAGOON SWEPT BY GALES

On the morrow the crew again refused duty. Captain Bohm, who had been in Japan for sixteen years, was able to harangue the men in their own tongue: if they did no work, he said to them, they got no food. They laughed at the threat: there were many birds and eggs on the island; the waters swarmed with fish; in brief, there was sufficient food to maintain them for three years. At length one Filipino began work; his fellows went to his aid, and rigged the vessel and commenced making repairs. This was early in January, 1886. On January 7 one Japanese reported, and within a week all had returned. For six days the weather remained good; then heavy westerly gales set in, as they did, at about the same season, with the General Seigel and Wandering Minstrel; and the schooner was not ready to sail until March 8. When she did depart, on that day, her crew was less by one, a Japanese having died March 7.

In view of the condition of the vessel and the lack of food, Captain Bohm decided to cruise along the leeward chain of Hawaii as he ran down to the inhabited islands. He made landings at several islands, on most of which, except French Frigate Shoals, he obtained a plentiful supply of turtles. That meat, and a little rice, made up the fare.

DISTRESS SIGNALS NOT SEEN

Early in May the Mary C. Bohm sighted Lehua, an islet near Niihau, but she again lay becalmed for several days and did not come to anchor until May 12. During the entire voyage only one vessel was sighted, the steamship Gaelic, which, however, did not see the schooner's signals of distress. (Nor is the Gaelic the only vessel that has failed to see, or respond to, such signals.) Throughout the nine months Captain Bohm had much trouble with his crew: frequently he had to draw his revolver to intimidate them; once off Midway eight men attempted to overpower him; a Japanese tried to push him overboard, Captain Bohm knocked him down, the man seized an iron bar and returned to the attack, at length the skipper mastered him and lashed him to the mast for three days.

Midway would appear to be the last place to which Captain Bohm wished to go; he did return, however, and left that handy sampan, in which the General Seigel's four sailed to the Marshalls.

SOURCE OF STEVENSON'S NOVEL

I have endeavored, with indifferent success, to trace in this series of adventures the source of Stevenson's "Wrecker." Stevenson knew of the loss of the Wandering Minstrel and the sufferings of her crew; for in a letter written in Honolulu in May or June, 1889, to Sidney Colvin, he said: "I am going down now to get the story of a shipwrecked family, who were fifteen months on an island with a murderer: there is a specimen." In June, 1889, two months after Captain Walker was landed in Honolulu, Stevenson sailed for the Gilberts in the schooner Equator; near Johnston Island, as he tells the story in the epilogue to "The Wrecker," he and Lloyd Osbourne discussed the plot. "'But how to get the wrong crew there?' 'I have it,' cried the other; 'the so-and-so affair.' For not so many months before, and not so many hundred miles from where we were then sailing, a proposition almost tantamount to that of Captain Trent had been made by a British skipper to some British castaways." To what incident he refers I cannot even guess, unless the captain of the Norma endeavored to compel the Minstrel's castaways to pay him lavishly for transportation to Honolulu (of which there is not a hint in the accepted versions of the story); but no other wreck of which I have heard answers the conditions of time and place as outlined by Stevenson. Aside from all this, "The Wrecker" surely drew some of its incidents and settings from the adventures of the Mary Bohm, General Seigel, Wandering Minstrel and Norma, as anyone familiar with the novel may demonstrate to his own satisfaction; and, finally, the Norma, in addition to being a prosaic fishing vessel, also was an opium smuggler of the first magnitude.

ERRATA

In the article on the Columbia Pacific Shipping Company, page 63 of the September Pacific Marine Review, appears a short account of the experience of Mr. B. L. McMullen, general freight agent of that company. It appears that this account was slightly in error and should have read: "In 1908 Mr. McMullen came to the West Coast and entered the service of the American-Hawaiian Steamship Company, later going into the importing and exporting business for himself. Mr. McMullen remained independently in business until he joined the Pacific Steamship Company, taking charge of their foreign and litherage departments and retaining this position until he assumed the duties of general freight agent for the Columbia Pacific Shipping Company." We are glad to correct this error, which inadvertently crept into the former account.

"YANKEE SMARTNESS"

Of late foreign publications, especially (it must be admitted with regret) those of our British cousins, have had much to say regarding "Yankee smartness." That phrase, in quotation marks, has taken on more than a tinge of innuendo; it is, in fact, the favorite thrust in what appears an attempt to discredit American commercial houses. Few well-informed Americans would claim absolute sanctity for their fellow-countrymen; as a people we are far from perfect; but as a people we are little disposed to concede perfection to the British, or any other foreign nationals, and at the same time shoulder the onus for all the violations of commercial good faith. The United States possesses as high a standard of business honesty as does any country in the world (to attempt to claim more would be to place ourselves in the unenviable situation now occupied by others who, as they themselves confess, are quite immaculate); and it is a positive relief, after the countless repetitions of the quoted phrase "Yankee smartness," to discover an opportunity to fight out this question, to meet our foreign critics in a pitched battle.

SOME HEAVY ARTILLERY

The occasion arises from an editorial published in the Rice Bowl, the well-known house-organ of W. T. Welisch & Company, San Francisco. In the July, 1920, issue of that publication, an editorial, entitled "The Test," urged importers of rice to stand by their obligations, despite the crash of the market caused by the officially-announced allotments of Rangoon rice. This editorial was countered by an article in the Hongkong Telegraph, which, although professing to admire the "outspoken article," seizes the opportunity to discharge several pieces of heavy artillery at us. Says the Telegraph: "Is it not also of considerable importance to maintain the standard of respectability all round? Many of the San Francisco importers of rice and sugar have not met their commitments. They have dishonored their bills drawn under confirmed banker's credit. . . . The local (Hongkong) banks have bought these rice bills from the exporters here. . . . The exporters have repudiated all responsibility, and disclaim any interest in those rice stocks. . . . In the meantime the rice that had been shipped to San Francisco has to be sold before it becomes bad and unfit for human consumption."

IF THAT WERE TRUE

If that account were true, the situation would be bad indeed. As a matter of fact, the Telegraph has erred grievously. No single instance of rejection or repudiation on rice contracts by San Francisco factors has come to light. There have been many rejections of other commodities, such as vegetable oils, Java sugar, camphor, peanuts. And why? Was it because of "Yankee smartness"? Can the Telegraph reply?

These rejections were due to the unmerchantable quality of the goods, although certificates had been obtained by exporters (Hongkong exporters, among others) stating that the goods were standard; despite these certificates, the goods, on arrival in San Francisco, were manifestly unmarketable.

AN EXAMPLE FROM HONGKONG

In order that this statement may go home to Hongkong, let a specific instance be cited. A leading San Francisco business house, known favorably throughout the United States, ordered 500 tons of white Java refined sugar, 97/98 polarization, at a price of approximately 23 cents a pound, against which was given a letter of credit for $250,000 United States gold. The sugar was shipped; it was received in San Francisco; and the American firm rejected it.

Why? For several reasons. More than 11 per cent of the aggregate was sweepings, such stuff as an American family would not put upon a dining table. No less than four distinct grades of sugar were comprised in the shipment; the sweepings; a lighter brown, resembling the usual Hawaiian raws, but perhaps of finer grain; another still lighter, approximately the sugar that passes for refined throughout the Orient, but which is as different from refined granulated as day is from night; and, finally, a white, fine, dust-like stuff. Moreover, the polarization, instead of being 97/98, ranged from 92 to 97. The sample submitted by the Hongkong exporting company was a dry, free-running white sugar; the goods actually received were anything else.

On the inner burlaps of the bags were discovered no less than ten different Hongkong shipping marks; the bags were sweated badly; the sugar evidently had been kicked about Hongkong warehouses for a year. And that was the stuff that Hongkong shipped to San Francisco as white Java refined.

Despite a potential profit of $15,000, the American importing company refused to accept the shipment, although at that time, when the sugar shortage was worst, the stuff could have been unloaded upon the tables of American consumers. Fortunately for the buyer, the surveyor had erred and had omitted the word "granulated" from the description of 350 tons, and the bank failed to note this omission, so that the American importer was justified technically in repudiation. How the sugar itself also justified him has been seen clearly enough.

THE BANK'S RESPONSIBILITY

Now, why should the Hongkong bank have permitted such stuff to be shipped? Did the bank believe that the sugar was up to specifications? Was the shipment surveyed by an unprejudiced and competent surveyor? Or did the corporation believe that anything was good enough for an American, despite our traditional "Yankee smartness"? Perhaps the Hongkong Telegraph can reply; perhaps the Telegraph can justify such business morality as is manifest in this and other instances: the quoting of prices c. i. f., on the basis of whatever the Hongkong exchange rate may happen to be; the shipping of markedly inferior merchandise against an iron-bound letter of credit; and, finally, the delay of three or four years before the American business house can force recovery in the Hongkong courts.

Does the Telegraph know that American importers have had such unpleasant experiences with South China wood oil that they virtually have abandoned any business in this commodity with Hongkong, preferring to deal with Hankow instead? Oils have been received in San Francisco from Hongkong that, despite analyses by Hongkong government chemists, showed markedly variable qualities; the violation of specifications became so frequent that, as indicated, American importers are exceedingly wary of the Hongkong market. Nor is trouble confined to wood oil. In 1919 a San Francisco importing company received a consignment of 10,000 bags of rice, shipped by its own representative Chinese house but certified as to weight by white surveyors of Hongkong. A few bags were weighed at the San Francisco dock; a shortage was disclosed such as to justify weighing the entire shipment, which was done both by public weighers and by representatives of the San Francisco Chamber of Commerce; the result of these surveys disclosed an average shortage of 5.4 pounds to the bag, or 54,000 pounds for the entire shipment. At that time rice was worth 9 or 10 cents.

"HANDS ACROSS THE SEA"?

Hongkong exporters are not the only source of trouble. A recent shipment of what purported to be No. 1 Saigon long-grain rice was anything else; anyone with eyes to see could understand that the rice virtually was unmerchantable, at least in an American market. A San Francisco importer said that he willingly would lay down a check for $100,000 if he never had bought Japanese peanuts in the shell; and other instances might be recited to almost any length.

Dishonest American business men have done, and are doing, and (until the millennium comes) doubtless will continue to do, much that shames their nation. Such persons merit the condemnation of their fellow-countrymen no less than that of foreigners. But American business men generally are not inclined to remain silent when accused of all the crimes on the commercial calendar; they certainly are not disposed to plead guilty to all the sins of the business world. The British are benefiting neither themselves nor us when they sneer at "Yankee smartness." Hongkong, in common with San Francisco, is under obligation to clean its own house; the British, whether in Singapore or London, are under obligation to play fair with America, to manifest their sportsmanship by frankly pleading guilty to their own faults. America must do no less. Otherwise, if either nation fail, "hands across the sea" must remain a dream.

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J. S. HINES . . . . Publisher
B. N. DeROCHIE . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor
G. N. SOMERVILLE . . . . . Associate Editor
J. G. BRAY . . . . Pacific Coast Adv. Mgr.

NEW YORK OFFICE
339 at 30 Church Street
M. B. STEWART, Manager

SEATTLE OFFICE
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THE ILLOGICAL PHILIPPINES

OUR neighbors of the Philippines continue to display resentment at the extension of the coastwise laws to the islands, as was done by the Merchant Marine Act, under which foreign vessels will be frobidden to trade between the Philippines and America after February 1, 1922, provided that adequate American shipping facilities exist at that time. This attitude appears to be ill-advised and indicates either an ignorance of what the extension of the coastwise law means or (to speak frankly) a propaganda of foreign inspiration.

Neither the Philippines nor any other country ever was benefited by rate-cutting—and rate-cutting seems to be what the protesting Filipinos desire, regardless of what they may say to the contrary. Unfortunately, they are not the only persons who desire it; America has merchants short-sighted enough to lick their lips at the prospect of shipping wars, remaining blind, as they do, to the incontrovertible fact that the man who sells something below cost today will take an additional profit, and more, tomorrow. Enough competition will obtain between American companies operating to the Philippines to assure the island of fair freight and passenger rates; and we certainly are justified in assuming that nothing more or less than fair rates will be asked. We may refer again, as we did in Pacific Marine Review for September, to the experience of Hawaii. That group of islands, long under the coastwise laws, was served when the war broke out by two excellent fleets, the American-Hawaiian and the Matson, both built up solely by virtue of the protection of the coastwise laws, in both of which Hawaiian capital was interested; and those fleets made Hawaii almost exempt from the evils of a world shortage of tonnage. If the Philippines would look farther ahead, instead of in the more immediate future, they would discover that their own interests would be served best by emulating Hawaii, by encouraging the formation of Philippine-America steamship companies, and by paying those lines rates at which fair profits may be earned. Nothing else can give the islands dependability and, in the long run, economy in steamship service.

In a statement published in the newspapers, a representative of the Filipino Press Bureau criticises the extension of the coastwise laws to the islands because: The extension was unnecessary; it will be injurious to Philippine trade; the Merchant Marine Act was passed against the will of the insular government; and, finally, American trade may be affected adversely. Nos. 1, 2 and 4 of these objections do not stand up under criticism. As for No. 3, it speaks of a too-sensitive insular administration. If Congress passed no law against the wishes of some section of the country, Congress would pass very few acts indeed.

The statement referred to closes thus: "The interests of America's proteges should be placed above those of the shipping adventurers. This is the only course consistent with her vaunted policy of altruism." Those sentences have a curiously familiar ring. They might have been written by a native of a country other than the Philippines; by a native of a country that benfiets greatly from the Philippine trade.

THE PANAMA CANAL

SOME statistics of unusual interest are published by the Panama Canal Record of the progress of commercial traffic through the waterway, covering the period August, 1914, to June, 1920. A study of the tables leads to the conclusion that the canal began to find itself only in the first six months of this year, during which 1324 vessels passed from one ocean to the other, as against 1154 for the last six months of 1919 and only 980 for the first half of that year. With various fluctuations the number increased from 351 for the period, August 15 to December 31, 1914, to 1048, July to December, 1918; but this last figure, which was the highest attained to that time, fell off to 980 in the next six months.

That the canal will find itself more and more is unquestionably true. The marked increase in the number of vessels engaged in the intercoastal trade scarcely had made itself felt in the first six months of this year; it will not have attained its maximum in the second six months, and consequently we may anticipate leaps in the number of vessels going via Panama. The announced intention of the eastbound intercoastal steamships to put into effect water import and export rates, which is dealt with elsewhere in this number of Pacific Marine Review, will increase intercoastal trade and naturally the use of the waterway; the growth of business of the Pacific Coast with the East Coast of South America, and of the Atlantic with the West Coast, and of the Atlantic with the Far East, all promise an amazing increase in canal business.

In furthering our commerce and that of other nations, not to speak of the augmentation of the power of the United States Navy, the canal is paying for itself much more rapidly that most of us realize.

INTERCOASTAL RATES

THE subject of Coast to Coast Water Rates is receiving a great deal of attention at present. The tendency of the rates to increase with the rail rate is causing quite a protest among shippers, although it must be evident to even the casual observer that costs of operation at sea have increased in even greater ratio than those on rail routes.

The San Francisco Chamber of Commerce, in a letter written by Seth Mann, manager of the traffic bureau, to the Shipping Board, opposes the practice of advancing intercoastal water rates in relation to the advances made by railroads. Says the letter:

"The San Francisco Chamber of Commerce respectfully protests against the action of the Shipping Board in advancing coastwise rates between the Atlantic and the Pacific Coast in the same percentage amount as authorized by the Interstate Commerce Commission in Ex Parte 74 to the rail carriers, to-wit, 33⅓ per cent.

"Water rates should bear no percentage or other relationship to rail rates, but should be established upon the basis of the net income from operation. The rates should ultimately be determined by circumstances of healthy competition between vessels operating on the route, but without reference to the contemporaneous rail rates existing between the same points of origin and points of destination. Any other system denies to ports and communities neighboring to the seacoast the natural advantages of their location in respect of transportation. There can be no justification of exacting all the traffic can be forced to bear in transportation either by rail or water. There is, therefore, no justification in a scale of water rates based upon the competing rail rates and just sufficiently below them to move some of the traffic by sea. Such a situation inevitably produces the result of keeping both rates at a higher level than would otherwise obtain and at a higher level than is fair and just to the shipping public.

"Furthermore, Section 18 of the Shipping Act of 1916 enacts as the law of coastwise water rates, 'that every common carrier by water in interstate commerce shall establish, observe and enforce just and reasonable rates'; and also that 'whenever the board finds that any rate . . . demanded, charged, collected or observed by such carrier is unjust and unreasonable, it may determine, prescribe and order enforced a just and reasonable maximum rate.'

"It is obvious that a just and reasonable rate by water can never be measured by the contemporaneous rail rate between the same points. The two rates cannot be rationally compared with each other, because the incidents and constituent parts of such respective rates are entirely different. The items of the cost of operation are in no way comparable. Cost of labor and supplies, of maintenance and overhead, and of investment in properties devoted to the public use are of an entirely different character. A just and reasonable rate by water should be measured by the cost of operation by water and the amount of investment in vessels and other property devoted to the public use in the water transportation in question. The water rate, therefore, should have no relation by way of percentage or otherwise to the contemporaneous and competing rail rate, but should be adjusted under the law of justice and reasonableness upon the circumstances and conditions applying to the water service alone.

"We respectfully request that the water rates between the Atlantic and the Pacific Coast be adjusted at just and reasonable maxima, without any reference whatsoever to the rail rates. We request advice as to your action in the premises."

THE SHIPBUILDING SITUATION

On September 1, says a report of the Bureau of Navigation, American shipyards were building for private owners 345 steel vessels of 1,236,547 gross tons, as compared with 389 vessels of 1,335,721 gross tons on August 1. These figures do not include Shipping Board building. The American Bureau of Shipping tabulation gives 383 vessels of 1,438,498 gross tons under construction for private account September 1; and a summary drawn up by the Atlantic Coast Shipbuilders' Association states that construction at the end of August aggregated 1,342,847 gross tons for private account and 687,895 for the Shipping Board, the total under construction being 207,000 tons less than at the end of July and 442,000 tons less than at the end of June.

The statement of the Atlantic Coast Shipbuilders' Association continues:

The extent of the shrinkage, however, is better indicated by the fact that in January nearly 3,000,000 gross tons were under construction, in comparison with the present (end of August) total of slightly over 2,000,000 tons. And, whereas at the beginning of the year building for the Shipping Board was almost a million tons in excess of that for private account, construction for the government is now about 650,000 tons less than that on private orders. As last year's production by American shipyards was 4,318,000 tons, the total now in hand represents less than six months' work for the yards generally, and unless new orders are secured on an appreciable scale a number of yards will be idle before the end of the year.

The rapidity with which the Shipping Board's program is drawing to completion is evidenced by the present total of 684,000 gross tons, compared with 1,975,000 at the beginning of this year, and 3,733,000 tons in March, 1919, the high-water mark of American shipbuilding. Not one new keel has been laid for the Shipping Board's account in several months.

A continuance of the decline in the volume of orders for private account which was first manifested in June is still noted. In three months the decrease has amounted to 125,000 gross tons.

An analysis prepared from the records of the Shipping Board, the American Bureau of Shipping, Lloyds' Register of Shipping and the Department of Commerce shows that at the beginning of this year the Shipping Board alone had more tonnage building than the Board and private interests combined have today.

It is also noticeable that British shipyards are widening the gap between the amount of work they have in hand and that in this country, as is indicated by Lloyds' Register. These show the tonnage of steel steamers building as follows, the British totals being Lloyds' figures and the American those compiled by the Atlantic Coast Shipbuilders' Association. The figures are given in gross tons:

1919	American	British
September 30	2,947,000	2,796,000
December 31	2,952,000	2,980,000
1920		
March 31	2,715,000	3,379,000
June 30	2,234,000	3,563,000

Records compiled since last October by the association show an unbroken decline in the work under way for government and indicate how increases in private orders have been converted into losses. The total in hand, in gross tons, for both accounts, is given in the following table:

1919	Shipping Board	Private Orders	Government Tonnage Lead
October	2,600,146	347,343	2,252,803
November	2,300,380	550,714	1,749,666
December	2,095,308	805,147	1,290,161
1920			
January	1,975,000	977,488	997,512
February	1,829,284	1,256,573	572,711
March	1,629,288	1,337,445	291,783
April	1,311,623	1,404,198	92,575*
May	1,140,683	1,466,624	325,941*
June	1,015,577	1,454,102	438,525*
July	834,145	1,400,865	566,720*
August	687,895	1,342,847	654,952*

*Private tonnage lead.

Tankers under construction for private account showed in August the first decrease recorded for vesseds of this class. Freighter tonnage continued the decline which has been unbroken since last April. Conditions have now reached the point where completions of vessels are materially in excess of new tonnage. Fluctuations in the amount of tonnage of various types being built in the months of the period under review are summarized as follows by the association, the figures being in gross tons:

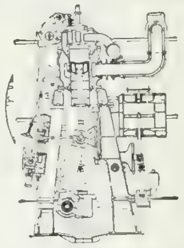
1919	Tankers	Freighters	Other Types
October	74,437	235,523	37,383
November	214,940	295,493	40,281
December	369,084	400,556	35,507
1920			
January	476,742	470,197	30,549
February	588,565	620,567	47,441
March	722,549	561,455	53,441
April	745,140	623,917	35,641
May	807,325	619,890	39,409
June	812,325	602,853	38,924
July	814,945	543,956	41,964
August	791,073	512,964	38,810

DIESEL ENGINE COURSE

Study of the Diesel (internal combustion) engine is being given by the Extension Division of the University of California in a course conducted by C. G. A Rosen.

This course is the first of its kind given by University Extension, and is offered in response to a demand on the part of engineers and mechanics. The instructor is a graduate of the College of Mechanics at the university and is now with the Dow Pump and Diesel Engine Company. The class is meeting on two evenings a week, Tuesday and Thursday, for eight weeks, 7:30 o'clock at Emanu-El School, 1337 Sutter Street.

Oil Engines and Motorships



THE DIESEL ENGINE

Its Development, Design and Construction Particularly as Applied to Marine Propulsion

II.

OR this third series of tests the fuel was to be gasified before entering the combustion chamber of the cylinder. Figure 8 shows the cylinder head designed for this purpose. The fuel entering on the right had to pass through a coil located in the combustion chamber before entering the fuel valve. The idea was to increase the temperature of the fuel to such a degree that it would gasify immediately after leaving the fuel valve on account of the drop in pressure.

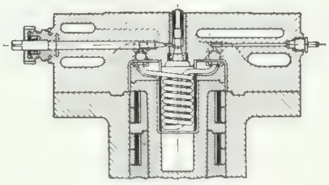


Figure 8

It is easy to see now that with the above arrangement no satisfactory results would be obtained, the combustion chamber being more unsuitable than ever and the entering fuel having a strong cooling effect on the small amount of air inside the coil, thus preventing ignition. To insure ignition, especially when starting, it was decided to use some ignition system, and considerable work was done to find some suitable means, but all such experiments resulted in complete failure, and as they did not yield any beneficial experience it is of no value to go into details.

After spending six months on above tests it was decided to start a fourth series, using city gas and gas from a gas producer using gasoline and kerosene. On account of explosions in this generator and the danger connected with them, these tests were only of short duration, but resulted in the first correct diagrams, Figure 9, Diagram No. 15. Although Diagram No. 8, Figure 7, is similar to this one, it was the only good one obtained during former tests and could never be reproduced. Further tests were made with the injection of city gas and parallel experiments with liquid fuel injected by means of compressed air as before, but with an air tank, called now injection or blast air tank, connected with the fuel injection valve. Injection of gas only resulted in considerable misfiring, which was remedied by injecting a very small quantity of gasoline ahead of the gas proper. This was the first step toward a system used later for the utilization of low-grade fuels such as tar oils, where a small quantity of a lighter fuel (ignition fuel) was introduced ahead of the heavier fuel.

During these tests it was found that liquid fuels injected with air gave better diagrams than gas, which led to the conclusion that on account of the self-isolation of the flame it was necessary to introduce the fuel mixed with air. It was not possible to make tests with gas injected after being mixed with air, as only one compressor was available which was used for the gas. But to improve the injection of gas a pipe about three inches long with about 28-1 mm. holes was extended into the combustion space. By these means correct diagrams were obtained, and it was found that with an increased number of holes the diagrams became better. Some of the diagrams are shown in Figure 10. Although these experiments with gaseous fuels did not result in later uses of this system, two of the most important rules in Diesel engine design were brought forth. They are:

1. The self-isolation of the flame, preventing the forming of a good mixture in the cylinder unless the fuel be injected by means of air.
2. The necessity of utilizing for the combustion process all the air contained in the combustion space.

With this in view a fifth series of tests was contemplated with a new engine designed according to the experience gained. Fig. 11 shows cylinder and cylinder head of this new design, the other parts being unchanged. The cylinder bore is increased to 220 mm. (8⅝ inches) while the stroke of 400 mm. (15¾ inches) is retained.

The combustion chamber is located now in the cylinder head, resulting in a better concentration of the air available for combustion. Unfortunately, the admission and exhaust valve were again combined, but by means of a rotary valve inlet and exhaust post were divided. For the first time the cylinder is provided with a waterjacket for cooling.

Consideration was given to the relation of bore to stroke. In the first engine it was 2.67, while now it became 1.82. The rule was to keep the bore small on account of the high piston pressures, thus reducing the weight. Now the basic idea is the design of a most suitable shape of combustion space with the greatest practicable reduction of its surface in relation to its volume.

As shown in Fig. 11, the injection valve is located on top of the combustion space. In the center of it is the fuel needle while the needle valves are on its side; the upper one for air or gas, the lower for liquid fuel. On the side of the combustion chamber provision is made for a spark plug. To obtain the most favorable distribution of the fuel in the combustion chamber a so-called double star burner was attached to the bottom of the fuel valve. The details of the design of this burner are shown in Fig. 12. However, the rings outside the nozzle holes had to be discarded as they became white hot and burnt off.

Careful measurement of the different pockets by means of a liquid showed that these pockets with their lost air content amounted now to only 10 per cent of the compression space volume against 60 per cent on the first engine and 28 per cent on the second.

During April, 1895, the first runs were made using gasoline and air injection. Immediately very good diagrams were obtained. Fig. 13, Diagram No. 20. The exhaust is absolutely clear. Diagram 22, Fig. 14, gives already an M. I. P. 97 lbs. per square inch at 200 R. P. M. or 23 I. H. P. and 34 I. H. P. at 300 R. P. M. According to no load diagrams, the mechanical efficiency is 58 per cent.

Now follow tests with kerosene giving even better results. (Diagram 24-25, Fig. 15) the combustion being smoother as clearly shown in a better compression line.

Experiments with various shaped burners did not give any better results, and the type as shown in Fig. 12 was used on further tests without the rings around the holes, for reasons already given above.

On June 26, 1895, just about two years after the beginning of the experimental work, the first brake tests were made, with the following results:

1. Thermal efficiency	30.8%
2. Mechanical efficiency	54. %

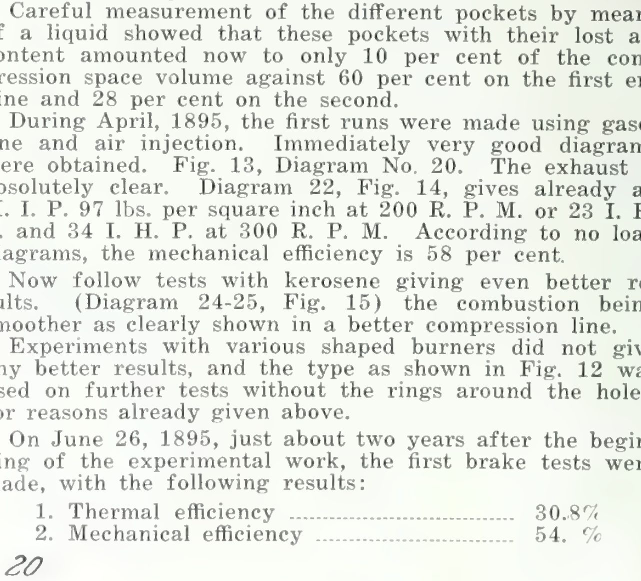


Figure 9

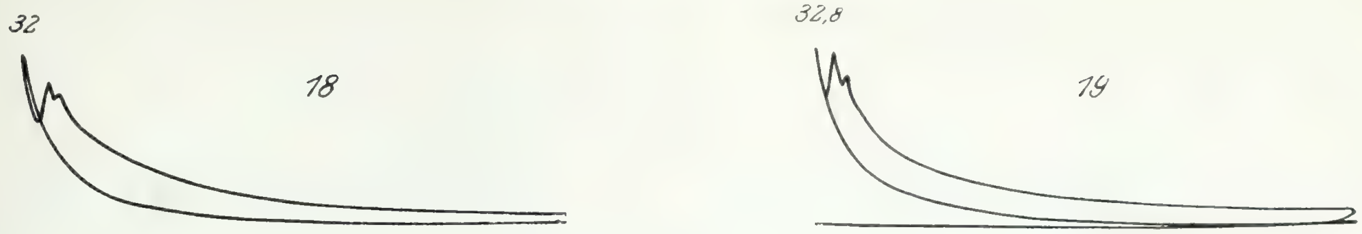


Figure 10

3. Over-all efficiency 16.6%
Fuel consumption (kerosene).......................... .455 lbs. per I.H.P. hour
Fuel consumption (kerosene).......................... .845 lbs. per B.H.P. hour

On account of the poor mechanical efficiency, more attention was now paid to details of design.

First, the piston: The piston rings showed evidence of very uneven bearing, and the cylinder also was found to be out of round. It looked as if the oil between the rings had acted as a seal instead of the rings proper. For this reason full cast-iron rings were resorted to, and this resulted immediately in a much better mechanical efficiency up to 64 per cent instead of 54 per cent, with a resulting better fuel consumption of .72 lbs. per B. H. P. The consumption per I. H. P. showed very little change but was about half what other types of oil engines were able to do.

After this, tests were made with different R. P. M., with the result that it was found necessary to change the size and amount of injection holes for different R. P. M.

Up to now the engine was started from a transmission, and to make it independent, experiments of starting with compressed air were undertaken. These proved very successful, as whenever the valve gear was thrown over from starting into fuel positions, ignition took place. This meant that the engine was ready to be started without long preparation, which is one of the most important items to insure its use as propelling machinery aboard ship.

Following are more tests with a view to improving the mechanical efficiency, and again it is the piston rings that come under special consideration. The experience gained was the foundation for a ring design which, with slight modification, is used today. This also led to further improvement in the mechanical efficiency, which rose to 67.2 per cent with a fuel consumption of .69 lbs. per B. H. P. Under test load conditions it was found that the injection air amounted to one-twentieth of the air taken in by the working cylinder itself.

For further tests the engine was provided with a one-stage compressor driven by a rocker arm as shown in Fig. 16. This shows also the general arrangement of fuel supply, the fuel being pumped by means of a hand pump into a receptacle holding about a gallon. This tank is under injection air pressure, the regulation being done by hand by means of a needle valve on the side of the injection valve as shown in Fig. 11.

During non-stop runs that were now undertaken it was found that there were practically no carbon deposits in the cylinder, only the holes in the burner began to clog up after forty to fifty hours of running; further, that this burner or distributor was good for only a definite amount of revolutions and not more. All other parts stood up very well during these runs.

Then a governor was fitted to automatically take care of the fuel supply according to load conditions. An analysis of the exhaust gases was made showing complete combustion to CO2 under different load conditions. Under fuel load there was still a considerable excess of air, showing that with a better combustion chamber it should be possible to get larger diagrams.

There were some larger diagrams obtained up to approximately 120 lbs. M. I. P., but mostly during the starting period when the cylinder was filled with pure air only, getting immediately smaller as the exhaust gas residue remaining in the cylinder increased. These diagrams show clearly what could be obtained if it were possible to remove the exhaust gases completely from the cylinder. There are some modern designs of Diesel engines, as we may see later, which gave this point due attention with

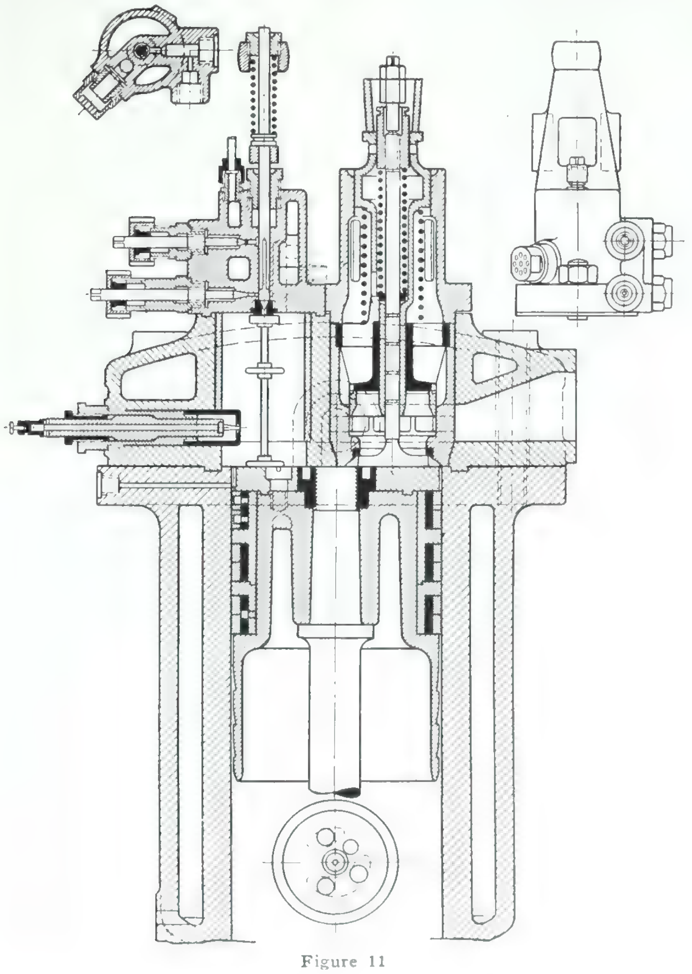


Figure 11

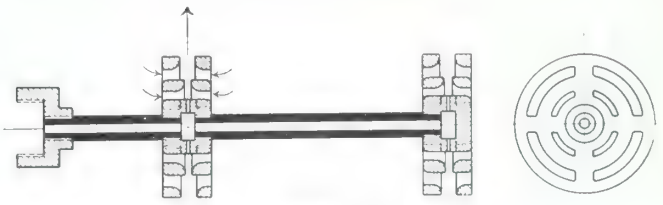


Figure 12

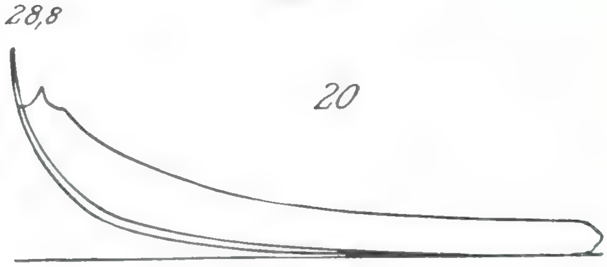


Figure 13

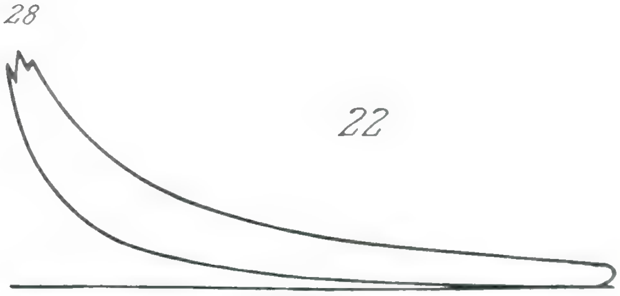


Figure 14

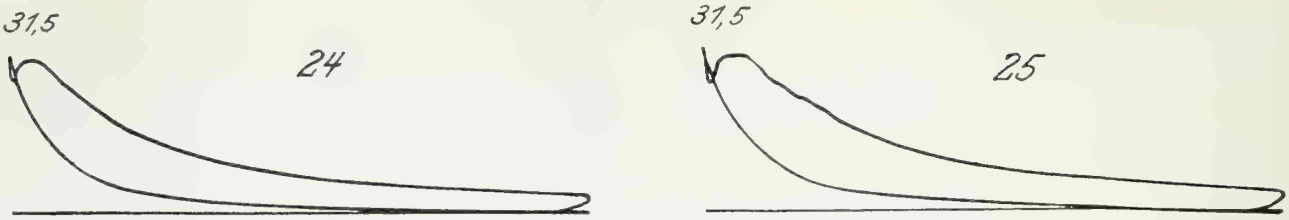


Figure 15

very satisfactory results. In this experimental engine conditions in regard to this were bad on account of the combination of exhaust and admission valve in one valve, and on future designs it was decided to resort to separate valves. The compressor stood up fairly well, but some explosions from lubricating oils took place in the lines, necessitating strong cooling of the air.

After running every day for seventeen consecutive days about eleven hours per day, the engine was considered thoroughly reliable, and further non-stop runs were not considered necessary. The only bad feature on the engine was the burner, which had to be replaced by a clean one every day, a job which required about fifteen minutes' time. For this reason it was decided to find some new design and see if conditions could not be improved. With this in view the nozzles as shown in Figs. 17 and 18 were designed and tried. The advantages expected from these new type nozzles over the former burners were: Burner parts did not extend far into the combustion chamber, thus avoiding the danger of overheating; and a smaller volume between needle valve and nozzle holes, reducing the formation of carbon. After a seventeen-hour run with clear exhaust and good diagram, the nozzle was inspected and about half of the holes found clogged up, which led to the idea of giving special attention to the nozzle area, which up to the present was notably too large. This area, of course, has a large influence on the amount of injection air consumed, and after making special tests to that effect it was found that the use of this nozzle resulted in a saving of injection air of from 50 to 70 per cent.

Tests to use this nozzle in connection with solid injection were an absolute failure, the exhaust being smoky and ignition out of control. More successful were the tests with city gas and the use of these nozzles, the diagrams showing a good combustion line and the gas consumption being below that of the gas engines of that time. For these tests gas alone without any liquid fuels was injected, and they proved that the engine could be used for gaseous fuels just as well as for liquid fuels without any change in construction whatever.

This last period of tests lasted from November, 1894, to September, 1896, practically two years, and furnished the most valuable experiences, which were:

1. Design of a compressor, fuel pump and governor.
2. Waterjacketed working cylinder.
3. Change in design of location of camshaft, putting it closer to cylinder head.
4. Improvements in design of combustion space reducing lost pockets to 10 per cent of compression volume.
5. Studies of the relation of bore to stroke and its influence upon the combustion process on one hand and the difficulties in design on the other.
6. Diagrams. Very good diagrams were obtained by absolutely clear exhaust of 105 lbs. per square inch, mean indicated pressure.
7. The engine can be used for liquid as well as gaseous fuels.
8. Influence of the injection air pressure on the combustion line.
9. Fuel consumption. The fuel consumption per B.H.P. is practically constant from half to full load.
10. The necessity of cooling and dehydrating the injection air.
11. Analyses of the exhaust gases giving important information on the process of combustion.
12. Improvement in details of design, especially with regard to piston and piston rings.
13. Separate arrangement of exhaust and suction valves.
14. Valve gear and cam design.
15. Atomizer and distributor tests, calibrated nozzles.
16. Foundry experience—suitable cast iron mixtures for high pressures and temperatures.

On the basis of these results and conclusions it was decided to work out drawings for a new one-cylinder engine and also a compound engine. The new one-cylinder engine was to be 9¾ inch bore by 15¾ inch stroke, which results in bore to stroke relation of 1.6.

After these drawings were already considerably advanced, a change was worked in by which the lower part of the piston and cylinder was to be utilized as a loading or charging pump; that is, this part was to act as a compressor discharging the air into a receiver from which it was to enter into the combustion side of the cylinder through the admission valve. The reason for this arrangement was to get a large quantity of air into the working cylinder, thus increasing its load capacity.

(To be continued)

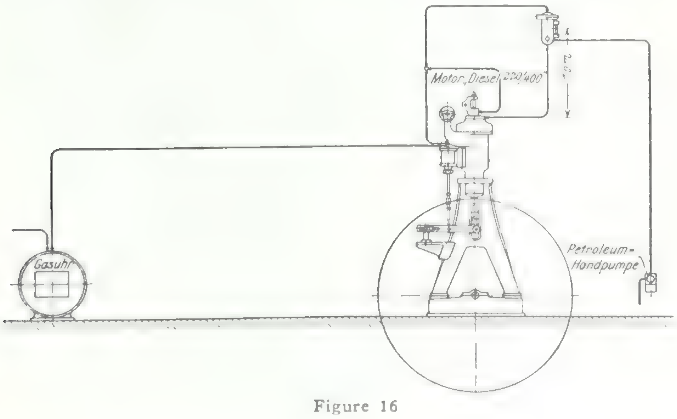
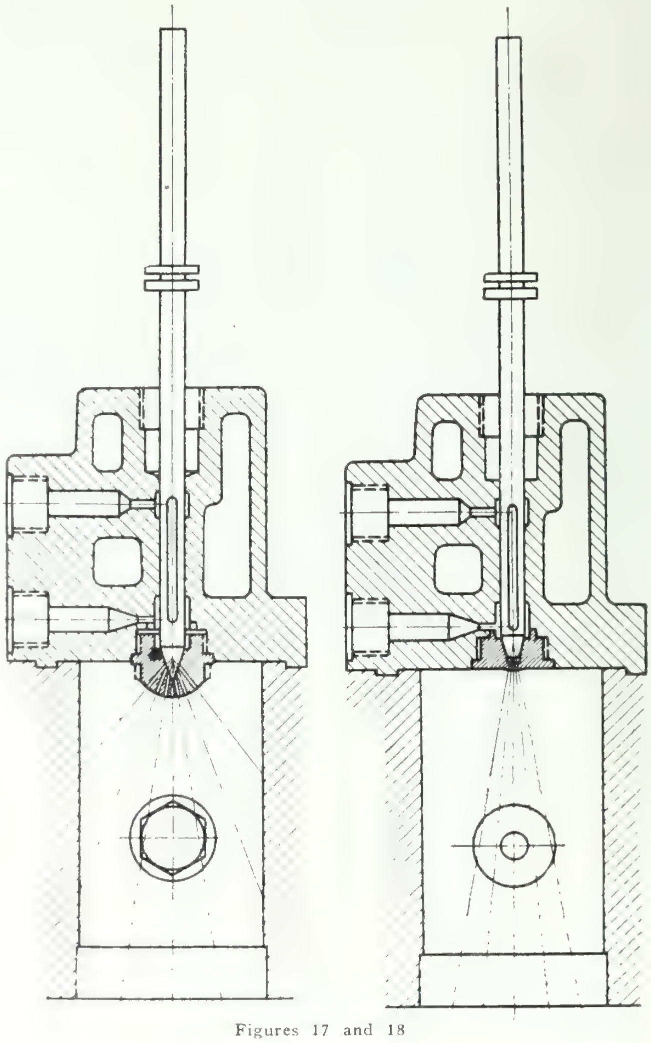


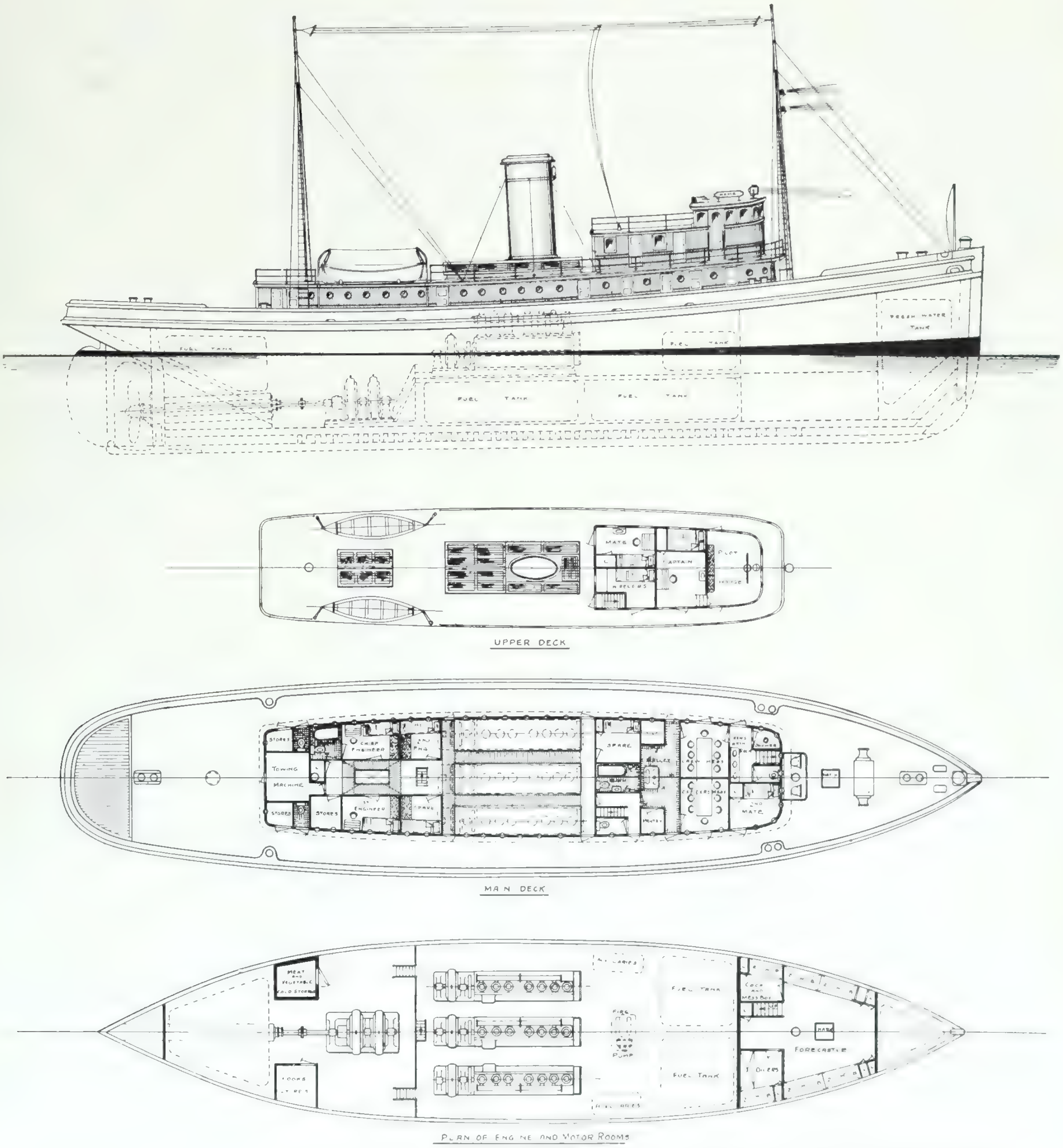
Figure 16



Figures 17 and 18

PROPOSED DIESEL ELECTRIC TUG

By R. Z. DICKIE



Outboard profile and deck plans showing machinery arrangement and accommodations for crew on proposed Diesel electric tug

SEA towing has become so prevalent that, in order to hold a crew on a small boat for several days at a time, it is necessary for the accommodations to be of the best and the boat to have as many desirable characteristics of design as possible and to be serviceable in all kinds of weather.

In the past it has been the practice of sea tow boats to be built of steel and, in order to keep down the first cost, the design was usually of low freeboard, to keep down Lloyd's numeral. In the sketch is shown a wooden tug with a freeboard of five feet at the lowest point of sheer.

This outline design is for a 150-foot sea-going tug equipped with 1000 horsepower electric drive, the power plant consisting of three 350 horsepower Winton Diesel engines directly connected to three generators operating a double armature driving motor at a speed of 120 revolutions when running light, provision being made for altering the field resistance so that the driving motors will exert full power at ninety revolutions a minute when towing.

This power plant is very reliable, as any one of the three engines can be used to operate the driving motor; also the driving motor has two armatures, either one of which can be used independently if necessary.

The anchor windlass, capstan, steering gear, heating and lighting system and galley range are operated electrically, thus giving the crew the opportunity of using the latest electrical appliances.

The towing machine can be of the regulation steam type, operated from the compressed air receivers which have to be fitted to comply with the law.

The crew accommodations have been worked out to make it unnecessary for the crew to go on deck in case of bad weather to get into the mess room or toilets. There are two bath rooms on the tug, one for the deck officers and one for the engineer officers, and a shower for the crew in their wash room, which is in the forward end of the deckhouse.

From an engineer's standpoint, the following table will give the advantages of the Diesel electric drive in a seagoing tug:

	Steam	Diesel
Indicated horsepower	1000	1000
Fuel used for h. p. per hour, pounds	1.182	.45
Fuel used per hour, barrels	3.75	1.4
Fuel used per day, barrels	90	33.6
Lubricating oil used per day, gallons	6	20
Cost fuel oil per barrel	$2.00	$2.25
Cost lubricating oil per gallon	$0.43	$0.29
Cost fuel oil per day, running	$180.00	$75.60
Days in operation	300	300
Fuel used per year (300 days), barrels	27,000	10,080
Cost of fuel for one year (300 days)	$54,000	$22,680
Lubricating oil used per year, gallons	1800	6000
Cost lubricating oil one year (300 days)	$774.00	$1740.00

CREW FOR TUG (Engine Room Only)

	Steam Tug	Diesel E. D.
Chief engineer	$225.00	$225.00
First assistant	175.00	175.00
Second assistant	160.00	160.00
Three oilers	270.00	270.00
Three firemen	270.00	
Total one month	$1100.00	$830.00

Engine room wages for one year	$13,200	$ 9,960
Total cost of fuel oil and lubr. oil	54,774	24,420
Total cost of crew, fuel and lubr. oil	67,974	34,380
Bunker capacity, running full power, 1900 barrels, days	21	56

From an operator's standpoint, the following interesting saving is shown, due to the tug being able to carry enough fuel for a round trip, thus avoiding delay and the extra cost of fuel oil at a distant port:

	Steam	Diesel
Fuel capacity of tug, barrels	1900	1900
Days towing vessel from S. F. to Balboa	18	18
Number barrels used per day, barrels	90	33.6
Cost fuel oil at S. F., per barrel	$2.00	$2.25
Number barrels used, S. F. to Balboa	1620	604.8
Probable delay getting fuel Balboa, days	1	0
Cost of delay at $500 a day	$500.00	0
Cost of fuel at Balboa, per barrel	$3.50	$3.75
Barrels fuel taken at Balboa	1400	0
Barrels used, Balboa to S. F.	1620	604.8
Days towing from Balboa to S. F.	18	18
Cost of fuel for round trip (both tows)	$8580	$2721.60
Days required for round trip	37	36
Cost of fuel and delay, round trip	$9080	$2721.60

It will be seen that the Diesel electric tug does the same towing in one day's less time at a saving of $6358.40. This saving is made in thirty-six days, and, with careful management, we therefore figure that the Diesel electric tug could net her owners $60,000 more in a year than a steam tug doing the same work.

CONSTRUCTION NOTES

William Penn to Cramp's

The motorship William Penn, recently launched by the Pusey & Jones yard, has been sent to Cramp's to have two Burmeister & Wain Diesel engines installed. The engines were purchased of Burmeister & Wain by Edward N. Hurley, formerly chairman of the Shipping Board.

Miniature Tanker Built

A small oil-tanker for the Behring River Coal Company has been launched by E. W. Heath, Seattle. She is of wood; is 65 feet long, 18 feet wide and 6 feet 4 inches deep; and has a cargo capacity of 12,000 gallons, in addition to a bunker capacity of 1500 gallons. She is fitted with two 60-horsepower Enterprise engines. Besides serving as a tanker the vessel will tow coal barges.

Dow Marine Work

Marine work now under way by the Dow Pump & Diesel Engine Company, Oakland, includes two Diesel auxiliaries of 200 indicated horsepower each, for the tanker Chalie Watson, building by the Union Construction Company for the Standard Oil Company of California, and three Diesel auxiliaries, one of 200 horsepower and two of 267, for the Standard Oil motor tanker F. H. Hillman, building by the Moore Shipbuilding Company, Oakland.

Nelseco Pacific Coast Headquarters

The New London Ship & Engine Company, manufacturer of Nelseco Diesel engines, has established Pacific Coast headquarters at San Francisco, with offices in the Exposition Building, 216 Pine Street. Many of the standard sizes will be carried in stock, prompt deliveries thus being assured.

Motorship Casco Delivered

The motorship Casco, equipped with Fairbanks-Morse engines, has been completed and delivered by the Long Beach Shipbuilding Company for the California & Mexico Steamship Company. She will be used in the coasting trade. Her length is 120 feet.

Tugs for Windjammers

Henry G. Seaborn, Seattle, is equipping his fleet of sailing schooners with small gasoline tugs, which will be carried in cradles on the vessels' decks and used for towing in calms at sea and in and out of harbors. The first tug, the Sea Gypsy, was built by the A. W. Carlson Company, Seattle, and was launched fifty-six hours after the keel was laid. She is 24 feet in length, has a beam of seven feet and is equipped with a 15-horsepower Sterling engine. The Sea Gypsy was launched 100 per cent complete; and, immediately after launching, started under her own power, with her cradle in tow, for Ludlow, where the schooner Camano was lying. At Ludlow the cradle was taken on board the schooner, to serve as a berth for the tug when she is not in use. Mr. Carlson recently organized the A. W. Carlson Company and leased the Duwamish yard of the Inter-Ocean Barge & Transport Company for five years. The Sea Gypsy was his first vessel.

Engines for South Sea Vessel

Engines for the Fanning Island schooner Doris Crane, building at the yard of W. F. Stone & Son, Oakland, are being constructed by the Union Gas Engine Company, Oakland. The main engine will be of 150 indicated horsepower; and in addition the Union plant is building a 9-horsepower hoist, an 8-horsepower electric light and pump outfit, and a 5-horsepower refrigerating set. All are kerosene-burners. An 85-horsepower Union kerosene engine has been installed in Atkins, Kroll & Company's schooner Tagua; and kerosene-burning equipment has been placed on the Union engine of the Golden State, owned by the Union Fish Company.

To Honolulu by Gasoline

The gasoline tug Mikioi, built by W. F. Stone & Son, Oakland, for Young Brothers, Ltd., of Honolulu, arrived at Honolulu August 5, eleven days from San Francisco. How the 95-foot vessel behaved on her 2100-mile voyage is told in a letter from J. A. Young to W. F. Stone: "I arrived in the Mikioi all safe and sound on Monday (August 15) at noon. You certainly did turn us out a wonderful seaboat. After we left the dock at San Francisco we struck a gait of about eleven knots an hour until we reached the lightship at 7:02. Coming out of San Francisco we struck a southwest breeze after leaving the Heads in very foggy weather. About 10 o'clock the first night off Point Reyes we ran into northwest winds blowing about forty to fifty miles. Captain Martin decided to turn south and run out of the heavy weather. After two days of northwest wind and abreast of San Pedro we shaped back our course direct for Honolulu and from there on had practically no wind. We were not able even to set our sails, as we were running away from the wind, averaging a speed of about 9.04. The engine behaved very well."

MOTOR SHIPBUILDING IN EUROPE

THE generally accepted idea that Italy is in a state of industrial chaos by no means applies to shipbuilding or, at any rate, to motor shipbuilding. Remarkable progress is being made in that country in the construction of motor vessels and the results of the first three standard ships built by the Ansaldo San Giorgio Company—one of the largest shipbuilding concerns in Europe—have been so successful that a building program has been laid down as comprehensive as that of some of the largest shipowning and shipbuilding concerns in Great Britain. An order has just been placed for a 15,000-ton cargo-carrying ship, which will be built by the Ansaldo Company of Spezia and in which two 2000 b. h. p. oil engines of the two-cycle type, constructed by the same firm, will be installed, giving a speed at sea of approximately eleven knots. The new vessel will be 511 feet 6 inches in length, with a beam of 65 feet 6 inches, and the gross tonnage will be 11,500 tons. Unlike the arrangement adopted in most of the British motorships, the engine room will be arranged right aft, and it is estimated that by the employment of internal combustion motors, instead of steam engines, there will be an additional carrying capacity of about 1000 tons, as compared with a steamer of the same dimensions. Moreover, with the current quotations for coal and oil fuel, the economy in the fuel bill will be extraordinary, since coal now costs from £12 to £14 a ton at Italian ports.

In addition to this large vessel, three more 8000 - ton cargo ships—named, respectively, Ansaldo San Giorgio VII, Ansaldo San Giorgio VIII, and Ansaldo San Giorgio X—are now approaching completion, while a tanker of similar size, Ansaldo San Giorgio IX, is being built; all these ships being for the Societa Nazionale Di Navigazione of Genoa. The object of constructing the tanker is to render the shipowners independent in their transport facilities for the supply of oil, and it is noteworthy that this is a policy which is being carried out by practically all the owners of motorships in Europe. Moreover, some 12,000-ton mixed cargo and passenger vessels are about to be laid down also by the Ansaldo Company, and in all of these ships engines of the same class are to be fitted.

A NEW NORWEGIAN MOTORSHIP

Their main peculiarity lies in a novel system of scavenging, all the scavenging air being admitted through one series of scavenging ports which are controlled by valves located within the scavenging trunk itself, so that no scavenging valves are necessary in the cylinder head. This arrangement, it may be noted, is unlike that adopted in the Sulzer engine, where port scavenging is used, since in the latter there are two rows of scavenging ports, extra air being admitted through controlled valves to the upper ports. The Ansaldo system is undoubtedly simpler, and it is stated that equally good results are obtained as regards fuel consumption.

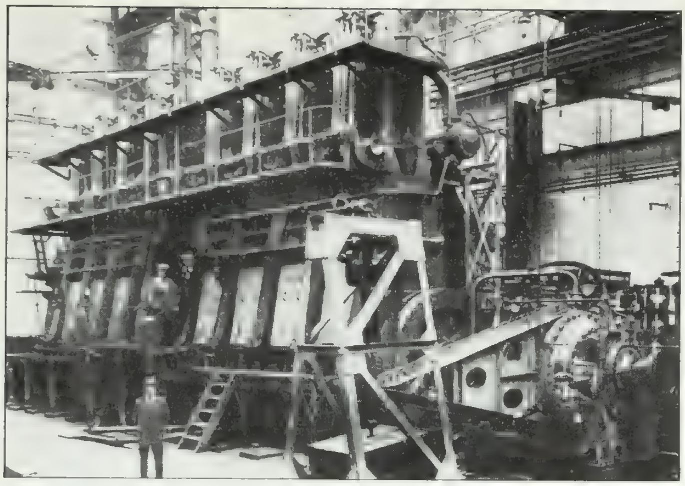
Shipbuilding is at rather a low ebb in Norway, and Norwegian shipowners during the past year or so have placed orders for vessels in other countries. Owing to the drop in freights and the uncertainty regarding the future of shipping, many of these contracts for steamers have been cancelled, and it is stated that in Great Britain alone no fewer than thirty such cancellations have taken place. This does not apply to motorships, however, as the owners realize that, in times of depression, vessels fitted with internal combustion motors are likely to be the most profitable, and within the course of the next few months, several new Norwegian motorships will be put into commission.

One vessel, the Athene, has recently been completed for Salvesen & Company of Kragero, this ship having been built in Holland and fitted with Werkspoor motors. She is 375 feet, with a beam of 51 feet, and carries 6500 tons of cargo on a fuel consumption of about nine tons a day at a speed of eleven knots. She is a twin-screw vessel, equipped with two 1400 i. h. p. Werkspoor four-cycle, six-cylinder motors, and has the usual accommodation for a few passengers. Like all Scandinavian motorships, the auxiliary machinery is electrically operated, and this is becoming almost universal on modern European motorships. Two sister ships are being built for Winge & Company of Christiania, and a third for Otto Thoresen, also of Christiania, for whom the first vessel of the class, the Salerno, was put into commission early this year.

MOTORSHIPS OF 2000 - 3000 TONS

While the tendency among shipowners appears to be to build larger and faster motorships — a good example of which is the standard 14,000-ton 14-knot class of which six are being built on the Clyde for the Glen Line—there is a rapidly increasing demand for motor vessels of from 2000 to 3000 tons deadweight capacity, fitted with motors totaling about 1000 b. h. p. It is with this type of craft that competition between the Diesel and the semi-Diesel motor is entering, and while some of the biggest Diesel manufacturing firms are standardizing sets of about 600 i. h. p. for installation in the smaller class of vessel, at least one hot-bulb engine manufacturing firm is building 500 b. h. p. semi-Diesel engines for the same purpose. A good instance of a semi-Diesel installation in a 3000-ton vessel is given in the motorship Tancarville (owned by the Philippine Vegetable Oil Company), which was originally fitted with steam engines. These were replaced by two 500 b. h. p. Bolinder oil engines, installed at Hongkong, and the operation of the Tancarville on her maiden voyage after

Motorship Theodore Roosevelt, Burmeister & Wain's Latest, on Her Trial Off Copenhagen



One of the Engines of the Motorship Glenogle on the Testing Floor at Harland & Wolff's Shop, Glasgow, 3200 I.H.P., 8-cylinder, 740 mm. Diameter, 1150 mm. Stroke

conversion seemed to show that such machinery is very satisfactory for the purpose. During its maiden voyage from Hongkong to Manila and then on to London, a distance of over 10,000 miles, not the least trouble was experienced, and there were no engine stops in the whole period. The fuel consumption was about 1400 gallons of oil a day, although an extra 600 gallons were used in the boiler for heating the cargo, which consisted of cocoanut oil.

A 1000-H. P. SEMI-DIESEL ENGINE

These 500 b. h. p. Bolinder oil engines are of interesting design, being four-cylinder machines of the usual hot-bulb, crank-chamber, compression type. There is an unusual feature in design, however, comprising the addition of a two-stage air compressor, which supplies air at a pressure of about 150 pounds a square inch to the cylinder, being admitted at the same time as the fuel. With this system, improved combustion is certainly obtained and the arrangement is now standardized on all the larger sets. It is interesting to record that experiments are now being carried out at Bolinder's works in Stockholm on a 1000 b. h. p. semi-Diesel oil engine, and if these prove as successful as anticipated, the hot-bulb motor will compete with the Diesel engine, even for large vessels.

An example of motorships of somewhat similar size, but equipped with Diesel instead of semi-Diesel engines, is given in two mixed cargo and passenger vessels now being built for the British India Steam Navigation Company, which already has three large motor passenger liners under construction. These two boats are 280 feet in length and have a deadweight carrying capacity of 2050 tons, in addition to accommodation for forty-four passengers. They will trade entirely on the East Coast of Africa and not return to Great Britain, so that special attention has to be paid to the design of the machinery in order to render it absolutely free from the possibilities of breakdown. In spite of the low power, twin screws have been adopted, and two 600-horsepower, four-cycle Diesel motors, built by the North British Diesel Engine Works, are to be installed in each vessel. These ships are interesting from several points of view, and especially from the fact that Diesel engine builders who are mainly concentrating upon the manufacture of large oil engines for vessels of 10,000 tons and upwards should also lay themselves out for the manufacture of motors of much smaller size, thus interfering with their standardization, which is so important in Diesel engine construction. The reason for this is that the builders consider there will be a very valuable market for oil engines of 600 to 800 horsepower, which at the present time is catered for by very few marine oil engine manufacturers.

USEFUL TYPE OF STANDARD MOTORSHIP

Reference has already been made to the motorship Theodore Roosevelt, which recently made her maiden voyage from Copenhagen to San Francisco, but a few further details will be of interest, as she is one of the most popular classes of European standard ship, of which perhaps more examples have been built and are on order, than of any other design. She is the first of four or five sister vessels to maintain service between San Francisco and Scandinavia for the Olsen Line. She carries 9400 tons of cargo (equivalent to 525,400 cubic feet of bales, or 567,700 cubic feet of grain), the registered tonnage being 7116 tons. The length over-all is 444 feet 4 inches, the beam 55 feet, and the depth from the awning deck 38 feet 6 inches. Fourteen hundred and twenty-two tons of water ballast are carried, and the fuel oil capacity is 1282 tons, giving a radius of action of 30,000 sea miles.

Two standard 1550 i. h. p., six-cylinder Burmeister & Wain four-cycle engines are installed, giving a speed of eleven knots, the fuel consumption per day being only ten and one-half tons. The engines run at 125 r. p. m. and drive manganese bronze four-bladed propellers 12 feet in diameter with a pitch of 9 feet 3 inches. All the auxiliaries are driven by electricity, and for the supply of electric power there are three 60-kilowatt generating sets direct coupled to Burmeister & Wain Diesel engines. There is the usual small oil-fired donkey boiler of 100 square feet heating surface for heating the ship and also for supplying steam to a small auxiliary steam compressor in case of complete loss of all the compressed air on the ship. It is generally found, however, that this auxiliary compressor is not required, and it may be taken merely as an emergency set.

It is well known that motorships show to special advantage on long voyages, and European shipowners are now alive to the fact that in services between European ports and the West Coast of North and South America through the Panama Canal, a ship fitted with internal combustion engines represents a wonderfully profitable proposition. Following the policy of the Johnson Line of Stockholm and the Societe Nazionale di Navigazione of Genoa, which runs regular services to the West Coast of South America, the Pacific Steam Navigation Company of Liverpool has ordered three motorships, which will trade between Liverpool and various ports on the Pacific Coast of South America through the Panama Canal. The first of these, La Paz, is due to sail on her maiden voyage from Liverpool on October 1, and will be followed very shortly by the two sister vessels, both of which are being built by Harland & Wolff of Belfast, who are rapidly converting their Belfast yard into a motor shipbuilding concern. These vessels will be very similar to a large number of the Glen motor liners, carrying about 10,500 tons of cargo at a speed of 11½ to 12 knots and being equipped with twin-screw machinery of 3600 horsepower. Bearing in mind the cost of coal at the South American ports, and the price of oil fuel at the Panama Canal, which, if not low, is not outrageously exorbitant, it will be readily understood why European shipowners are now concentrating their attention on motor vessels for this service.

British Motorship Dorsetshire, 12,000-ton Deadweight Capacity, Driven by Two 2250 I.H.P. Harland & Wolff Burmeister & Wain Diesel Engines

THE FRANCO TOSI DIESEL ENGINE

DURING the war a number of Franco Tosi full Diesel engines of the marine type have proven themselves to be very reliable and very economical under extraordinarily heavy service. A number of 800 H. P. units of this engine have worked very satisfactorily in naval and merchant service with fuel consumptions not to exceed .40 younds of fuel oil per shaft horsepower hour.

The Franco Tosi engine, as made for all sizes ordinarily used in marine propulsion, is of the four-cycle, cross-head type. The frame is of "A" section and comprises in one piece the column cross-head guide and cylinder jacket wall. This frame is made of ordinary gray iron and of a cross section and weight that insures absolute rigidity. The separate liner forming the cylinder is made in the shape of a plain tubular casting of special close grained iron, and this liner and the frame are assembled in such a way that the former is free to contract and expand in the direction of its length.

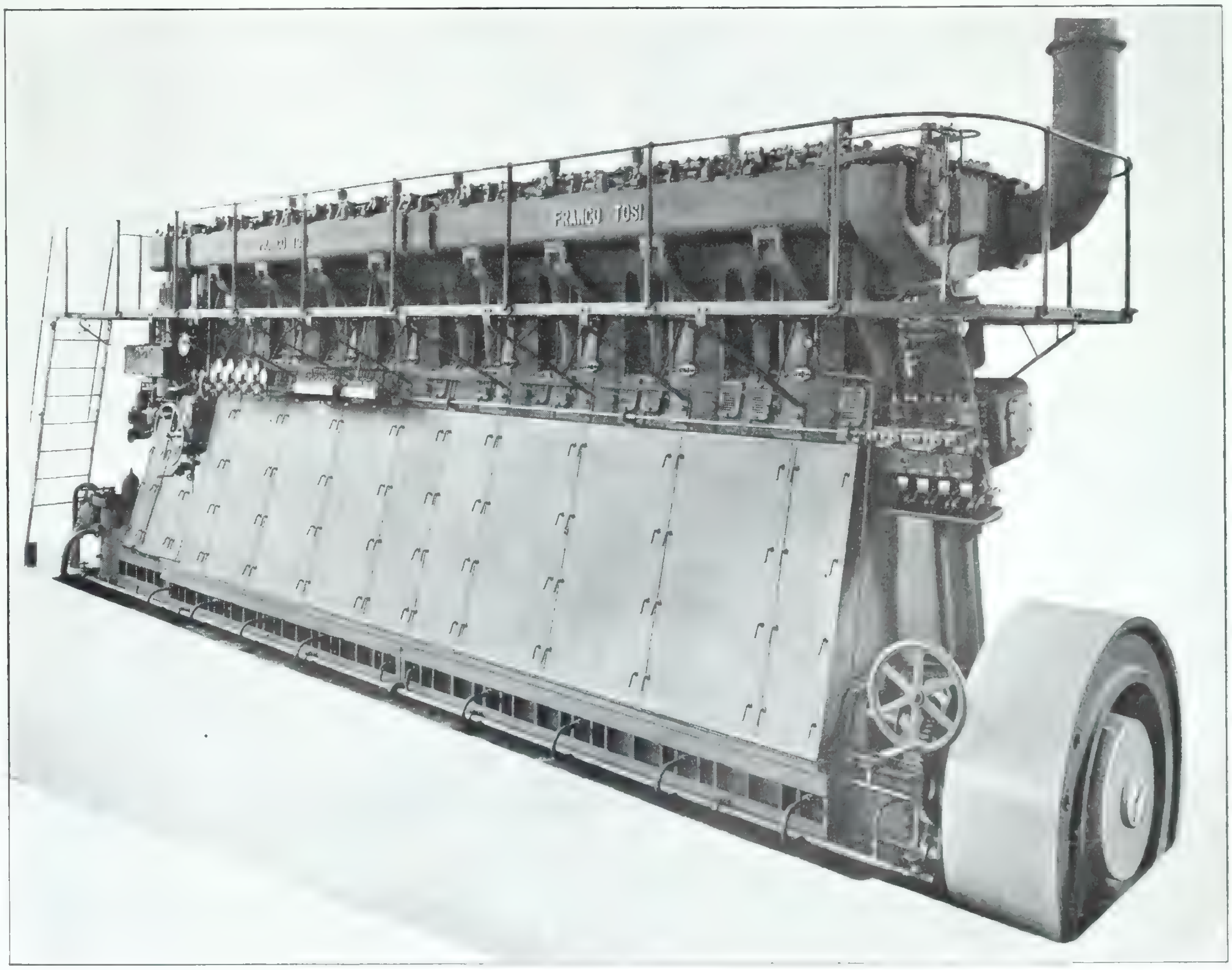
The cross-head guide is circular in form and is bored at the same setting with the cylinder, insuring perfect alignment. This guide is of ample surface to insure minimum wear. All of the bearings in this engine are made of very ample surface proportions, the connecting rod, piston rod, and cross-head pins being heavy enough so that ordinary forgings of mild carbon steel can be used. The pistons are cast of close grained gray cast iron and are water or oil cooled through a special type of telescopic joint tubing.

In the six-cylinder engines the crankshaft is built in two sections and is amply heavy for all marine work, being proportioned to Lloyd's maximum requirements. Each cylinder has its own individual fuel pump, and each fuel pump is under the control of a safety governor which completely cuts out fuel supply to the engine cylinders in case of excessive engine speeds. Each cylinder head contains one injection valve, two exhaust valves, and two admission valves, all of which are arranged in vertical position. The double admission and exhaust valves have sufficient combined area to insure high volumetric efficiency, insuring low maximum temperature and high overload capacity. The camshaft for the operation of these valves is located on the inboard side of the engine on a level with the heads of the cylinders and is driven from the crankshaft through two pairs of helical gears and a vertical shaft which is of ample size to safeguard against vibration and excessive wear. This camshaft is mounted in a housing which encloses also the rocker arms and the reversing shaft. In this housing a constant level of oil is maintained, insuring positive lubrication of the cams, rollers, and fulcrums of the rocker arms.

The air compressor is of the three-stage type built into two cylinders with ninety degree cranks and having their lower ends arranged for double action. The lower side of this compressor is used as a maneuvering motor by the admission of air from the high pressure tanks. Two high pressure air receivers are provided for starting air for each engine and one small high pressure receiver for fuel injection air. All of the valves controlling these receivers, together with the throttle control, reverse control, and the various gauges are assembled in a very compact arrangement within easy convenient reach of the maneuvering stand, and all of the engines for marine purposes are supplied with a complete system of forced lubrication for all bearings, in which system is included coolers and strainers for properly treating the oil before re-use.

As will be seen in the illustration, the design of this engine gives it a very compact and sturdy appearance.

It is manufactured and distributed on the Pacific Coast by the United Engineering Company of San Francisco.



CONCRETE FOR SHIP CONSTRUCTION

A Discussion of Some Problems Brought Out by Experience in the Use of Cement and Concrete in Fixed Marine Works

By A. K. ARMSTRONG

Formerly Assistant to Chief Surveyor, American Bureau of Shipping

ONE of the problems before those who have the shipping interests of the country at heart is the concrete ship. In considering the problem, attention is naturally first turned to the materials employed; and the question of their suitability for the purpose immediately presents itself. This question has come before the writer in a way similar to that in which it would come to those who, while interested in ship construction in general, are not technically informed as to concrete construction.

Owing to the above conditions, the writer's present intention is to state, in general, the questions relative to cement and concrete in marine works, which may have a bearing upon the usefulness of the concrete ship; not from the shipping man's or concrete expert's point of view, but from the viewpoint of one who, while familiar with the shipping man's point of view at first hand, has acquainted himself, through an exhaustive search of the publications on cement and concrete in marine works, with the point of view of cement and concrete experts prior to the initiation of the concrete ship program in the United States. The problems raised may be conveniently classed under two general heads—i. e., chemical disintegration and mechanical disintegration.

CHEMICAL DISINTEGRATION

It is a distinct surprise to those who first approach the subject of concrete construction to find that the possibility of the disintegration of cement products in sea-water is admitted by those who have used and experimented with them. The opinions and conclusions of scientific and practical men, briefly stated, will serve to elucidate this phenomenon as far as is possible.

The Phenomenon of Disintegration.—The nature of the chemical disintegration of cement in sea-water has been the subject of much research; but the results thus obtained often seem to conflict. However, some of the conflicting evidence thus brought out has apparently resulted from the difference in the action of sea-water upon cement in neat form and concrete. To quote a conclusion reached in Technologic Paper 12 of the United States Bureau of Standards:

"All cements resisted disintegration in sea-water better in mortar mixtures than in the form of neat briquettes. In most cases the mortar briquettes had normal strength up to two years' exposure."

It is also probable that the results of laboratory or semi-service tests, in which comparatively small forms are employed, and in which all conditions are under close supervision and control, may vary considerably, or even show a difference in reversal in effect, from those obtained in actual practice. For that reason much attention has to be paid to European scientists and practical men, who are, in some respects, better qualified than our own to speak with authority, due to the longer experience which they have had with concrete in marine structures.

It has been generally agreed upon, however, that the chief cause of the chemical disintegation of cement lies in the decomposition of its active ingredients—lime, the aluminates, and the silicates—when they come into contact with the sulphates of magnesium and sodium contained in sea-water. The resultant reaction is said to be the formation of soluble sulphate of calcium, which brings all the lime present into a state of solution. The calcium sulphate thus formed reacts with calcium aluminate, and produces calcic sulpho-aluminate, whose crystallization gives rise to a swelling and cracking of the material. However, the Bureau of Standards was apparently unable to establish a definite sulphate compound as the cause of disintegration, but concluded that the sulphates in sea-water are taken up by the cement; and that their action is accelerated in the presence of chlorides.

The most soluoble element of the cement is the lime. Even if the cement does not contain free lime, when water free, it is subject to the action of sea-water; since the setting of the cement frees a portion of the combined lime. O'Hara found that over twice as much lime is set free under the action of sea-water, as under that of fresh water.

During the reactions indicated above, magnesia is precipitated from the sea-water in direct proportion to the solubility of the lime of the cement; but the creamy deposit thus formed is said to exert no injurious action upon forms molded before placing in sea-water, even if subsequently absorbed. On the contrary, it seems to serve as a deterrent to disintegration, by filling the pores of the mass.

Apparently, the nature and extent of these reactions bear a relation to the salinity of the sea-water at the place of its contact with the cement. The percentage of salts and the temperature of the Caspian and Black Seas, being higher than those of the seas about Scandinavia, less drastic action by sea-water would be anticipated in the vicinity of Norway, Sweden and Denmark than upon the southern shores of what was originally Russia. It is also to be expected that the abnormal percentage of salts (4 per cent) in the Mediterranean will tend to exert a more intense chemical reaction upon submerged cement than the less saline waters of the North Sea.

Admitting that disintegration is established, the question arises whether the practice of the Norwegians with respect to the composition of cement and concrete for the ships for the North Sea and Baltic trade could be safely followed in American practice for larger vessels intended to ply everywhere under all conditions of salinity and temperature of the sea-water. This would seem of importance in that the writer understands that the methods of the Norwegians with respect to concrete ships have served, more or less, as a basis for American practice.

The situation in the above respects would be further complicated through local conditions, as in the vicinity of large cities or certain types of factories; since it has been found that when an abnormal amount of sulphuric acid is present, as in sewage-laden water, softening of the concrete takes place. This is the result of the reaction of the acid upon a part of the lime in the cement. For the same reason it might be worth while to know whether cargoes of sulphur or nitrate would have any tendency to soften the concrete; and whether the presence of sewage or acid laden waters would require regulation of anchorages for concrete ships.

Besides the widely recognized reactions previously stated, there seem to be others also, which may or may not be less important than that of the sulphates. It has been stated that common salt (sodium chloride), the principal content of sea-water, is able to dissolve calcium silicate, the main factor of final hardening and strength. The Bureau of Standards concluded, however, that "the quantity of chlorine and sodium taken up by the cement is so small that no statement can be made as to the existence of any definite chloride or sodium compound formed with the cement." This does not wholly clear the matter; and if the sodium chloride does dissolve the calcium silicate in the cement, it is apparently the case that the sea-water is thus able to gradually penetrate the mortar and rot the concrete, which is destroyed through lack of cohesion.

The inherent cause of failure has been attributed largely to the presence of alumina and free lime in the cement, although the Bureau of Standards concluded that:

"Contrary to the opinion of many, there is no apparent relation between the chemical composition of a cement and the rapidity with which it reacts with sea-water when brought into intimate contact."

However, since the presence of free lime and alumina is considered by many authorities to be the inherent cause of failure, the method of eliminating these compounds has been the subject of much research; and the data relative to the results of these researches deserve consideration.

THE PREVENTION OF CHEMICAL DISINTEGRATION

Puzzuolana and Trass.—To eliminate the uncertainty due to free lime, it has become the practice, in parts of Europe at least, to add puzzuolanic material and trass to Portland cement mortar; the use of these substances having arisen through studies of the employment of puzzuolana by the Romans. Rebuffat, an engineer, after experimenting with ancient and modern puzzuolanic cements, concluded that, in the first few years after their immersion in sea-water, they undergo a very radical chemical change, which finally renders them indifferent to the chemical action of sea-water. At the end of this period a mortar has lost almost all its lime, and is transformed into a hydrated silicate of aluminum, with traces only of lime, magnesia and other alkalies.

Puzzuolana cement is said by some authorities to never become extremely hard like Portland; but puzzuolana mortars are less brittle than Portland. On the other hand, it is said to be unfit for use where subjected to any degree of mechanical wear, attrition or blows; which would indicate that it is brittle as well as soft. It is also said to be unfit when exposed for long periods to dry air, even after it is well set; since it then disintegrates. This disintegration is attributed to the oxidation of its sulphides. It is further stated that after about twenty years' exposure to the action of the sea, it acquires a consistency similar to that of chalk.

Apparently, the high reputation of puzzuolana cements proper, in the very saline waters of the Mediterranean, is due to their use in heavy construction in a comparatively warm, tideless seas; but the deficiencies above indicated would serve to make them unavailable for use in ship construction. Thus one possible remedy for the inherent causes of failure in marine concrete is apparently eliminated.

Portland-Puzzuolana Cements.—Following the successful employment of puzzuolana in the Mediterranean, it was thought by the addition of puzzuolanic material to Portland cement mortar, prior to exposing the latter to the action of the sea-water, the soluble silica which exists in the former would act beneficially upon the free lime in the latter. These findings were also found to apply to trass, a volcanic scoria found near the Rhine, and similar to the puzzuolana of Italy in its power of conferring hydraulic properties upon unslaked lime. These, and like compounds, are supposed to combine with the free lime of the cement, and form combinations free from the action of sulphates. The hydrate of lime is said to be taken into combination with silica and alumina, and its solution prevented. Stable silicates are supposed to result.

While in Southern Europe the value of puzzuolanic additions to large masses of concrete is not a matter of doubt, the same cannot be said of Northern Europe. While experimented with, and more or less employed in practice, the value of puzzuolanic material in the latter region seems, on the whole, somewhat doubtful—that is, with respect to resistance to disintegration. On the other hand, if increased strength is attained through the addition of trass or puzzuolana, these materials should be worthy of consideration in the design of concrete ships.

Relative to the proportion of these materials which is employed in mortar, the officials of the French Corps of Ponts et Chaussees recommended (1908) two parts of Portland cement to one of puzzuolana by weight. In the Netherlands it seems to be the practice to use either one part of cement to one and one-half parts of sand or one of cement, one-half trass, and three of sand. This is of course in fixed marine works in large masses. The cement and puzzuolana are mixed dry.

An idea of the cost of puzzuolana additions may be gained by the following:

Van Kuffeler, a Netherlander, gives an idea of the cost of a Portland-cement-trass mortar prior to the war. With the proportions just given as Dutch practice, a pure cement mortar cost 50 per cent more than a cement-trass-mortar; so that, in the Netherlands, it is evidently cheaper to use trass mixtures. On the other hand, Baffrey stated (1910) that in the United States puzzuolanic cements would be difficult to obtain, and their expense run high, except on the Pacific Coast. This, however, gives rise to the following thought: if the puzzuolanic or trass additions add strength to the concrete, this would probably permit of a lighter structure, less weight, and more carrying capacity; and hence might permit of a relatively higher price for the puzzuolanic or trass cements.

Iron-Ore Cement.—Iron-ore cement was devised to eliminate the dangers arising from the presence of alumina. The iron is said to be a better flux than the alumina, and will not swell in contact with the sulphate of lime. However, the Bureau of Standards reached the following conclusion: "The quantity of alumina, iron or silica present in the cement does not effect its solubility."

Since other authorities have different opinions, the matter of iron-ore cement requires consideration.

It is manufactured from silicious limestone and iron-ore, or pure limestone and silicious iron-ore. The process used is apparently the same as for Portland cement, except that the clay in the latter is replaced by iron-ore.

The product is said to be a dark-colored cement, of a higher specific gravity than the ordinary Portland, and slightly slower setting. It is said to be constant in volume, containing only about 1.5 per cent of alumina. This low content of alumina is supposed to prevent the formation of calcic sulpho-aluminate.

It is claimed that iron-ore cement, when exposed to sea-water at five times normal strength, under a pressure of fifteen atmospheres, shows no trace of expansion or cracking. Under similar conditions Portland cement is said to be destroyed within a few days. It is also claimed that the mechanical resistance of ferruginous cements is much greater than that of aluminous cements.

With respect to the iron-ore cements, the Bureau of Standards must again be quoted:

"The behavior of iron-ore cements is not different from the other Portland cements, as far as the removal of lime is concerned. Gaines has noted that, while the iron-ore cements might be less readily affected by sulphated waters, yet they are as readily affected by chloride of lime or magnesia as the ordinary cements.

"The results of tests reported . . . . in this paper show that the high iron cements when brought into intimate contact with sea-water and other solutions react just as rapidly as the cements of normal Portland composition."

This, if correct, would serve to indicate that the iron-ore cements also disintegrate; but if they have higher mechanical properties, their use should permit of lighter structural forms and greater carrying capacity.

Iron-ore cements were manufactured, prior to the war, under a patent, by the Krupp Steel Company. They are known as "ore cements (Erz cement)"; and were made at Hemmoor, Germany. In that country they were more expensive than Portlands. The patents probably do not now hold in this country; and it is possible that, if of any value, these cements could be made here. The same reasoning with respect to the cost of concrete ship construction would hold as for puzzuolana and trass above.

MECHANICAL DISINTEGRATION

Crystallization of Salts.—Quoting the Bureau of Standards again:

"Portland cement mortar, or concrete, if porous, can be disintegrated by the mechanical forces exerted by the crystallization of almost any salt in its pores, if a sufficient amount of it is permitted to accumulate, and a rapid formation of crystals is brought about by drying; and as large crystals are formed by slow crystallization, there would be obtained the same results on a larger scale, but in a greater time if slow drying were had."

These conclusions are stated as applying primarily to conditions in the alkali regions of the West, ratner than to sea-water. If, however, crystallization can take place it might be important in a concrete ship above light water line, or at least above the deep-load line, where alternate wetting and drying of the surface can take place. It would seem that in a concrete ship the density of a concrete is not altogether assured; but this will be considered later.

Tides.—According to replies received by the Superintendents of Bridges and Buildings Association (1907), in answer to a circular letter, the rise and fall of the tide has a tendency to disintegrate concrete. This disintegration is said to occur even in warm weather. The mechanical action of the waves, and the abrasion of fine sand in the water, is supposed to have a tendency to prevent the deposition of any reaction products; with the stated result that concrete structures in seas subject to tide suffer more than those in bodies of water at a constant, or nearly consant, level. Above the water line, where disintegration is said to be greatest, the water comes into contact by capillarity alone; and the abrasive action of the tides cannot therefore be the cause.

If, in any case, the action of the tides is detrimental, the question arises as to how great an extent the concrete ship will be affected, since the alternation of the loaded and unloaded condition would give a similar effect, but at longer intervals; while the ordinary pitching and rolling would give a similar effect at much shorter intervals than those between the tides. Any effect would be greatly accentuated by the greater relative motion between the water and the ship than in the case of fixed structures.

Freezing and Thawing.—Alternate freezing and thawing in the tidal range are apparently large factors in the destruction of concrete in cold countries. The water enters the concrete at high tide, and freezes when the tide recedes. Freezing water expands, and this action loosens the surface of the concrete. When the concrete is again submerged the ice thaws, and a new supply of water enters the enlarged pores and works deeper into the structure. Such is the theory.

Actually, the destructive action of freezing and thawing in the inter-tidal space is apparently well attested in this country (from New York northwardly along the Atlantic Coast), and on the Danish Coast. It has also apparently been found that any mechanical breaking down of the surface tends to allow the freer action of destructive chemical factors within the cement.

Here, again, the vessel in the alternate loaded and unloaded condition would have a large area subject to the above conditions; and above the deep-load line would have the condition accentuated through the action of the waves alternately wetting and drying the surface. The upper structure at the bow, and the decks, would, under the pounding action of the sea, in heavy freezing weather, be subject to this action in an acute degree.

Corrosion of Reinforcing Bars.—A great difference of opinion seems to prevail as to the depth at which reinforcing bars should be set in concrete to prevent their corrosion, and the consequent failure of the mass through their expansion. According to Wig, however, the result of two years' experimentation at Atlantic City, New Jersey, showed that even if the metal was covered by not more than one-quarter of an inch of mortar, it remained in a perfect state of preservation, although the sea-water might have completely penetrated through the concrete. However, the Bureau of Standards, on the basis of the same experiments, concludes: "Metal reinforcement is not subject to corrosion if imbedded to a depth of two inches or more from the surface of well-made concrete."

In Holland a minimum distance of two centermeters, or about seven-eighths inch, from the surface is specified for reinforcing rods; and in Italy it is considered good practice to coat the reinforcing bars with cement, applied just as the concrete is put into the molds.

The point is that if two inches of mortar is required to prevent corrosion of the bars, what will happen where they are protected only by one-half inch, which, so far as is known, is what is being done in the concrete ships building in this country. It is probably not possible to set the rods in any further in the thin shells and deck of the concrete ship, in which the proportion of iron is apparently much higher than in ordinary reinforced concrete land structures. The question then arises as to whether, if the minimum required depth is not held, any steps are being taken to prevent corrosion, and if these steps have been demonstrated to be satisfactory.

Light Construction.—In Europe it seems to be the practice to employ concrete for marine works in the form of blocks of the largest practicable dimensions. The use of lighter structures of reinforced concrete is apparently the exception. Carey considers in effect that when a reinforced concrete pier is damaged by a striking ship, it is difficult to determine the extent of such damage, and rather hard to be sure that it is satisfactorily remedied. Hence, it arises that claims for damages of that nature are often exceedingly heavy.

It seems apparent to anyone who examines a reinforced concrete structure that any damage causing fracture at any place is likely to make its effect felt well into the surrounding structure without being visually apparent in distant parts. While this may not be so vital in fixed structures, it is of great importance in ship operation; since any vessel may be ordinarily exposed, many times in a year, to accidents resulting in fracture of the hull. If any weakening results, which is not apparent, it is likely to cause the loss of the ship due to its further development under the many and great stresses to which sea-going craft are subjected.

MIXTURES FOR MARINE CONSTRUCTION

So far several apparent deficiencies in the material and structure of reinforced concrete have been pointed out; but no satisfactory means of overcoming them seem to have been advanced in the preceding paragraphs. It remains to be considered what various authorities otherwise advocate as to the proper methods of preparing and using the material to give the best service. The applicability of these methods to ship construction will, at times, be brought into question.

Quality of Cement.—Unless a cement has inherent qualities that enable it to resist the disintegrating action of sea-water, the greatest precaution, in a mechanical way, will scarcely save it from chemical decomposition. Quoting the Bureau of Standards:

"The physical qualities of the cement, which depend essentially upon the method of manufacture, would seem to determine its resistance to decomposition when brought into intimate contact with the sulphate and chloride solutions."

According to some authorities, a cement suitable for sea-water work should be rich in silica, and as poor as possible in alumina; it should not contain lime in an unslaked condition; should be ground as fine as possible; and contain less than one per cent of sulphuric anhydride, and less than two per cent of magnesia. The latter substance in the cement is said to be inert.

If the above requirements are essential, the question arises as to whether they are, or can be, met in reinforced concrete ship construction.

Kind of Cement.—According to the Bureau of Standards: "Properly made Portland cement concrete, when totally immersed, is apparently not subject to decomposition by the chemical action of sea-water."

Leaving aside the question as to what is meant by properly made Portland cement concrete for marine works, and the conclusion (based on semi-practical tests under one set of conditions) that such concrete is not subject to decomposition, it is apparently the case that a slow-setting Portland cement of a certain quality is better for marine work than a natural cement or hydraulic lime.

Apparently, however, some hydraulic limes, namely, those of Teil, have given better results in the Mediterranean ports than Portland cement. This is attributed to the fact that blocks of Teil lime are allowed to harden a long time in the air before immersion, whereas Portland cement in similar structures is generally exposed to the action of sea-water at once. Teil lime acquired a great reputation in the French Mediterranean ports; but on the Danish coast, a ten-year test indicated that in those less saline and colder waters it was subject to great chemical variations.

It must be granted that of the pure cements, Portland is apparently the best for ship construction. Here, again, the question arises as to what particular properties, other than those called for in ordinary marine work, are, or should be, required for the service expected of the thin shells of the concrete ship.

Sand.—Candlot concluded that a relatively poor mortar, made with a coarse sand, was to be preferred to a rich one made with a fine sand. It was stated that the practical difficulty of obtaining thoroughly uniform mixtures is greater as the sand becomes finer; since the voids between the grains, being smaller, are harder to fill with powdered cement. Some engineers, however, apparently prefer a mortar made with mixed sand of different degrees of fineness, the greater portion of which is fine sand.

There is evidently a best grade of sand—whether coarse, fine or mixed—and the question arises whether the best grade has been demonstrated and put to use. This would be an important point in the relatively thin shell of the concrete ship, whose requirements might be far different from those of other structures.

Proportions.—According to Baffrey, nearly all the important sea-works of England and France, constructed in recent years, are of a very rich mixture — generally about 1:1½:3. Candlot concluded that the most resistant mortars are those made of one part of cement to two parts of sand. Poulsen considered that, in Danish practice, the 1:3 mixtures were too poor for use in normal sea-water (3.5 per cent salt), but that weaker mixtures might be used in the less saline waters of the Baltic Sea, if protected from frost. Kuffeler considered, as already mentioned, that a safe rule for maritime structures in the Netherlands was to specify mixtures of not less than one part of cement to one and one-half parts of sand, or one cement, one-half trass and three sand. Luiggi recommends a quantity of cement much greater than that which is necessary to fill the voids in the aggregate, and which should be increased in proportion to the diminution of the size of the grains of sand employed. Lombard and Deforge concluded that the proportion of cement should not be less than 500 kilos per meter of sand, a proportion of 600 kilos being the best from all points of view. Voisin recommended that whatever mixture was used, it should be made richer in the submerged portion of the work.

The question arises whether the above requirements for fixed structures for European conditions would be sufficient for the shells of the concrete ships; and whether it has been determined by any direct data or approximation which proportions could be considered best for the above mentioned shells.

Kind of Water for Gauging.—In gauging the mortar it seems to be generally considered that the use of sea-water in work to be submerged in the same element is detrimental to concrete; but some authorities do not believe that it is harmful to use sea-water in mixing concrete to be employed in those portions of a structure which are to be exposed to the air only.

If sea-water has any detrimental effect on mortar it seems evident that it should not be used to gauge any mixture intended for any purpose.

Impermeability.—The penetration of marine salts into the interior of the mass of concrete evidently should be prevented. It is considered, by some authorities at least, that sea-water penetrates in two ways. A mortar which, under a head of water, does not allow the latter to pass through it, is normally impermeable; but it may, nevertheless, be moistened by capillarity. There is then said to be a diffusion of the salts in the mortar towards the outside, and of the salts in the external water towards the interior of the mass.

Impermeability to diffusion may, according to Bied, be obtained by adding to the mortar, at the time of mixing, barium aluminate, which is transformed into barium sulphate—a precipitate which is supposed to close the capillary pores. However, the Bureau of Standards experimented with both barium chloride and barium carbonate for the same purpose; but although the sulphate was formed, no success in preventing the diffsion of sea-water into the cement was attained. Other compounds, attempting the impermeability of concrete, have been recommended by others, but, so far as is known, no definite good has been done by any of them.

The general conclusions with respect to impermeability stated by the Bureau of Standards are as follows:

"It is not yet possible to state whether the resistance of cements to chemical disintegration by sea-water is due to the superficial formation of an impervious skin or coating, which is subsequently assisted by the deposition of shells and moss in forming a protective coating; or by the chemical reaction of sea-salts with the cement forming a stable compound without disintegration of the concrete, or by a combination of both of these phenomena."

On a ship's bottom the assistance of a deposition of shells and moss is out of the question, due to the retardation of speed which they would cause. The conclusions reached apparently do not cover the formation of an impervious skin in any or all cases; nor is anything stated as to the particular steps necessary to obtain this desirable factor. So far as the reaction of sea-salts forming a stable compound is concerned, it is a conclusion based on one series of semi-laboratory tests against the conclusions reached by practically all other investigators who have dealt with both laboratory tests and practical experience. For that reason the disintegration of concrete in sea-water cannot be perfunctorily dismissed.

It is considered by some authorities that the best practicable assurance of retarding disintegration lies in ramming the mortar into the molds to produce the densest possible mass; especial pains being taken to secure this mechanical density in the outer layers. How this is to be done in the thin shells forming the concrete ship, with their high proportion of reinforcing, is not understandable, since from all appearances it seems absolutely impracticable. In this connection it should be pointed out that proper ramming likewise increases greatly the compressive strength of concrete.

The authorities last referred to recommend the coating of the whole structure with pure cement prior to immersion; and, in France, one or two coatings of tar are also applied. Just how coating the structure with pure cement would help matters is not evident, if the findings of the Bureau of Standards with respect to the lower resistance of pure cement as compared to mortar are considered. Furthermore, it is not certain that the coating of coal tar, if effective, could be used on a vessel; since an anti-fouling paint of some kind would have to be used, and this would probably be adversely affected by coal-tar, which, so far as is known, is not anti-fouling.

On the whole, it appears that in the case of the concrete ship, the matter of impermeability to diffusion must largely be left to chance, unless a satisfactory external coating is demonstrated, which will not effect any anti-fouling coating and which can be periodically renewed.

Seasoning.—It is considered desirable that all concrete intended for marine work be mixed in contact with the air, and allowed to season for a considerable period in either moist air or sand. In this way, according to some authorities, it attains its maximum strength, and acquires a skin of carbonate of lime which, being insoluble, aids in preventing the action of marine salts. This skin, however, is said to be extremely thin, and, unless great care is exercised in handling the seasoned product, may be broken.

It seems impracticable to comply with any of the above requirements in the case of the concrete ship. In this country the vessels are practically certain to be built under conditions of humidity which are normally lower than those of coastal Europe; and, so far as a ship is concerned, the skin referred to may be broken before the ship leaves the ways—it certainly will afterwards.

So far as strength is concerned, it has been found apparently that concrete made in a mold and placed in sea-water immediately after setting, will, in a comparatively short time, attain the same strength as though allowed to set and age for a period before immersing. These are results of semi-laboratory tests; and the effect of either method upon the ultimate strength of the concrete was apparently not ascertained. It is to be noted, however, that practically all authorities advocate the seasoning of concrete before immersion; and those who assent to its use under certain conditions without seasoning recommend the proportioning of richer mixtures.

Placing in Sea-Water.—In connection with the last paragraph in the preceding section, the following statement of the Bureau of Standards is of interest:

"Marine construction, in so far as the concrete placed below the surface of the water is concerned, would appear to be a problem of method rather than materials, as the concrete sets and permanently hardens as satisfactorily in sea-water as in fresh water or in the atmosphere, if it can be placed in the forms without undue exposure to the sea-water while being deposited."

Since a vessel might sometimes be subjected to underwater repairs while afloat, the following data need consideration:

According to Technologic Paper No. 12 of the United States Bureau of Standards, concrete dumped through sea-water from the top of the form was mechanically separated into its constituents of cement, sand and stone; and, in this manner, settled in separate layers. The writer has seen the results of this method of depositing concrete, at a large railroad pier on the Pacific Coast, which was supported by wood piles protected with a jacket of concrete. These jackets were entirely unsatisfactory, having to be repaired almost continuously at great expense by the same method, although the concrete was dropped not more than two feet.

According to Wig, in depositing concrete in this way its magnesia was precipitated and deposited between the particles of the stone and sand; thus destroying all of the bonding value of the cement. In dumping from a bucket brought to the bottom of the form, the mechanical separation was almost entirely overcome; but over the exposed surface of each bucketful, after emptying, magnesia was deposited; which affected the bond between it and the succeeding bucketful. By depositing the concrete through a tremie, or pipe, more satisfactory results were obtained; and when the molds were removed from a test-piece made in this way, the concrete presented a good surface. Upon testing a specimen, however, it developed only one-third to one-fourth the strength of similar concrete placed in dry forms, even though, in the latter case, the sea-water was permitted to cover the concrete immediately after it was placed.

All of the above would seem to show that repairs to a concrete ship while afloat could not be made with cement or concrete below the light-water line.

Protection After Placing.—It is considered indispensable in European practice to fender the faces of all exposed marine concrete with elm or similar hardwoods, to prevent the abrasion of the surfaces by striking objects. Evidently, from what has gone before relative to keeping the thin surface skin of seasoned concrete intact, the concrete ship should be well fendered; although it is likely that it would be impracticable to provide entirely adequate fendering.

CONCLUSION

Having given a general resumé of the opinions of authorities as to concrete and the placing of concrete in fixed marine works, the writer has endeavored to raise the questions which these opinions might bring forth with respect to concrete ships. There are evidently several unknown quantities relative to the materials composing ships of this kind, upon which their ultimate value to the shipping world may depend. Like all other good things, the concrete ship can only be developed to an economical security by actual trial; but until the problems raised by the materials are fully solved (and, perhaps, those of design also), it would probably be better to follow the example of our canny European competitors, and develop gradually into the concrete ocean-carrier of large capacity, rather than by leaping by thousands of tons from one size to a greater, before the smaller size vessel has been able to demonstrate, at least partially, her economic value.

MARINE GEARED TURBINES

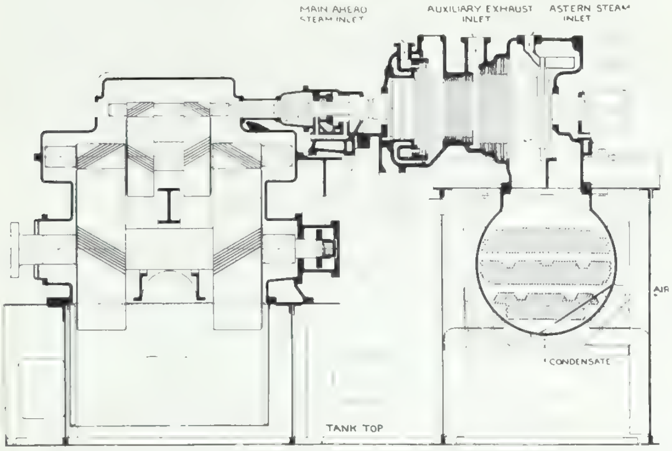
Some Types Thereof and Their Applications in Merchant Service

By WILLIAM H. EASTON
Westinghouse Electric & Manufacturing Company

ONE of the important advantages of the marine geared turbine is its adaptability to a wide range of services. Both the turbine and the gear can be built in several different types, each of which has its own special characteristics; and therefore, by selecting the proper combination of turbine and gear, the naval architect can obtain a unit that will exactly suit the needs of a given ship. Since everything that influences the all-around operating efficiency of a ship is of importance to shipping men, the following brief account of the different types of turbines and gears used in merchant vessels may prove of interest.

TYPES OF TURBINES

The steam turbine is a very simple piece of mechanism and consists essentially of only two main parts—the rotor, which revolves, and the casing, which is stationary. Its principle of operation is likewise simple, being the same as that of a child's paper pin-wheel or of the familiar rotary lawn sprinkler. Steam from the boiler is admitted at one end of the casing, and, acting on blades or vanes mounted on the rotor, causes the latter to turn, and thus produce power. In small turbines, the rotor is simply a flat disc with blades around the edge; but in large turbines, the rotor consists of a drum with a number of circular rows of blades, and the steam is guided from one row to the next by blades or nozzles mounted on the casing. As the steam progresses through the turbine, its pressure decreases and its volume increases until it is finally discharged into the condenser at a pressure that may be as low as twenty-nine inches' vacuum and at a volume that may be several hundred times greater than its initial volume.

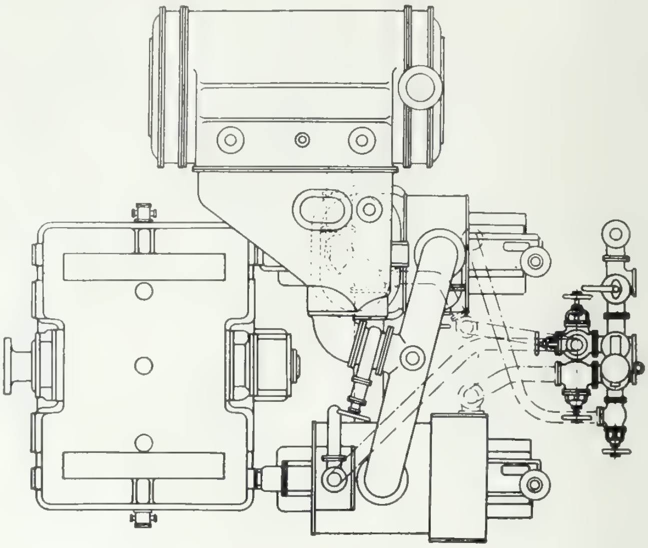


Sectional Elevation of 1500 H.P. Single Expansion Turbine Mounted on Top of Condenser and Connected to Propeller Shaft by Double Reduction Gear

Actually two different principles, both used in turbines, are illustrated above. In the impulse (or "pin-wheel") turbine, the steam blows against vanes on the rotor and turns it in the same direction as it (the steam) is traveling. In the reaction (or "lawn-sprinkler") turbine, the steam is forced out from between blades on the rotor and turns it in the reverse direction by reaction. The two are combined in the "impulse-reaction" turbine, in which the blades first struck by the steam are of the impulse type, while the remainder are of the reaction type. This last design retains the excellent features of the reaction type, but reduces the length of the turbine by replacing with two rows of impulse blades many rows of the less efficient reaction blades. All of the turbines mentioned in this article are of the impulse-reaction type.

The turbines that are generally in use for the propulsion of sea-going merchant vessels may be divided into three classes:

1. Complete-expansion turbines.
2. Cross-compound turbines.
3. Divided-flow turbines.



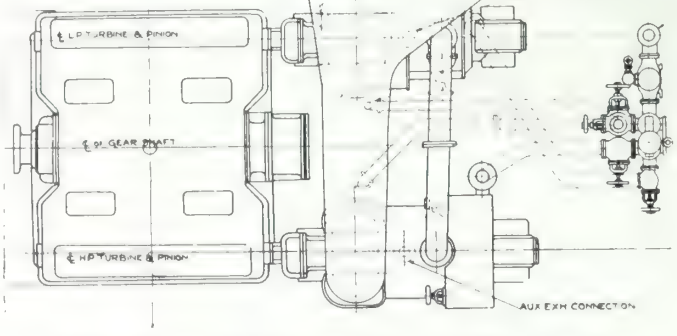
Outline Plan of Cross-Compound Turbine, Condenser and Gears

Complete Expansion Turbines: This name is given to that type in which the steam is expanded over its entire range, from boiler pressure to condenser vacuum, within a single unit casing. It is the simplest type of turbine and, together with the reduction gear necessary for connection to a screw propeller, forms a very compact unit. It is not, however, the best type for single-screw ships, because, if it is put out of commission for any reason, the ship is rendered helpless. This possibility is avoided on multiple-screw ships, where each propeller is driven by a separate turbine; but though this arrangement is favored for certain large naval ships, it is not regarded as suitable for the ordinary cargo vessel, because its fuel economy is not as good as that of other forms of turbine drive.

A reversing turbine for astern operation is mounted in the exhaust chamber of the main turbine, where it revolves in a vacuum when the ship is being driven ahead.

Cross-Compound Turbine: The cross-compound turbine, in its simplest form, consists of two separate units—the high-pressure unit and the low-pressure unit. The steam from the boiler enters the high-pressure unit and undergoes here about half of its expansion; it then passes over to the low-pressure unit, at a pressure slightly above atmospheric, and is completely expanded and exhausted into the condenser.

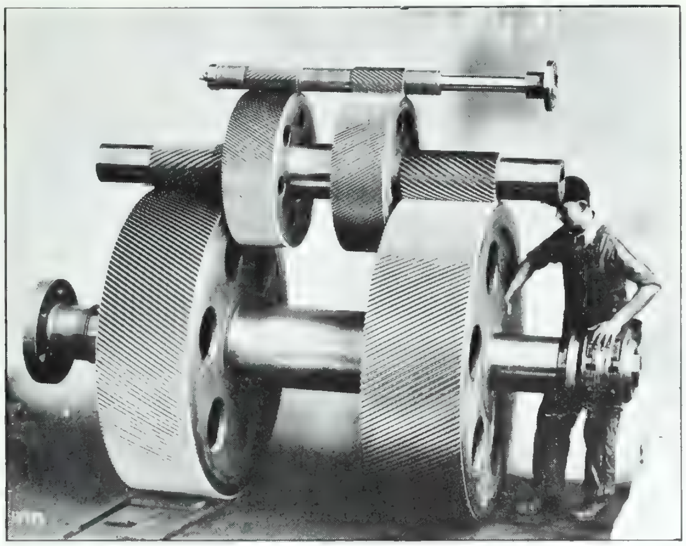
By thus dividing the expansion of the steam between two units, instead of doing it all in one, a higher operating efficiency can be obtained; the length of the units between bearings is reduced; and, more especially, since either unit



Outline Plan of Divided-flow Turbine, Condenser and Gears can be operated independently (the high-pressure unit exhausting into the condenser, or the low-pressure unit receiving steam from the boiler), the failure of a unit does not cripple the ship, which can still proceed, though, of course, at reduced speed and poor fuel economy.

Hence the cross-compound turbine is generally preferred over the single-expansion turbine for the ordinary cargo vessel that regularly runs at its maximum speed, its higher first cost being more than counter-balanced by its better economy and its greater reliability.

In the single-screw vessel, both units of a cross-compound turbine drive the propeller through a single gear with two pinions, one for each unit. In twin-screw vessels, each propeller can be separately driven by a turbine unit, or (which is the usual practice for large vessels) two compound turbines can be used, with two units to each propeller. In triple-screw vessels, the high-pressure unit can drive the center propeller, while the low-pressure units, each taking half of the steam from the high-pressure unit, drive the wing propellers. In this case, all three units are designed for equal power outputs and for independent operation.



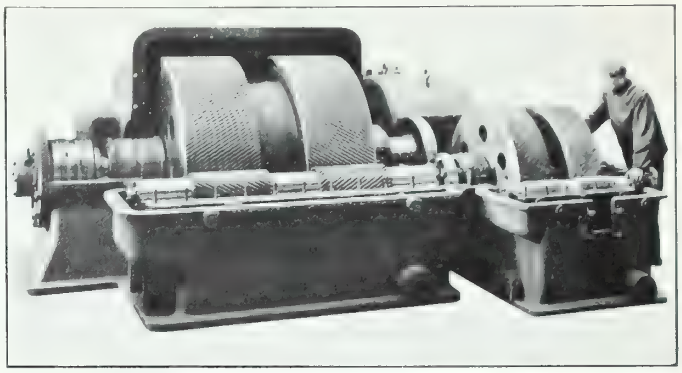
Helical Pinion and Gears of a Double-reduction Gear Set Removed from Casing

Astern turbines are incorporated in each unit of a cross-compound turbine and are compounded and can be operated independently like the main turbines. The astern turbine in the low-pressure unit operates in the exhaust chamber; but that in the high-pressure unit must be placed in a special compartment where it is not exposed to the comparatively high pressure of the exhaust from this unit.

Divided-Flow Turbines: The divided-flow turbine resembles the cross-compound turbine in consisting of two separate units, but the course of the steam through it is entirely different.

The steam enters the high-pressure unit and passes through a few high-pressure blades. It then divides, while still at a comparatively high pressure, into two nearly equal parts, one of which continues through the high-pressure unit into the condenser; while the other part goes over to the low-pressure unit, and, passing through it, goes likewise into the condenser. Therefore both units are practically of the complete expansion type and differ only in that the high-pressure unit has a somewhat larger number of high-pressure stages than the low-pressure unit.

The efficiency of this type of turbine is, for reasons previously discussed, usually somewhat less than that of a corresponding cross-compound machine, but it possesses the special advantage of being able to provide a low speed economically by shutting down the low-pressure unit and using the high-pressure unit only. It is therefore especially adapted to naval service, where high speeds are wanted for battle purposes and low speeds for ordinary cruising, but it also finds some application in the merchant machine. In addition, because of certain technical factors of design, divided-flow machines of a limited range of capacities and speeds are more satisfactory from a mechanical standpoint and are more efficient than cross-compound machines of the same ratings. Hence this type is sometimes recommended for merchant vessels that are not expected to use low speeds to any great extent.



Double-reduction Two Pinion Triple-case Gear

The astern turbines are located in the exhaust chambers of both units. As they are not compounded, they do not operate at the same efficiency as those of a cross-compound turbine, but, on the other hand, no special chamber is required for the astern turbine of the high-pressure unit.

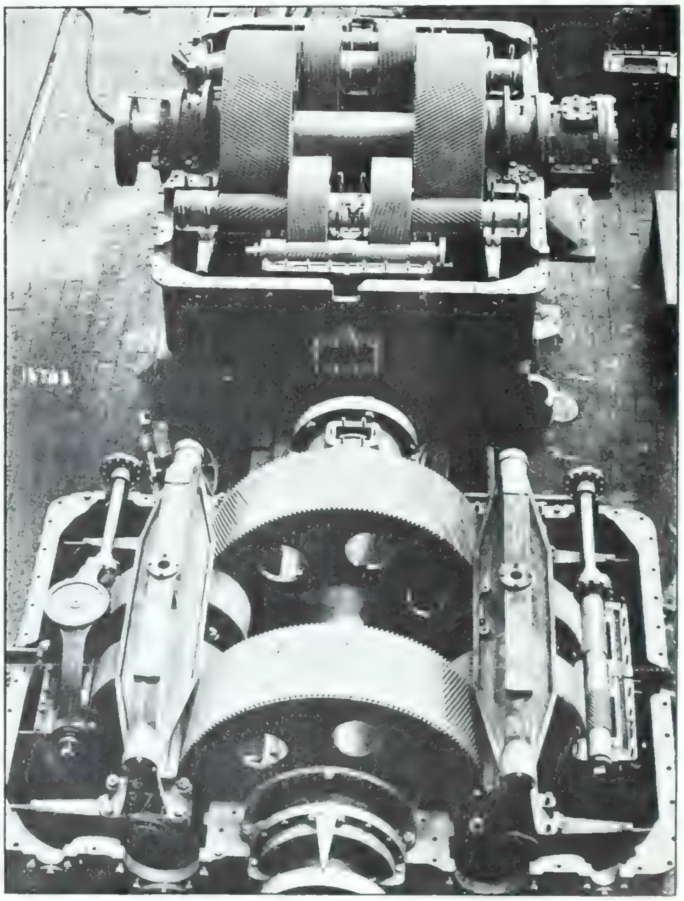
The gear drives of the divided-flow turbine are the same as those of the cross-compound.

Cruising Turbines: As has been indicated, neither the complete-expansion turbine nor the cross-compound turbine can produce low speeds economically. Hence, when low speeds are needed, small auxiliary cruising turbines are used. These cruising turbines are either incorporated in the casings of the main turbines, where they operate in special chambers, or they are entirely separate and are connected to their propellers by means of clutches. The latter arrangement is somewhat more economical than the other. Cruising turbines are, however, rarely used in merchant service, although they are generally found on naval vessels.

TYPES OF GEARS

The gears, by means of which the high turbine speeds are reduced to the low speeds required by the propellers, can be divided into several classes, depending upon the number of pinions, number of reductions, number of cases containing the mechanism, and method of supporting the pinion.

Single and Multiple Pinion Gears: When the propeller is driven by a single turbine (either a complete-expansion machine or a unit of a multiple-unit machine), a gear with a single pinion is used. When the propeller is driven by more than one turbine unit, a gear with a pinion for each



Double-reduction Two Pinion Single-case Gear unit is necessary. Usually the number of pinions per gear is limited to two, but there are cases where four pinions are used to drive a single gear.

Single-Reduction Gears vs. Double-Reduction Gears: One of the most important differences in gears depends upon whether the turbine speed is reduced to the propeller speed in one step or in two. In the first case, the gear mechanism consists essentially of the high-speed pinion and the gear wheel; in the second case, the high-speed pinion connected to the turbine drives an intermediate gear, on the shaft of which is an intermediate pinion, which in turn drives the main slow-speed gear.

The single-reduction gear is obviously the simpler of the two, but its use is limited by the fact that the present manufacturing limits for gears of the size needed for ship propulsion are: maximum diameter of gear, 160 inches; minimum diameter of pinion, 8 inches; which gives a ratio of reduction of 20 to 1. Therefore, if the turbine speed is less than twenty times as great as the propeller speed, a single-reduction gear can be used, but for larger ratios a double-reduction gear is necessary.

The most satisfactory speed for a turbine of the size to drive a ship lies between 3000 to 4000 r. p. m., and if the speed of the ship's propeller is from 200 to 500 r. p. m. (as is the case with high-speed vessels, such as scout cruisers, destroyers and express steamer), single-reduction gears are applicable. But with the ordinary, easy-going merchant vessel, the most efficient propeller speeds are usually around 100 r. p. m., and it is therefore impossible to use a single-reduction gear with a 3000 r. p. m. turbine; and even when the propeller speed is 150 r. p. m., the 160-inch gear needed for that particular speed reduction would probably be physically too large to go satisfactorily into the ship. Hence, it is necessary to use either double-reduction gears with high-speed turbines, or single-reduction gears with low-speed turbines. Which of these alternatives should be adopted for a given ship is a question for the naval architect to decide; but in general it can be stated that the double-reduction gear with a high-speed turbine is preferable to the use of a single-reduction gear with a low-speed turbine, because, as the speed of a turbine decreases, its size, first cost and maintenance expense increase and its efficiency falls off rapidly.

Theoretically, reductions up to a ratio of 400 to 1 can be obtained by a double-reduction gear, but 40 to 1 is probably the maximum in commercial use.

Single- and Multiple-Case Gears: All of the mechanism of a double-reduction gear can be enclosed in a single case, or each reduction can be mounted in a separate case, making two cases for a single-pinion gear and three cases for a two-pinion gear. The single-case gear is more compact, while the multiple-case gear provides a somewhat greater degree of accessibility and ease of repair. The space available generally determines which type shall be used.

Floating-Frame and Rigid Gears: Gears also differ in the method of supporting the pinion. In the "floating-frame" gear the pinion is supported in a frame which is so mounted that the pinion can automatically adjust itself to any changes in the alignment of either the gear or the pinion. The object of this device is to insure a uniform pressure along the entire surface of the teeth in contact, thus avoiding the concentration of all the pressure on a limited area of tooth surface, which is a frequent cause of broken or damaged teeth. In the "rigid" gear the pinion is rigidly mounted in bearings on the gear frame and is without provision for automatic readjustment. The gears shown in the illustrations of this article are all of the floating-frame type.

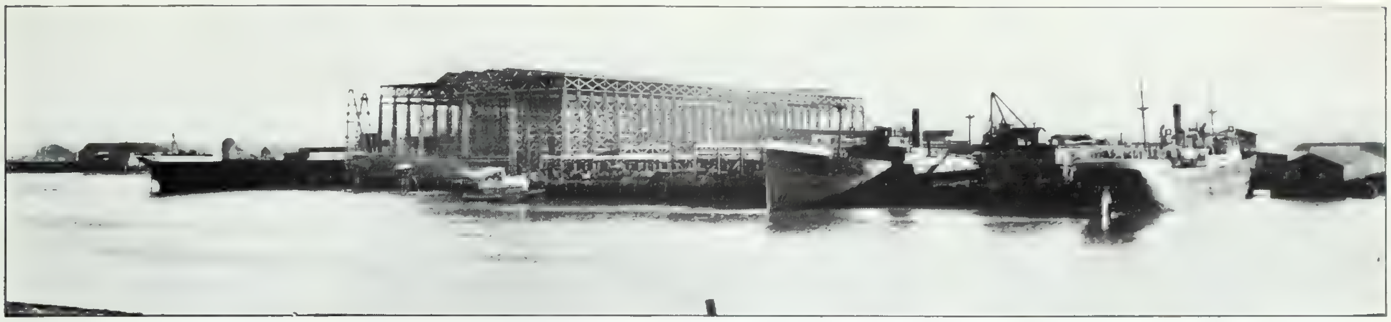
THE COUGHLAN YARD

A Highly Successful Shipbuilding Enterprise at Vancouver, B. C.

THE firm of J. Coughlan & Sons, Ltd., of Vancouver, British Columbia, was originally established by Mr. J. Coughlan as far back as 1878. In 1905 they entered the structural steel industry, and have fabricated the steel necessary for the majority of Vancouver's largest buildings. In 1917 they heard the call of "Ships, More Ships," with the result that they started in the erection of a most up-to-date shipbuilding plant. They have specialized on large types of standard freighters of 8800 tons that have proven entirely satisfactory in speed, seaworthiness and general efficiency. The Coughlan vessels are now in active operation on all the sea lanes of the world, and are owned by British, Belgian, Swedish, French, Italian, Spanish, Greek and Canadian interests.

In March, 1917, commencement was made on a contract to construct ten ships of 8800 deadweight tons each for the British government, through the Imperial Munitions Board, and a staff of workmen and mechanics was assembled. Following completion of these ten vessels, just before the close of the war, the firm secured a contract for four 8100 deadweight ton freighters for the Canadian government merchant marine, and when that job was done they obtained two more Canadian government merchant marine orders, and undertook the venture of building vessels to their own order, some for market and some for operation by themselves. The Coughlan firm was the first shipbuilding concern in Canada to attempt construction of ships as large as 8800 deadweight tons. They were the first company in Canada to build, own and operate deep-sea vessels. When the firm decided to build ships to its own order, which was during the period when ship contracts were scarce, it laid the keel for an 8800-ton steel freighter. This had hardly been done when Swedish interests purchased the vessel, and sent their engineers to the yards to inspect the work as construction progressed. This ship, named the Braheholme, sailed early this summer from Puget Sound for Egypt, with a cargo of flour. Following her, the steamship Indus, a sister ship, was laid down, and was purchased before completion by the same interests. Meantime the firm had built the 8800 deadweight ton steamer Margaret Coughlan. She was launched by the Coughlans to be operated by them, and has made one trip to Scotland. This voyage, from

Steamship Margaret Coughlan, 8800 ton Deadweight Capacity



View of the Waterfront of the Coughlan Yard Showing from Left to Right Steamships Canadian Inventor, Canadian Exporter and Canadian Importer, Each 8100-tons Deadweight Capacity

which she is now returning, was made in thirty-six days from Bellingham, Washington, to Grangemouth, Scotland. She took 4,700,000 feet of ties. A sister ship to the Margaret Coughlan, the City of Vancouver, was launched September 10. A third will be launched the following month.

To the present, the firm has built eighteen vessels, including the City of Vancouver. These vessels are the Alaska, operated during the last two years of the war by Furness, Withy; the War Company, now the French freighter Ontario; the War Chief, now the Spanish steamer Alfonso Perez; the War Camp, now the Belgian steamship Sierra Quemada; the War Chariot, operated by Raeburn & Verel of London; the War Convoy, now owned by New York interests; the War Column, now the Italian steamer Atta Vita; the War Cavalry, now the steamship Sylvia Victrolia of Montreal; the War Noble, now the French steamship Maryland; the War Charger, now the Greek steamer Nacarhos Koundsorale; the Canadian Importer, Canadian Exporter, Canadian Inventor, and Canadian Prospector; the Braheholme, Indus, Margaret Coughlan and City of Vancouver. The Canadian government ships are sailing on the Australian route, out of Vancouver.

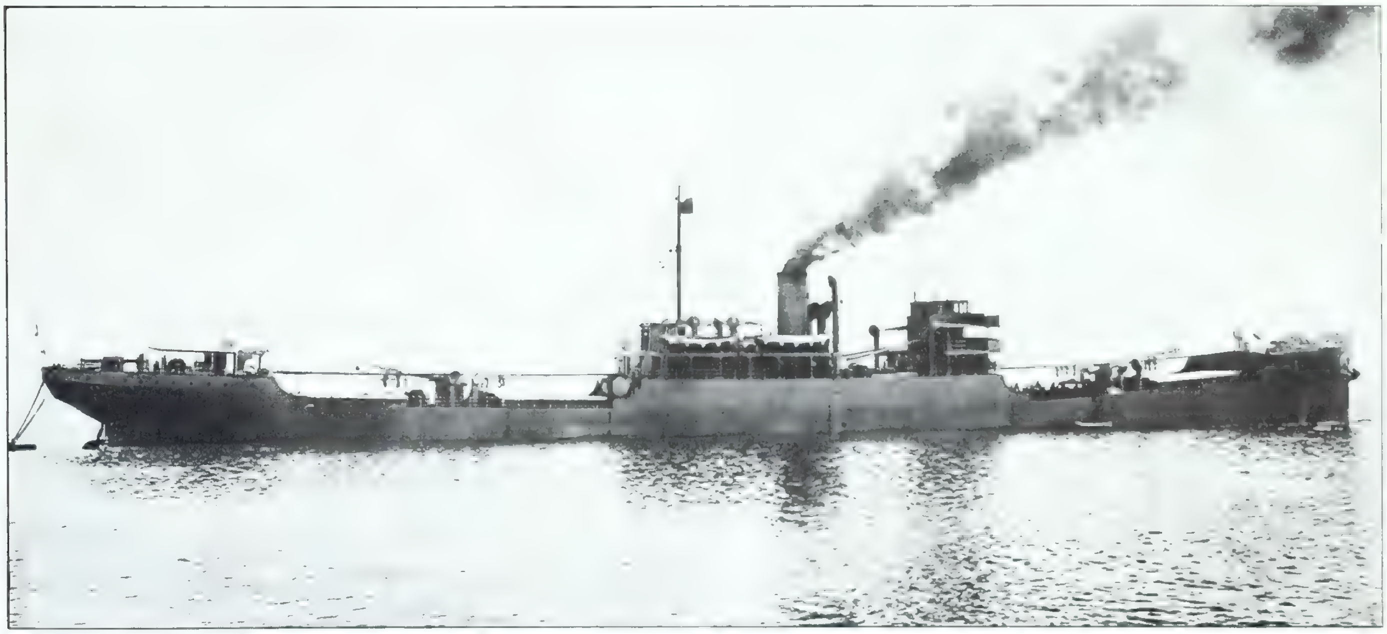
At present hull 19 is on the ways, which is being built to the company's private account. In addition there are yet two vessels to be built for the Canadian government, each ship of 8340 deadweight tons.

The shipbuilding plant is an up-to-date and extensive concern, reputed to be one of the best equipped in the Dominion of Canada. Shortly after the yards commenced operations in 1918, they were swept by a fire and a heavy loss was experienced, but, undauted by this, the firm rebuilt at once and continued the contracts. Their launchings of Imperial Munitions Board ships were very little delayed by the fire, owing to the manner in which the men rallied to the support of their employers and rushed construction as soon as the yards resumed.

Today the shipyard of J. Coughlan & Sons, Ltd., occupies a large area on False Creek, Vancouver. It consists of four building ways, capable of handling any type of ship up to 12,000 deadweight tons. Each building way is equipped with three five-ton overhead traveling cranes. There is one outfitting berth with eighty-ton shearlegs, and two finishing berths equipped with derricks and other modern facilities.

From 2000 to 3500 men are employed, and from a gang of unskilled, crude workmen in 1917 the firm has developed a shipyard staff and crew of as good shipbuilding mechanics as will be found in any yard.

Full credit for the establishing and development of this industry in the Canadian gateway to the Pacific is due to Mr. John Coughlan and Mr. J. J. Coughlan, president and managing director, respectively. Their vision and courage have created for the West Coast of the Dominion another industry which has shown the Old World that the New West is its equal at present and threatens to become its superior in the future. The Coughlan ships, when they leave the home port for the ports of the United Kingdom, go with the knowledge that they are to be examined and criticised by the sharpest and most critical ship operators and builders. Weakness of construction or lack in finish are points that rival shipbuilders in other parts of the world would not hesitate in bringing to the notice of the shipping world, but no report of such has ever been heard in Vancouver. All the vessels that have gone to Europe have given steady, reliable service—have been good sea boats and good carriers. They have kept up their scheduled speeds, have run side by side with the output of the yards of the world, and have held their own. The best proof of this is the fact that European interests, after seeing Coughlan-built ships stand the severest tests, have come to this far Western Coast to purchase ships.



Steamer War Camp 8800-tons Deadweight Capacity, Built by J. Coughlan & Sons for the British Government

OXYGEN IN STEEL CUTTNG

By LETSON BALLIET, M. E.
Efficiency Engineer, 1508 Hobart Building, San Francisco

THE advent of oxygen cutting into the metal trades brought a great economy into the industry. Hundreds of experimenters attacked the problem from different angles, with different results. It is pictured as a mysterious giant; it is looked at with awe; when in reality it is a very simple thing to understand.

What is "a fuel?" The common answer is, "Anything that will burn."

Our earliest elementary chemistry gave us the same answer in other words, after explaining that "burning" and "oxidizing" were exactly the same process.

A "fuel" is any substance or element that will combine with oxygen, and give off heat by the action of combining.

Some fuels will combine with oxygen more rapidly than others. Some fuels must have special conditions surrounding them before they will combine. Different conditions often make different speeds of combustion. Under various conditions some fuels will combine with oxygen from the air, or even from water.

Air is composed mainly of two gases, nitrogen and oxygen, mixed together as simply as you might mix sand and bird shot. The two gases are not combined—simply mixed. If the nitrogen would combine with oxygen, it would be **a fuel,** and a flash of lightning or a spark of fire would explode the whole atmosphere around the world, with one big explosion.

Water is composed of two gases, hydrogen and oxygen, but the hydrogen is combined with the oxygen. The combination is water.

A fuel may be a gas, a liquid, or a solid. Just so long as it will combine with oxygen it is a fuel.

Hydrogen, city gas, natural gas, acetylene and carbon-monoxide are examples of gaseous fuels.

Fuel oil is a liquid fuel.

Wood, iron and aluminum are solid fuels. They will all burn when the conditions are right for them to combine with oxygen.

You may take a long, thin wood shaving and lay it on the ground and it will not combine with oxygen, until you take a match and heat some point enough to be above the **temperature of kindling.** When this is done the shaving takes up enough oxygen out of the air to burn, and in burning heats the adjoining parts of the shaving hot enough that they rise above the temperature of kindling, and as this occurs the adjoining parts take up oxygen and continue until the whole shaving is consumed.

An iron wire will do the same thing; only you cannot raise iron to the **temperature of kindling** with a match. It must be much hotter before it is kindled, but iron wire does not get enough oxygen out of the air to burn very rapidly; hence it requires a pure oxygen to get rapid combustion of iron. The iron wire will not burn fast enough in ordinary air to furnish heat to the adjoining parts of the wire to bring it above the point of kindling; therefore the propagation of combustion ceases before the whole wire is consumed, unless we put some special conditions around it to promote the combustion.

This can be done in two ways: either to heat the whole wire and maintain the heat above combustion or kindling point until the white hot iron wire has absorbed enough oxygen from the air to be burned (oxidized), or to supply it with oxygen more rapidly.

Experiments show that both wood and iron burn or oxidize more rapidly under compressed air than in air at ordinary atmospheric pressure. Why? Merely because they obtain oxygen faster. The oxygen molecules are closer together.

On top of this experiment came the attempts to produce pure oxygen, that there might be no inert nitrogen to retard combustion, thereby obtaining more rapid combustion. This resulted in the discovery that the purer the oxygen the more rapid the combustion. In fact, with the wood-shaving the combustion became so rapid as to approach the point of "exploding the shaving." By winding it up into a little ball, with an electric resistance point or glowing coal in contact with the shaving, it sprung into a bright flame and was wholly consumed almost within a second when the experiment was made under a bell jar filled with pure oxygen.

Later experimenters attempted to use liquid oxygen and charcoal (carbon) as explosives in mining and tunneling. During the war with Germany, Georges Claude of France made liquid oxygen bombs which he dropped from aeroplanes to demonstrate their use. Had the war continued a few years, perhaps carbon, sawdust, charcoal, coke and the like would have been saturated in liquid oxygen, to take the place of dynamite and nitroglycerin.

I am not going to discuss liquid oxygen explosives. I have mentioned it only to point out how rapid combustion can be made with pure oxygen. The bombs were perfectly "safe" until the fuse brought some point of the mixture of carbon and oxygen above the kindling point. Then the rate of heat propagation made the combustion instantaneous and the expansion of the gases of combustion took place.

After the chemist was able to obtain pure oxygen, we found, by inserting an iron wire into a bottle filled with pure oxygen, that (provided the end or some point in the wire had been heated red hot) the iron wire would burn up, with a shower of sparks dropping from it as ashes drop from a shaving as it burns in the air. The whole thing depends upon this. Kindle the wire and it will burn up, making a heat in burning sufficient to keep the wire burning in the atmosphere of pure oxygen.

When the iron and steel workers took up the use of oxygen for cutting metal, they did it on the principle that **iron is a fuel that will burn if kindled in an atmosphere rich enough in oxygen.**

It then became a question of producing the oxygen cheap enough and in quantity enough to have a commercial advantage over other methods of cutting and producing the mechanical contrivances to deliver the oxygen to the iron as wanted. Various types of blow pipes, called "torches," have been placed on the market that combine the delivery of oxygen with the heat for kindling the metal, obtainable from another fuel gas delivered through the same torch.

Several methods of producing oxygen were offered by the chemists, but these are so expensive that they are now seldom used.

The two main sources of oxygen appear to be from air and from water. Without going into the technical detail of the equipment and methods of obtaining oxygen from either sourse, a brief statement of the general principles will give a clearer understanding of the subject.

The air contains about four parts of nitrogen and one part of oxygen, simply mixed, not chemically combined. Carl Linde of Munich and later Georges Claude of Paris brought out the most important processes for obtaining oxygen from the air. The mechanical equipment is different, but the principle is the same,: mainly compressing and cooling it until it becomes liquid air, and then evaporating the nitrogen by boiling it off from the liquid air, leaving the liquid air with less nitrogen. If this is done carefully, nearly all the nitrogen can be evaporated, leaving the liquid air with only 2 per cent, 3 per cent, or 4 per cent nitrogen. With extreme care it can be distilled to as low as 1 per cent (and occasionally a trifle less than 1 per cent) nitrogen.

Oxygen of this richness will burn iron rapidly; hence it was thought that the acme of perfection had been reached, and for a number of years no startling improvement in oxygen was thought possible or worth striving for. The cheapness and simplicity of the process, so far as power was concerned, seemed to leave little room for competition by other methods.

At the present time the oxygen production of the United States amounts to about 3,000,000 cubic feet per day, of which nearly 75 per cent are produced by the Linde and Claude processes. The remaining 25 per cent is produced by electrolysis from distilled water.

The process of obtaining electrolytic oxygen from water is, briefly, the collection of the gases liberated by the decomposition of distilled water in an insulated vessel (called a "cell") through the electric action between the positive and negative poles of a direct current electric circuit immersed in it. The cell is divided in two parts and bubbles of hydrogen gather upon one pole and oxygen upon the other. The gases, being lighter than the water, rise to the top, where they are caught in air-tight containers designed for the purpose and drawn off in pipe lines to be compressed to any desired pressure.

Inasmuch as there is nothing in distilled water but hydrogen and oxygen, there can be no impurities in either gas, save a very small fractional per cent of the other gas.

The hydrogen is a fuel gas and will **mix** with oxygen from the air or from any other source. If you light a match it will be brought above the kindling temperature and will **combine** with the oxygen, or burn just as acetylene will.

Oxygen itself, whether from air or water or produced from chemicals, is not combustible. You cannot burn or oxidize oxygen. It will not explode nor unite with itself, but if you mix oxygen with acetylene, natural gas, city gas, carbon monoxide, hydrogen or other combustible gas, the other gas will burn or combine with the oxygen when ignited. That condition is taken advantage of by using the other gas through the torch with oxygen to preheat the metal, or, as I have explained, to bring the metal up to the point of kindling before the metal takes fire and begins to burn.

You can take any torch and burn a streak through a board just the same as you can through a steel plate. You will have to cool the board below the kindling point behind the cut, is all the difference.

The electrolytic method of producing oxygen is somewhat more expensive than the methods of obtaining atmospheric oxygen, but it has several advantages that make it worth considering, for some applications.

First and foremost, for every cubic foot of oxygen obtained by electrolysis from water, two cubic feet of hydrogen is simultaneously obtained. The hydrogen has a fuel value that is used through the torches or blowpipes for kindling the metal to be cut, effecting a big saving in acetylene gas used with oxygen for the same purpose. Hydrogen has other uses which give it a marketable value that will not be discussed in this paper. It is customary in different privately owned plants to charge all of the costs against whichever gas is the most desired and claiming the other gas to be free. Several large plants using the hydrogen sell their oxygen and get their hydrogen without cost. Others sell their hydrogen and get their oxygen without cost.

Second advantage: Electrolytic oxygen is made by the use of a number of cells, which may be installed in units of a single cell or many thousands. The supply can be as little or as great as desired, and the power used depends upon the number of cells connected.

Third advantage: Electrolytic oxygen is produced with a higher per cent of purity than atmospheric oxygen ordinarily is produced. For blast furnace work and for explosives, this extra purity probably makes but little difference, but in the cutting of steel and iron the difference is greater than popularly supposed.

The impurities of the oxygen when obtained from the two sources, air or water, are different. Oxygen obtained from air contains ordinarily from 1½ to 4 per cent of nitrogen, while oxygen obtained from distilled water contains from ¼ to ¾ of 1 per cent of hydrogen.

However, I have found occasionally a cylinder of oxygen obtained from air that contained but 1 per cent of nitrogen, and once I found one that contained but ¾ of 1 per cent nitrogen.

Comparing the work of the cylinder of air-oxygen which was 99¼ per cent pure, with a cylinder of electrolytic oxygen, atlso at 99¼ per cent pure, used in cutting steel plate, there was 11 per cent more air-oxygen required per foot of cut than electrolytic oxygen, and 9 per cent more time consumed per foot of cut—with each oxygen adjusted to its own best pressure and working condition. This was the average from the work of several different operators using both gases, and the human element no doubt played some factor. I am not giving these figures as a positive basis of difference, but merely to point out that there is a difference, for in no case did the air-produced oxygen equal the electrolytic oxygen. In some cases the diffierence was smaller than this and in others greater. But in all cases the finished cut was smoother when cut with the electrolytic oxygen, which took less time in finishing, grinding, chipping and tooling the cut to get a smooth edge.

Although, I used every care to get a fair comparison of these two bottles of oxygen in similar work, the results were challenged as not conclusive, and thus far I am unable to offer further tests in support of the difference at this high percentage of purity, as I have been unable to obtain another cylinder of 99¼ per cent oxygen from atmospheric source.

However, a similar test made with 99 per cent atmospheric oxygen, and 99.3 per cent electrolytic oxygen, showed a difference of 15.4 per cent in favor of the electrolytic gas, not including the fact that the electrolytic oxygyn made the smoothest cut. This test was made under the direction of the challenger of my test, for the purpose of disproving the facts that I had obtained. The test lasted over two days and was handled by a disinterested torch operator, and by the challenger's own expert in the presence of a number of chemists and engineers. The results seem to substantiate the results of the previous experiment.

Another test was made, where the operator attempted to make as fast a cut as possible with air-produced oxygen, sacrificing smoothness of cut and oxygen consumption for speed. Even penetration was sacrificed for several inches in a dozen places in fifteen feet of cutting for speed. Oxygen with 2.7 per cent nitrogen was used for this cut in 1¼-inch steel plate. Following this, a similar cut was made, where the same operator tried to use the **same time** for the cutting with 99 per cent electrolytic oxygen and succeeded within two or three minutes. From these two cuts the slag or blisters were collected and analyzed. From the speeded-up cut of air-oxygen the slag was iron oxide, and from that slowed down with electrolytic oxygen it was largely melted iron, showing that the speed was too slow. Another cut of the same length in the same metal with 99 per cent electrolytic oxygen showed 80 per cent increase of speed over the air-produced 97.3 per cent oxygen, using the same torch and same operating conditions.

The result of these tests and many others made from all angles, under every kind of pressure and operating condition, brought forth a question, not alone as to the greater value of the higher purity of oxygen, but as to the difference between oxygen of the same purity, when the impurity of one is nitrogen and of the other is hydrogen.

A great amount of unnecessary importance seems to have been given to the manner of kindling the iron. Many experiments have been made with the different preheating gases (the kindling) and the results differ widely. Results have been published and immediately some one else rushes into the field and obtains the same results with another preheating gas; then perhaps we find the purity of the oxygen is different, the torch is different, or some other condition is different.

Personally, my own experience and observation lead me to conclude that with the same grade of oxygen, and the same conditions throughout, the fuel used for preheating (kindling) makes very little difference, if any, in the results. The matter of cost of the preheating fuels is naturally of interest, but just why any preheating gas should require any excessively greater quantity of oxygen than another, is not quite clear. True, the chemical forulae governing the combustion of gases differ considerably per cubic foot, and per pound, but do not seriously differ with volumes required to give a similar number of heat units.

A cubic foot of acetylene requires two and a half times as much oxygen as a cubic foot of city gas, and about five times as much as a cubic foot of hydrogen. But whw the cubic foot standard? It means nothing. Acetylene has 1600 heat units, city gas has 570 heat units, and hydrogen has 345 per cubic foot. Why such a comparison? The amount of city gas required to bring a steel plate to the temperature of kindling, and the amount of hydrogen and the amount of acetylene to do the same thing, is not a cubic foot in each instance. As a matter of fact, the oxygen consumed in the combustion of the preheating gas while kindling the iron is really the least of the oxygen demand. The greatest volume of oxygen is that which combines with the iron, to make the iron oxide—i. e., to consume the iron as a fuel (assuming that none is wasted).

So far I have not been able to find any nitrogen in the iron slag, nor in any of the products of the combustion, but this much is known: the nitrogen does not burn—it expands rapidly with heat, it absorbs heat, and it occupies space. Hence, when we use an oxygen with a nitrogen impurity, we must allow for those four factors. It is a chemical law that cannot be argued, and as a matter of fact we find a rougher cut, no doubt due to cooling effect of nitrogen expansion, and its absorption of heat. We also find it a wider kerf, no doubt due to expansion of the nitrogen and the space it occupies. Naturally, the wider cut requires more oxygen. An increase in pressure of the oxygen may partially overcome this difficulty, but this increases the quantity of oxygen and the cooling effect of the expansion.

With the same amount of hydrogen as nitrogen impurity, we find that above the "temperature of disassociation" the hydrogen does not combine with the oxygen, but passes into the envelope flame to be burned there, possibly having a little preheating value in keeping the plate from losing its kindling temperature by conduction

The hydrogen impurity is so small in commercial oxygen that its value is unimportant, but is quite certainly less detrimental than the nitrogen. Moreover, analyses of commercial oxygen show several times more nitrogen impurity in atmospheric oxygen than hydrogen impurity in electrolytic oxygen. Manifestly, ninety-eight cubic feet of oxygen will not consume as much iron as ninety-nine and a half cubic feet, even if there were no impurities to be reckoned with. The efficiency of oxygen in cutting drops rapidly from 99.8 per cent pure to 98 per cent. The drop is not quite so rapid between 98 and 97 per cent, and, after passing 96 per cent, the efficiency drop is fairly regular.

From the results of my own experiments, and those of others within my own observation, using oxygen cylinders selected at random from deliveries of commercial oxygen, I find that the speed of cutting and quantities of the oxygen required for given work vary in efficiency from 11 to 80 per cent. Collected data from the work of dozens of other experimenters shows the difference to range about the same, all in favor of the nitrogen free oxygen.

From practical work in a plant that used over $100,000 worth of oxygen a year, I made the estimate that the average increase in cost of finished product, chipping, grinding and dressing the cut included, was from 50 to 60 per cent with air-produced oxygen over electrolytic oxygen. Analysis of the oxygen showed varying purities from 97 to 98.8 per cent, with occasional analyses dropping below 97 per cent, and it is upon this basis the estimate was made.

More or less confirming data is coming to me from industrial centers all over the world.

I seriously doubt if absolutely concurring results can ever be obtained, for differences in analysis of the metal cut, differences in temperature and humidity of the surrounding atmospheres, and differences in elevation (barometric conditions), will likely make some difference in results. The human element in adjustment of even mechanically-operated torches will also make a difference.

NEW BUNKERING FACILITIES

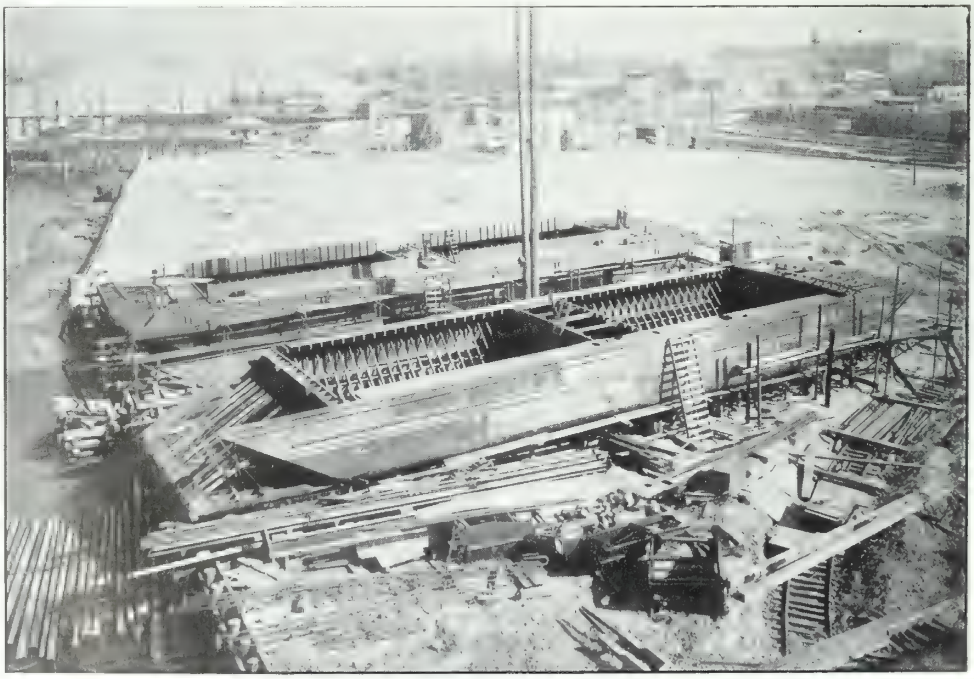
A VERY interesting bit of construction work is going on at the present time on the Alameda side of the Oakland estuary and just west of the Webster Street bridge. The Standard Coal Company of California is fitting out a coal storage yard at this point and is building two steel barges for the handling of bunker coal which, together with the storage yard, will be equipped with the most modern type of electric coal-handling machinery.

The barges are of special interest because the steel which is being used in their construction was sheared to specifications and punched at the mills of the American Bridge Company at Ambridge, Pennsylvania. This steel so punched and sheared was shipped out here in carload lots, dumped on the ground, and is being erected into the barges by the J. G. Williams Construction Company, 519 California street, San Francisco, under the personal superintendence of Charles F. Hathaway, a Pacific Coast shipbuilder of many years' experience. Mr. Hathaway is responsible for the statement that the punching of the plates and shapes shows as much accuracy of fit as any work that he has seen done in the fabricating plants of shipyards and that the method of distant fabrication is highly satisfactory as far as these barges are concerned.

The J. G. Williams Construction Company have confined their work to steel buildings, bridges and tanks until recently, but the record time in which the first barge was built and launched and the fact that not one leak could be found after launching, proves the ability of this concern in this new field.

The barges are built of steel throughout with self-trimming coal holds, and are very heavily braced and framed and the corners finished with a heavy steel casting. They are 138 feet in length, 35 feet in width, 12 feet molded depth, with a coal capacity of 900 tons. The superstructure on these barges will carry an electric trolley suspended from a beam and operating a grab bucket. This trolley will discharge into a central hopper which in turn discharges onto the elevator buckets in the tower. The tower is to have a height above the deck of 66 feet, and the unloading mechanism will have a capacity to handle into a ship's bunkers 100 tons of coal per hour for each barge.

The coal storage yard is completely spanned by a large traveling gantry bridge. The rails on which the bridge runs have a gauge of 200 feet, and the length of travel along the bulkhead of the estuary is 550 feet. The total length of bridge, including both overhangs, is 361 feet. The trolley on the bridge will have a capacity to load or unload 100 tons of coal per hour. The total storage capacity of the yard will be 100,000 tons of coal. This gantry bridge and the electric coal handling machinery on the barges are being furnished by Heyl & Patterson, Inc., of Pittsburgh, Pennsylvania, and erected by the J. G. Williams Construction Company. For the handling of the barges on the bay, the fleet of small tugs now controlled by the Standard Coal Company of California will be used, and undoubtedly this whole unit will prove a great asset to the quick turn-around of coal-burning steamers in the harbor



Above, Birdseye View of New Steel Barges Being Built by the J. G. Williams Construction Company for the Standard Coal Company. At Left, J. G. Williams, President of the J. G. Williams Construction Company.

NEW BOOKS

Proceedings of the Seventh National Foreign Trade Convention. Bound in buckram with gold stampings; 900 pages; price $2.50. Published by the National Foreign Trade Council, O. K. Davis, Secretary, India House, Hanover Square, New York City.

The general theme of the Seventh National Foreign Trade Convention was the effect of being a creditor nation. The convention was held in San Francisco, May 12 to 15, inclusive, 1920. There were five general sessions, at which various phases of the above theme were very ably presented by experts. In addition to these general sessions there were fifteen group sessions, which considered in detail ways and means of meeting the immediate problems which American foreign trade was facing.

This convention was unique in the history of the National Foreign Trade Council in that for the first time foreign delegates were admitted at the sessions. It was the largest yet held, the delegates numbering 2432, and the discussions and original papers contained in this bound volume of the proceedings represent the most comprehensive and authoritative statement yet made of the measures and policies necessary to secure the fullest development of our foreign trade. Many of our Pacific Coast readers who had the privilege of attending general sessions of the convention will be no doubt interested in securing a copy of this volume.

The American Red Cross in the Great War. By Henry P. Davison, Chairman of the War Council of the American Red Cross. Three hundred pages, eight full page illustrations. Bound in blue buckram with gold stampings. Price $2 net. Published by the Macmillan Company, New York.

When the war closed, more than thirty million Americans were enrolled in the great organization of the American Red Cross, and this volume is an effort to summarize the work of these thirty millions. The book, therefore, covers the organization for war service, home work in all of its various branches, the work on the battle front, and the work among those made destitute by the war in their homes in the various countries involved. Red Cross and official government records have been freely drawn upon in the preparation of this book, which in itself may accurately be described as a product of American Red Cross work. All authors' royalties connected with the publication of the volume go immediately into the treasury of the Red Cross for the furtherance of its work growing out of the war, which work is becoming steadily more extensive

A cursory reading of the book hints at many wonderful stories of individual heroism, and undoubtedly there will be many books to follow this one describing more in detail the splendid service rendered by the "Greatest Mother in the World."

Steamboat Inspection Service—Ocean and Coastwise General Rules and Regulations Prescribed by the Board of Supervising Inspectors as Amended at the Board Meeting of January, 1920. Edition of May 14, 1920. Published by the Department of Commerce of the United States of America. Printed at the Washington Government Printing Office.

This volume of 205 pages, very carefully indexed, records all of the rules of the Steamboat Inspection Service with regard to ocean and coastwise steamers. The majority of the amendments to these rules is in connection with the requirements for life saving apparatus at sea. The book constitutes the chief source of information for all engineers and line officers going up for examination for license on higher grades, and all persons so situated should obtain a copy of this latest edition by addressing the Department of Commerce at Washington or applying at some of its numerous branches in the principal coast cities.

Naval Consulting Board of the United States. By Lloyd N. Scott, Liaison Officer to the Naval Consulting Board, with a preface by Josephus Daniels, Secretary of the Navy. Two hundred and eighty-eight pages, with numerous illustrations and insert diagrams and drawings. Bound in blue buckram with gold stampings. Published by the Navy Department of the United States of America. Printed at the Washington Government Printing Office.

The Naval Consulting Board was an organization of civilians brought together for the purpose of assisting to solve the problems that confronted the Navy. The membership of this board was chosen by the department from the foremost engineering societies of America and embraced many men whose achievements were of international renown. This board was not specifically a war organization. It was first initiated in 1915, two years before America entered the world war, and it had given study and research and investigation to many naval problems before the stress of war came. Mr. Thomas A. Edison, as president of this board, spent long months in the Navy Department and extended periods of deep sea cruising in testing out various inventions and in studying at first hand the problems to be solved. Many of the other members of the Board gave themselves and their talent as fully as did Mr. Edison.

The first work of the board, as described in this volume, was that of the industrial preparedness campaign by which the information necessary for the mobilization of all industries in war service was gathered and made ready for use. This involved also a study of the fuel oil situation, which is described in a separate chapter, and the establishment of naval stations. The activity of submarines early in the war caused the appointment of a special committee on ship protection, and very quickly this committee was almost overwhelmed with inventions from all over the United States calculated, in the minds of the inventors, to be proof against underseas' warfare. The work of segregating and testing out these ideas was enormous and, as would naturally be expected at such a time, the account of this work deals with inventions, some of which have great intrinsic merit but many of which are ridiculous in the extreme. In a vast number of cases ideas and inventions were submitted with purely patriotic motives and no thought of gain. Letters came from "old miner past seventy sitting in his lonely cabin on stormy days studying how he could do his bit"; others from brokers in lower New York studying how they could get their bit, but all had to be scanned, and out of the general chaos many very meritorious ideas were culled. Not a few of these best inventions from the public are described in detail in some of the chapters of the book, and there is much material that should be of great value for study by marine engineers, naval architects, and ship operators.

The Nautical Telegraph Code Book and Postal Guide. By Captain D. H. Bernard. One hundred and sixty-six pages; bound in red buckram; 3/6 net. Published by James Brown & Sons, Glasgow, Scotland.

This is the first compilation of a nautical code by an experienced merchant seaman. Only words which pertain in some way to the sea are used in the compilation, so that it will be apparent to the recipient of any telegram under this code that the words have been selected from the Nautical Code. The words are coded in such fashion that the sentences for which they stand cover practically every ordinary requirement of a seaman or officer at sea. This code should be found very useful by all merchant marine officers and in many cases by tourists, passengers and foreign residents.

SALVAGING THE MARNE

THE 9600-ton steamer Marne, which was sunk by submarine fire in the harbor of Cristobal, at the Atlantic entrance of the Canal, on January 24, in order to extinguish a fire in her cargo of oil and gasoline, has been raised and discharged and is being rebuilt at the Balboa shops of the Panama Canal.

The use of the submarines to sink her was resorted to because of the intense heat aboard, which made it impossible to open the seacocks. After the fire had been extinguished and the ship raised, a second fire broke out, with a violent explosion, while she was being discharged at dock. It was necessary to beach her again in order to put out the second fire.

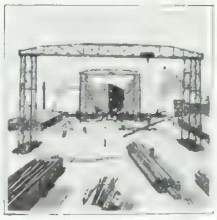
The submarine shots, double scuttling and explosions naturally made necessary a considerable amount of repairs. These are being directed toward restoring the Marne to the condition in which she was prior to the first fire.

The engines and auxiliary machinery have been taken out, and are being overhauled. The amidships deck structure has been entirely removed, and a great deal of the material is being salvaged for replacement.

VIEWS IN WELLINGTON HARBOR

Upper, View of Shipping at Ferry, G[illegible] and Kings Wharves. Left Center, Wool Clippers Aven and Loch Garves Loading for London. Right Center, Four-masted American Bark Andromeda Coming to Berth. Lower, Ocean Shipping at Queens Wharf

Material Handling



THE PORT OF WELLINGTON

SOME thousand years ago an old Polynesian navigator by the name of Kupe boldly sailed out across the vast trackless Southern Pacific Ocean from Tahiti to the southwest and, according to Maori myths, discovered the islands of New Zealand, uninhabited, silent in the great sea. He entered Wellington Harbor and brought back a description of its wonderful bay and its then double entrance, but discovering no inhabitants on whom to whet his cannibalistic appetite, he refitted his craft and sailed back again to his eastern Polynesian home. Some two hundred years later another sea rover by the name of Toi, popularly known all over the South Seas even unto this day as the "Wood Eater," came to the shores of New Zealand and, finding them inhabited, settled at a place on the north island called Whakatane near the present site of Auckland. Two of his great-grandsons, Tara and Tautoki by name, were sent southward by their father in search of a new home, and, after exploring all of the districts in the southern end of the northern island, they settled on an island in Wellington Harbor, which they named Te-Whanga-nui-a-Tara, or the Great Bay of Tara. From time to time other homeseekers came down from the north, tribes became intermixed, and managed to eke out an existence by literally living on the black aborigines.

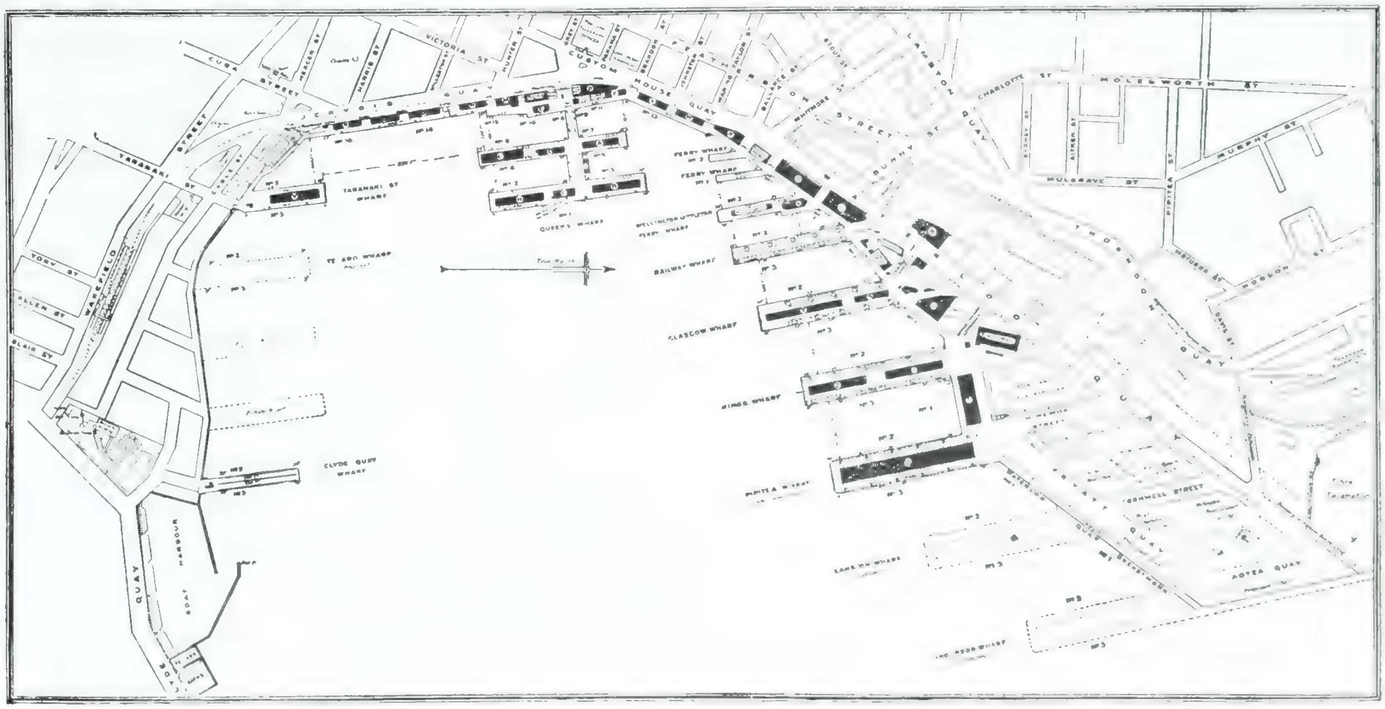
On November 2, 1773, Wellington Harbor was rediscovered by the great British navigator, Captain Cook. His vessel did not enter the harbor, but anchored for a few hours at the entrance. The harbor was next visited by Captain Herd of the British ship Rosanna in 1826, but there was no definite British settlement at Wellington until the arrival of the Tory on September 20, 1839, under the command of Colonel Wakefield. The Tory was quickly followed by other vessels, and on May 16, 1840, the English settlement was given the name of Wellington by the board of directors of the New Zealand Company, meeting in London, England.

It was foreseen from the very beginning that this harbor would play a very important part in the development of commerce in the South Pacific. The most direct line from Sydney to either Panama or Cape Horn lies through Cook's Strait and, therefore, past the gate of Wellington Harbor, and this port is the only adequate harbor for deep-sea shipping along six hundred miles of the New Zealand coast.

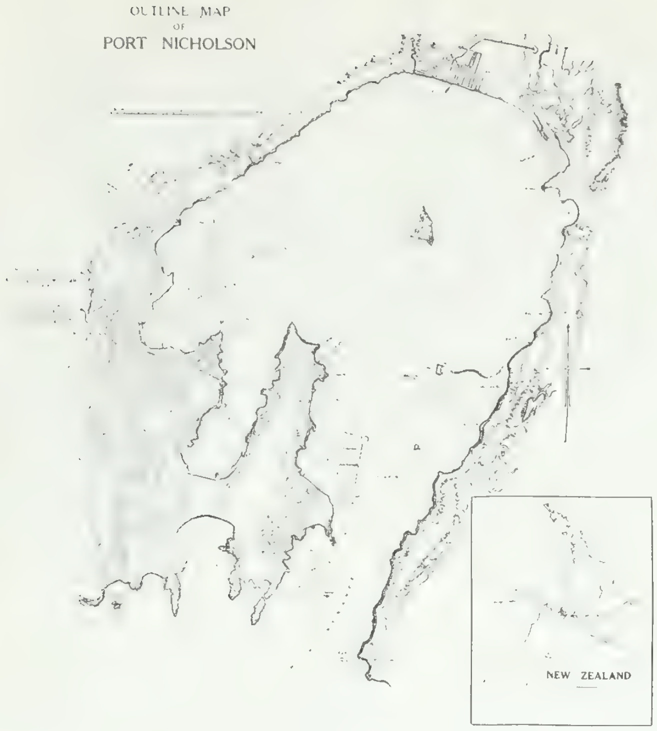
The history of the port as a shipping center really dates from 1862, when the first pile of the old Queens Wharf was driven. Prior to that date the work of the port had been carried on by means of lighters discharging and loading at small private jetties. Queens Wharf was built by the Wellington Provincial Council and managed by that body for a few years. In 1871 the Wellington City Corporation acquired the wharf and ran it under a leasing system for five years, or until 1876, when the corporation itself assumed control. In 1879 the Wellington Harbor Board was constituted by legislative authority and held its first meeting on February 20, 1880, at that time taking over from the Dominion Railway Department the railway wharf and its adjacent breastwork at the Waterloo quay. In October, 1881, the Harbor Board acquired Queens Wharf and its bonded warehouse from the City Corporation, and since that date the Wellington Harbor Board has exclusively administered all the affairs of the port.

WELLINGTON HARBOR BOARD

This board is a public body constituted and empowered under acts of Parliament and consists of fourteen members, one of whom is appointed by the Governor-General in council, and the others elected—ten by the electors of the city of Wellington and the electors of districts combined therewith, two by the payers of harbor dues on British ships, and one by the payers of harbor dues on merchandise. The Wellington Harbor Board is unique in New Zealand through its functioning as wharfinger, receiving the goods from the ship's slings, giving receipts therefor,



General Plan of Wharf Accommodations at Wellington Harbor



Outline Map of Wellington Harbor and Insert Map Showing Relation of Wellington to the Dominion of New Zealand

and delivering to consignees or trans-shipping to other vessels as required. It has been found that this method works out more satisfactorily and cheaply than if this function were left to private enterprise. This system has also another important merit in that the central authority of the board becomes an arbitrator in the case of disputes between the ships and the consignees, with considerable leverage in the way of authority over both. The board also undertakes the dumping of wool and hemp, the storage of duty paid or free goods, the warehousing of bonded goods, the provision of cold storage accommodation for dairy produce, and the supplying of water to shipping. In 1919 the board had under its control eight wharves with continuous quays, giving a total lineal berthage of 17,027 feet, with depths of water alongside from 16 to 41 feet, and thirty-three warehouses with a gross storage capacity of 8,587,111 cubic feet. All of these wharves, quays and warehouses are completely and elaborately equipped with mechanical handling appliances, both hydraulic and electric, the cranes varying in capacity from two to thirty-five tons.

The harbor of Wellington is completely landlocked, with an area of over twenty thousand acres. It is said to have sufficient capacity to enable the entire British fleet to maneuver under steam within its limits. The anchorage is excellent. The entrance to the harbor is 3600 feet wide at its narrowest point and from seven to eight fathoms deep. The rise and fall of the tide varies from two feet six inches to four feet six inches, and the current in the entrance never exceeds two knots per hour.

PORT CHARGES

The Harbor Board has framed its system of charges so as to produce a slight margin of revenue over working expense. All wharfage is paid on inward goods by the consignees of cargo, and on outward goods by the consignor. On general cargo this tax amounts to 3/- per ton inward and 1/6 per ton outward; on wool 9 d. per bale inward and outward, and on hemp 6 d. per bale inward and outward. These charges include labor and, in the case of inward general cargo, one night's storage. On all goods directly landed at wharves into railway trucks or shipped therefrom, no labor supplied, the charges are: general freight, 1/8 per ton inward and 10 d. outward; wool, 7 d. per bale inward and outward; hemp, 4 d. per bale inward and outward. These charges are collected for the Harbor Board by the railway department on delivery of the goods. The trans-shipment charge on general cargo is 3/6 per ton, which covers all labor and wharfage as well as seven nights' free storage. Goods trans-shipped overside from one vessel to another while lying at a wharf are charged at the rate of 1/- per ton for general goods; 4 d. per ton for coal; 6 d. per bale on wool; 3 d. per bale on hemp.

Pilotage is not compulsory, but the Harbor Board keeps a staff of three pilots and has a working arrangement with steam tug owners to place one of them on board any vessel which signals for a pilot. The charge for pilotage is 4 d. per ton inward and 3 d. per ton outward, on sailing vessels; 3 d. per ton inward and 2 d. per ton outward on steamers.

The Harbor Board also has an arrangement with privately owned screw tugs for towage rates to any point within five miles outside the heads. The minimum towage charge is £10, and the rate from sea to wharf, or from wharf to sea, is 8 d. per ton from sea to anchorage and from anchorage to sea 6 d. per ton.

REPAIR WORK

At Evans Bay, about two and one-half miles by water from the center of the Wellington waterfront, the Union Steamship Company of New Zealand maintain a patent slip which can take vessels up to 2000 tons not exceeding 300 feet in length or 16 feet of draft at the forward end when going on the slip. A very complete shop is maintained at this point adequate to take care of all repairs to steel or wooden hulls or any class of propelling machinery up to the above capacities. All ordinary repairs not requiring drydocking can be effected on the Wellington waterfront, there being a number of engineering plants adequately equipped to take care of this work. The Harbor Board maintains a staff of competent mechanics and a very well equipped machine and carpenter shop to attend to its own repairs to its equipment and plant.

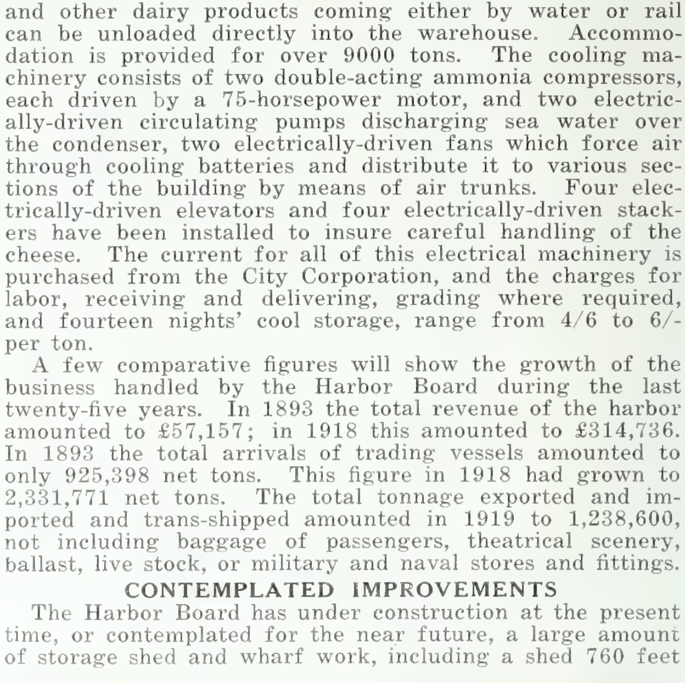
COLD STORAGE

Wellington exports yearly a large amount of dairy produce, and to adequately take care of this class of goods the board has erected a very efficient cold storage plant adjacent to the Glasgow Wharf, which handles the bulk of the export business. In front of the storage building is a quay where small coastal vessels can be berthed. At the rear of the building is a railway siding so that cheese and other dairy products coming either by water or rail can be unloaded directly into the warehouse. Accommodation is provided for over 9000 tons. The cooling machinery consists of two double-acting ammonia compressors, each driven by a 75-horsepower motor, and two electrically-driven circulating pumps discharging sea water over the condenser, two electrically-driven fans which force air through cooling batteries and distribute it to various sections of the building by means of air trunks. Four electrically-driven elevators and four electrically-driven stackers have been installed to insure careful handling of the cheese. The current for all of this electrical machinery is purchased from the City Corporation, and the charges for labor, receiving and delivering, grading where required, and fourteen nights' cool storage, range from 4/6 to 6/- per ton.

A few comparative figures will show the growth of the business handled by the Harbor Board during the last twenty-five years. In 1893 the total revenue of the harbor amounted to £57,157; in 1918 this amounted to £314,736. In 1893 the total arrivals of trading vessels amounted to only 925,398 net tons. This figure in 1918 had grown to 2,331,771 net tons. The total tonnage exported and imported and trans-shipped amounted in 1919 to 1,238,600, not including baggage of passengers, theatrical scenery, ballast, live stock, or military and naval stores and fittings.

CONTEMPLATED IMPROVEMENTS

The Harbor Board has under construction at the present time, or contemplated for the near future, a large amount of storage shed and wharf work, including a shed 760 feet



Twenty-knot Turbine Steamer Wahine Which, with Several Similar Ships, Is Used for Ferry Service Between Wellington and the South Island long, 107 feet wide, and 24 feet high, for the Pipitea Wharf. This shed is to be equipped with electric overhead traveling cranes on the interior, and on the outside with semi-portal hydraulic cranes. Two lines of railway tracks will run down either side of the wharf outside the shed.

A new reinforced concrete wharf, to be known as the Te-Aro, is to have a length of 650 feet with a width of 123 feet and 31 feet depth of water at low tide. This will also have large shed accommodation and be equipped in the same manner as the Pipitea Wharf.

The Jervois Quay is to be widened, and the four sheds are to be removed and two larger sheds erected in their place. A concrete seawall will be run along the whole length of this quay and a solid fill made at the back of this wall with a reinforced concrete breastwork 35 feet wide outside the wall for the berthing of ships. This berth will have twenty-six feet of water at low tide and will be 1295 feet in length.

The future plans of the Harbor Board call for two more wharves along the Waterloo Quay outside the Pipitea, and two more wharves between the Clyde Quay and the Te-Aro Wharf. These, however, will not be undertaken until the growing commerce of the port demands their construction.

BOATING

Wellington Harbor is a paradise for the power boat owner and the yachtsman, and the board has provided for their use a snug boat harbor adjacent to the Clyde Quay. This has an area of about six acres with a depth of water varying from four feet to eleven feet six inches. It is enclosed by concrete seawalls, and a number of reinforced concrete boat sheds have been erected by the board and are leased on reasonable terms to boat owners. In 1919 there were about thirty-three yachts, forty-one motorboats and ten other craft taking advantage of this shelter. The boat haven is in charge of a caretaker employed by the board, and a small fee is charged to each boat using its facilities. This ranges from 5/- per annum for boats not exceeding twelve feet in length to 20/- per annum for craft not exceeding thirty feet in length.

ELECTRIC WINCHES

By SVERRE FASTING

ELECTRICITY as a medium of power has on account of its ease of installation, its reliability, control and flexibility gradually taken the lead over any other power used for individual drives of machinery. Practically all drives in the industrial field are at the present time accomplished through the use of electric motors; and it can be predicted with great certainty that its use in the marine field will in time become as universal as in the industrial field. We have seen how the electric ship has made its debut and through its behavior and economy has proven the advantage of electricity for marine service.

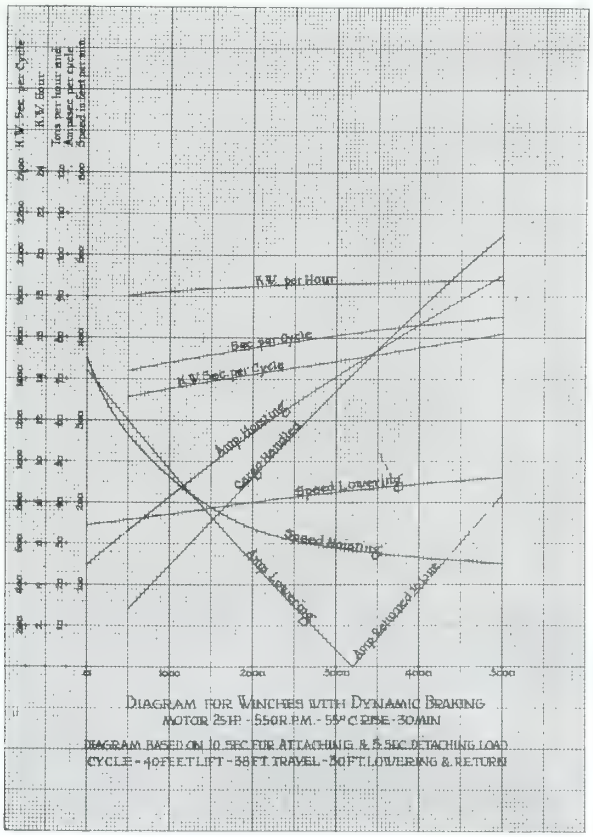
In the industrial field practically all of the handling of materials is done by hoisting machinery employing electricity as the driving element, and it will also take the place of steam in marine work as soon as the ship operators open their eyes to its several advantages.

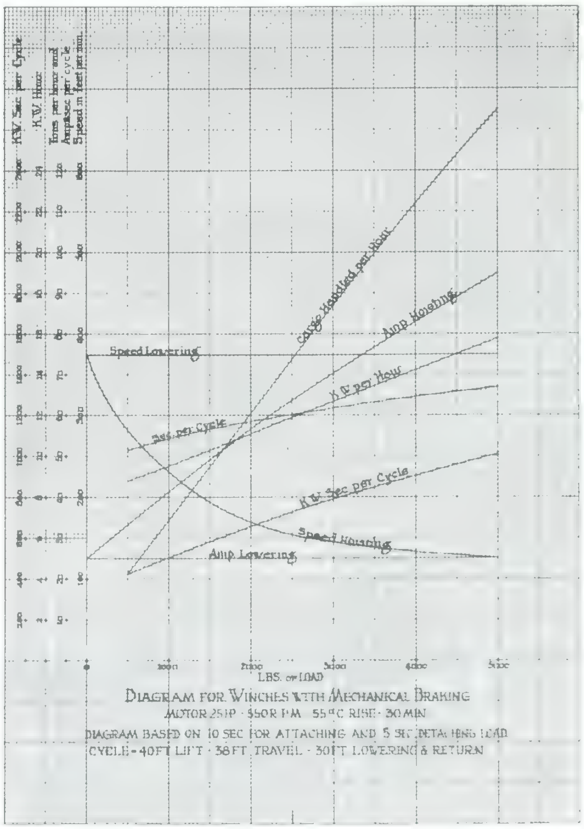
The steam winch when properly designed has given good service under ordinary conditions, but has always been uneconomical to run. Among other drawbacks can be mentioned the deck obstruction by steam pipes and the common troubles caused by freezing in cold weather and leaks in the piping. The electric winch will naturally not have any of the above drawbacks, but will have a considerably higher first cost, which will be offset by its economical operation and its freedom from breakdowns when properly designed and built, so they will in the end be cheaper than the steam winch.

The steam-driven ship will presumably, when the operating efficiency of the electric winch becomes more generally known in the marine field, install this type of apparatus, and certainly the motorship will always be equipped with them as standard equipment.

In considering the electric winches they may be divided into three groups or classes—the winch with dynamic brake, the winch with automatic mechanical brake, and the winch with gravity lowering. This latter may be disregarded as liable to accidents and is for this reason prohibited in several large ports in Europe. The other two classes operate exactly alike in the hoisting direction, but when lowering the load some very important differences will be found.

The general system of dynamic braking can be explained as follows: The load on the hook will naturally tend to revolve the motor in the lowering direction and so as to protect the load from falling too fast a system of wiring





is used which, when the control switch is set in lowering direction, forms an extra circuit which changes the motor into a generator driven by the weight of the load. This system has been used extensively and has been found to satisfy most needs in the industrial field. It has, however, its drawbacks, and some of these may be found of importance in deciding its use for marine work. The heavy load will descend at a relatively high rate of speed, while the empty hook will move relatively slow due to the fact that power will have to be applied to drive the winch motor in the lowering direction against the dynamic braking circuit. This difference in lowering speeds will always make it necessary to retard the winch carrying the load to the speed of the winch without load in lowering a draft when a burtoning system is being used. In dynamic braking there is also a certain element of danger, which, however, is slight and which does not need to be considered in cases where the winch operator has a view of the load at all times and does not depend upon a signalman for regulating his speeds. One of the characteristics of dynamic braking is, namely, that during lowering, should any of the armature leads be disrupted through a break of the wire, a loose connection, a stuck or broken brush, the load will drop if the controller is not brought to neutral position, allowing the electric brake to set. This may cause trouble in case the operator works on signals as during the time consumed in imparting and acting on the signal the load may drop a considerable distance.

In the automatic mechanical brake winch the load is at all times held by a disc brake set by the weight of the load, which "set" or pressure is released by the motor running in the lowering direction. This "unsets" the brake enough to allow the movable discs of the brake to revolve between the stationary ones and in this manner allows the load to descend at a speed corresponding to the speed of the motor. If the motor should stop from any cause the brake will set at full power proportional to the load, and will hold the load suspended. In addition to the mechanical brake, there is generally also an electric brake attached directly to the motor which will set and bring the motor quickly to rest if current is interrupted by operator centering the controller or by accident.

While generally conceded that the mechanical brake has many advantages over the dynamic brake a great deal of difficulty has been found in properly designing a brake of this type and for this reason a large percentage of builders have been forced to use the dynamic braking as their standard. There are a few well designed mechanical brakes on the market which have proven their value and ruggedness in service through a period of about twenty years in all kinds of hoisting works.

The power consumed in unsetting the brake is practically the same as the friction load in hoisting the empty hook and does not change under varying loads, so the lowering speeds under all conditions will be the same. This characteristic will be found of great value when operating on burtoning systems. Another advantage will be the low current consumption on account of the small power necessary.

The attached diagrams will give an idea of the different values when comparing dynamic with mechanical braking. Both diagrams are made up from the same motor and the cycles of operation are the same for either machine. The dynamic braking used is of a type especially adapted for winch service when overloads may be expected to occur in the course of handling.

Making a listing from the diagrams for the amount of cargo handled per hour, together with the current consumption per hour for the two types of winches, we get the following results when considering full, three-fourth, one-half and one-fourth loads:

	Dynamic Braking		Mechanical Braking	
Loading Pounds	Tons Per Hr.	K. W. Hours	Tons Per Hr.	K. W. Hours
5000	105	18.8	135	15.8
3750	82	18.7	105	13.8
2500	57	18.6	74	12.
1250	30	18.3	41	9.7

Relisting the results showing the freight handled and kilowatt current used per hour and considering the dynamic braking winch results as 100 per cent, we get for the mechanical braking winch the following results at the different loadings:

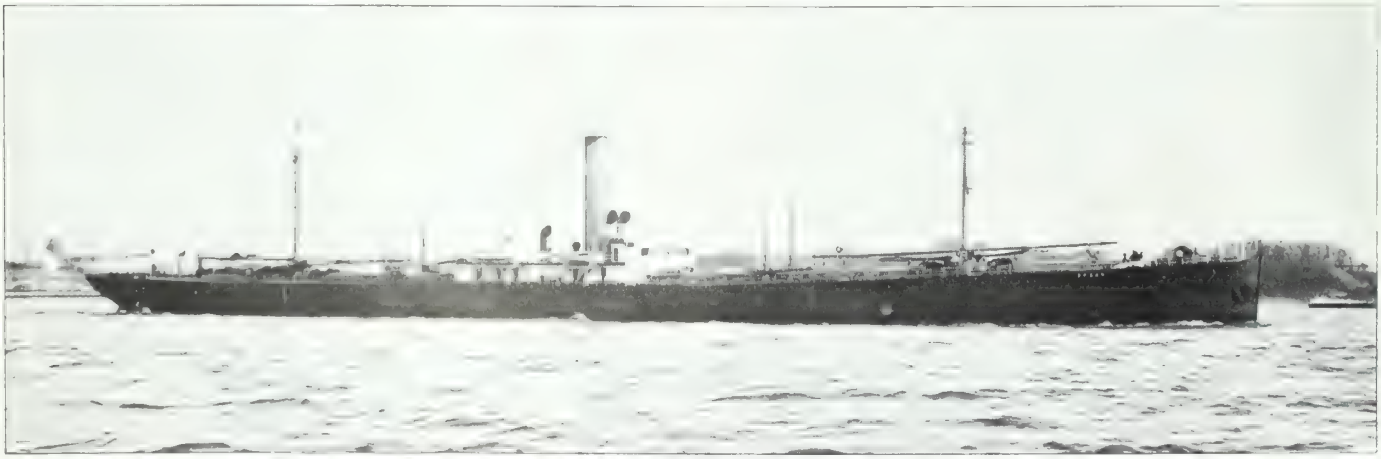
Pounds	Freight Handled Hourly	Current Consumed Hourly
5000	129 per cent	84 per cent
3750	129 per cent	74 per cent
2500	130 per cent	65 per cent
1250	136 per cent	53 per cent

We can here see that the mechanically braking winch will handle an average of 30 per cent more cargo at a current consumption of 30 per cent less than for dynamic braking.

To equip a ship with electric winches the first step will naturally be to determine the amount of cargo which will be desirable and possible to handle with each set of winches. From these figures we will arrive at the generator sets necessary for this equipment and from the above we will see that the mechanical braking winch will be able to use a motor at least 33 per cent smaller than the dynamic braking one with a result that the same reduction can be made in the generator and in this way effect a considerable saving in equipment, as well as a saving in space consumed.

Referring to our diagrams and listings, we will see that these winches will handle more than it is generally possible to handle over one set of winches, which fact brings us to the point that certain changes will have to be made in the present arrangement of the ship's gear and the methods used. One way would be to add to the number of the hatches and have them made as wide as possible. This will, however, at times, be found inconvenient in operation, as very bulky packages may be handled at times and these smaller hatches may interfere with getting this type of freight in and out of the ship. The best method would be to enlarge the present hatches, running two lines into the hatch;; this will give the distribution of loads which will be found necessary for rapid handling. With this additional amount of winches it seems possible that smaller powered winches using between fifteen and twenty horsepower may be the ones which will fit the general conditions to the best advantage both as regarding purchase price of winches as well as the cost and size of generator sets for supplying the power.

This two-line arrangement out of each hatch will also be found of benefit at times when a ship will be able to discharge or take in cargo from both sides of the ship as in ports where lighters are used. If we are going to compete with the more economically operated ships of other nations it will be absolutely necessary to equip the ships in a manner that the turn-around can be done in shorter time than the competitors. The first cost may seem high, but the saving in time will apply to the values of the whole rest of the ship and will therefore be true economy.



The American-Hawaiian Freight Liner Texan Ships of the American Hawaiian Fleet Are Very Generously Equipped with Freight Handling Machinery and Have Made Some Wonderful Records in Discharging and Loading Cargo

EUROPEAN MARINE DEVELOPMENTS

Exclusive Correspondence of Pacific Marine Review

WITH the month of September has come considerable freedom from control for British shipping. In fact, a general license has been issued by the controller authorizing all British vessels to proceed upon any voyage whatsoever. There is therefore no need to be always applying to the Ministry of Shipping for licenses. It is pretty clear, however, that this general license can be withdrawn at any moment by public proclamation. British shipowners sighed with relief when the news was published, but it has to be borne in mind that the position has been reached by very gradual stages. Early in July there were marked relaxations allowed. At other times there have been improvements.

The expert view here is that it would be indeed difficult to justify any further general continuance of control. Control of shipping, as of everything else, could only really be justified when the supply was not equal to the demand, and, in order to prevent rates rising to unreasonable levels, it was necessary to ration tonnage. The shipping statistical position has during the past few months been undergoing radical change. Few, probably, would care to contend that there is at present an insufficient supply of cargo tonnage for the world's needs. It is, of course, difficult accurately to estimate what are the world's present needs, for a considerable proportion of the population of the world is not yet hard at work producing, and there have been such great changes in the principal trade routes during the past few years. The real practical guide as to the relations between supply and demand is the test of freight rates. These have been generally declining throughout this year, and, although they are still on a much higher average basis than those ruling before the war, yet all operating expenses are also higher, so that it may be seriously argued that the net returns to proprietors may be no better than before the war, and in some pre-war years the return was very poor indeed. It should be remembered that accounts hitherto published have related largely to conditions ruling many months ago. The liner companies usually feel a fall in rates less quickly than the purely cargo ownerships, just as they are slower to participate in an upward movement. Some of the cargo steamship ownerships may be fortunate in that they were able and wise enough to charter their ships some time ago for a year or more at rates representing, perhaps, double those that could be secured today. Now and again voyage rates are seen to rise sharply, as in the case, during the past few days, of the freights for maize from Argentina, but such a rise is usually due to the fact that ships are wanted to load at an early date at particular ports, and few can participate in such terms.

VOYAGES IN BALLAST

Such considerations as have been indicated do not, as a writer in the Times points out, disturb the contention that, generally speaking, there is no lack of ordinary cargo tonnage at present, and therefore nothing to justify the continuance of control. It is now quite a common occurrence for brokers to be asked to find profitable employment for vessels, and the task is often by no means easy. Too often the only employment in sight involves outward voyages in ballast, so that the homeward freight has to be sufficient to cover the cost of the round voyage, whereas before the war the coal cargoes which were carried outwards were at least sufficient to pay for the cost of that part of the venture. It is the unsatisfactory condition of the freight markets at present which has made British owners almost indifferent to the prospect of a strike of coal miners, which would involve the laying up of ships. In some directions freight rates are now being offered which British owners consider quite unprofitable.

SHIPPING TRADE OUTLOOK

Rather gloomy views as to trade conditions during the coming winter, especially in the shipping industry, were given expression to by Francis Henderson at Liverpool on August 25 in presiding over the annual meeting of shareholders of the Anchor Line. Speaking on the shipping outlook he said the nation was in an unsound and precarious period in regard both to the cost of operating ships and the cost of shipbuilding. No one with a stake in the country's interests wished to see a reduction in wages; but the mad race which was going on to keep wages up with prices could only end in ultimate disaster. Unless dire poverty and distress were to overtake the country this winter there must be, besides increased production, a united facing of the problems of peace. Present costs of ship operation and building could not be maintained, because they were uneconomic and artificial; and to attempt to maintain them would cause disaster in the shipping trade within twelve months. The public, already overburdened by taxation, could not afford to pay the charges necessary to meet the costs.

PROHIBITIVE SHIPBUILDING COSTS

Critics of the shipbuilding position here hope that the facts alluded to in the speech of Sir Thomas Fisher, general manager of the Canadian Pacific Ocean Services, Ltd., after the launch of the Canadian Pacific liner Empress of Canada, at Govan, Scotland, recently, will receive the full consideration they deserve. Sir Thomas put the cost of the vessel at about $6,800,000, as compared with a price of $2,200,000 for which such a ship might have been built before the war. He indicated that the directors of the Fairfield Company had suggested to him the desirability of laying down on the slipway just vacated a vessel similar to the Empress of Canada. Sir Thomas indicated that, however much the directors of the company might like such a course to be followed, he had no hesitation in saying that they would consider it absolutely out of the question. The cost was prohibitive. And then followed a string of comparisons of working costs which are just as serious for the nation as they are striking.

Taking the estimated cost of building a vessel of the finest type of liner now engaged in the Canadian-North Atlantic trade, insurance, allowance for depreciation, and interest on the increased capital, would, Sir Thomas said, represent an additional $80,000 to be earned on a round voyage. As compared with the pre-war cost of $18,000 for coal, the present cost would be $96,000; repairs, which previously accounted for $6800, would now have to be reckoned at $30,800; the cost of provisions had increased from $12,000 to $32,000; and wages had risen from $10,000 to $36,000. The net result was that the cost of a round voyage of a new ship would have to be estimated at $240,000 more than that of a similar voyage of an existing ship before the war. In order to meet the higher expenses, the first-class minimum fares had been raised from $76 to $202, the second-class fares from $44 to $112, and the third-class fares from $26 to $76. (These prices are worked out on the basis of an exchange rate of four dollars to the pound sterling.) Yet the higher passenger fares represented an increase of only 185 per cent, whereas the ship working expenses had advanced by not less than 350 per cent. The increased fares were not sufficient to meet the increased expenses. Sir Thomas has no illusions at all about the gravity of the present high cost of travel, and he declared that unless a stop were put to the raise, the cost would lead to the disintegration of the British Empire. Other leading ship managers have commented on the rise in working costs, but the facts and the effects have never before been put more plainly.

A NEW WHITE LINER

Painted white, the color of the Canadian Pacific liners on the trans-Pacific route, and gaily decorated with flags, the Empress of Canada slid down the ways at the Fairfield yard (Govan) at 3:20 on the afternoon of August 18. Mrs. G. M. Bosworth, of Montreal, wife of the chairman of the Canadian Pacific Ocean Services, Ltd., released the vessel. After a momentary pause the great liner began to move slowly down the ways, gaining momentum until, when she was in the water, powerful hawsers checked her course across the Clyde. A large party of guests proceeded to Greenock by the Caledonian steamer Duchess of Fife to join the Empress of Britain, reconditioned after war service, for the passage to Liverpool. It is reported that the Empress of Britain has cost about as much to recondition as she did to build.

The twin-screw geared turbine passenger liner Empress of Canada has a length over-all of 653 feet, beam of 77 feet 9 inches, and a depth to the bridge deck of 53 feet 6 inches. The gross tonnage is about 22,000 and the sea speed 18 knots. The first-class accommodation is arranged on "B" deck in large state rooms for one, two and three persons, and also on "C" deck in rooms for one, two and three persons. In addition, there are a number of private suites, consisting of sitting room, bedroom and bathroom, and also of special rooms with bathrooms. The first-class dining saloon is placed on "D" deck amidships and will accommodate 307 persons at one sitting. On "A" deck the main stairway opens into the long gallery which has been made a feature of the ship, as it gives access to all the principal first-class public rooms. At the forward end of this long gallery is the first-class lounge. This room is to be utilized for concerts and also for cinematograph exhibitions, a cinematograph operating room having been arranged for at the forward end.

The second-class accommodation is arranged on "C" deck aft in state rooms for two and four persons. The dining saloon for the second-class is on "D" deck, and is to accommodate 100 persons. The third-class passengers are to be accommodated on "D" and "E" decks in rooms for two, four, and six. The dining saloon, having accommodation for 100 persons, is on "D" deck. All the equipment of the liner has been designed with a view to the employment of the Empress of Canada in a semi-tropical climate. The ship is propelled by two sets of Brown-Curtis turbines driving twin screws through double reduction gearing. The propelling machinery is stated to be the largest installation of double reduction gearing which has so far been constructed. The boilers are designed to burn oil fuel in combination with the Howden system of forced draught.

THE KITCHEN RUDDER

SHORTLY before the war Mr. J. G. A. Kitchen of Lancaster, England, experimenting with parabolic reflectors in a physical laboratory, was struck with the idea that it might be possible to put a fitting at the stern of a boat which would, by controlling the direction of the stream of water from her propeller, enable an operator to drive the boat in any direction without reversing the propeller. Working out this idea, he evolved what is now known as the Kitchen maneuvering and reversing rudder, which has been given much prominent notice in the public press during the last few months. The following description of this rudder and of its operation was taken from an address delivered before the Liverpool Engineering Society on the subject, "Maneuvering and Reversing Rudders," by A. T. Wall, a naval architect of Liverpool:

> The essential parts of the rudders consist of two curved deflectors generally formed of parts of a circular cylinder, partly enclosing the propeller. They are shown in perspective in Fig. 1. Both deflectors are pivoted at the top and bottom on common centers. One of the deflectors is operated by a solid shaft "A" and the other by a hollow shaft "B" concentric with the solid shaft. By suitable mechanism the deflectors or rudders are made to turn together in the same direction or equally in opposite directions. Some of the possible positions are shown in Figs. 2 to 8.
>
> To be as effective as possible an ordinary rudder should be placed in, or very near, the propeller race. This ensures that the speed of the water passing over the rudder will be greater than the speed of the vessel through the water by a varying value which may be as much as 30 per cent; and that in starting the ship from rest there will be a flow of water over the rudder, giving steering power before the vessel has much weigh on. This the rudders do in the most efficient way possible, since not only are they in the propeller race but entrain it.
>
> ### VARIATION OF SPEED
>
> For ordinary direct speed ahead the rudders will be fully opened out as shown in Fig. 2. When the deflectors are partially closed, as shown in Fig. 3, the speed of the boat will be reduced to about one-half the full ahead speed, the engines still running at the same revolutions, as in all the operations to be described. When the rudders are closed still further to the position shown in Fig 4, the boat will remain stationary. In this case the forward thrust on the propeller is exactly balalced by the water from the propeller directed forward by the rudders. When the deflectors are closed altogether, as shown in Fig. 5, the reaction on the rudders causes the vessel to go astern. This position gives the maximum astern speed.
>
> ### STEERING
>
> The vessel can be steered by carrying helm on the rudders, whether they be fully open, partially closed or quite closed. In Fig. 6, the rudders are shown fully open and carrying full helm. It has been found that 25 degrees to 30 degrees of helm is quite sufficient for all practical purposes, although with ordinary rudders as much as 38 degrees or even 40 degrees of helm is used. This limitation of helm angle tends to decrease of size in the operating gear, but there is no reason why it should not be increased if preferred. In Fig. 7 the rudders are shown carrying helm when closed to the neutral position. Under these conditions the vessel will turn about an axis somewhere near her middle length without moving ahead or astern. Similarly, helm can be carried with the rudders fully closed, as shown in Fig. 8, when the vessel turns going astern.
>
> ### BRAKING
>
> By closing the rudders quickly when the vessel is going full speed ahead she will be brought to rest very quickly, the time taken depending partly on the rapidity with which the rudders are closed, and also on the ratio of power to displacement, but boats up to 50 feet in length have been brought up from full speed to stop in their own length and often in something less.

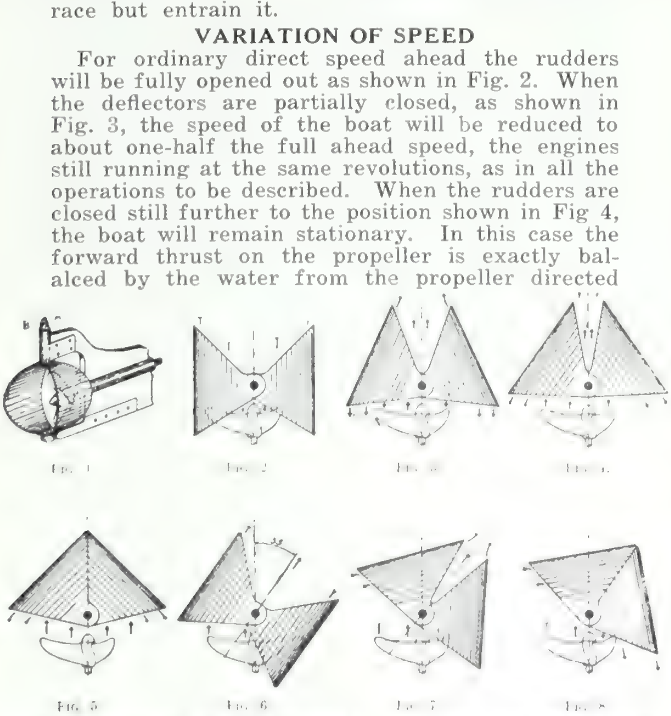
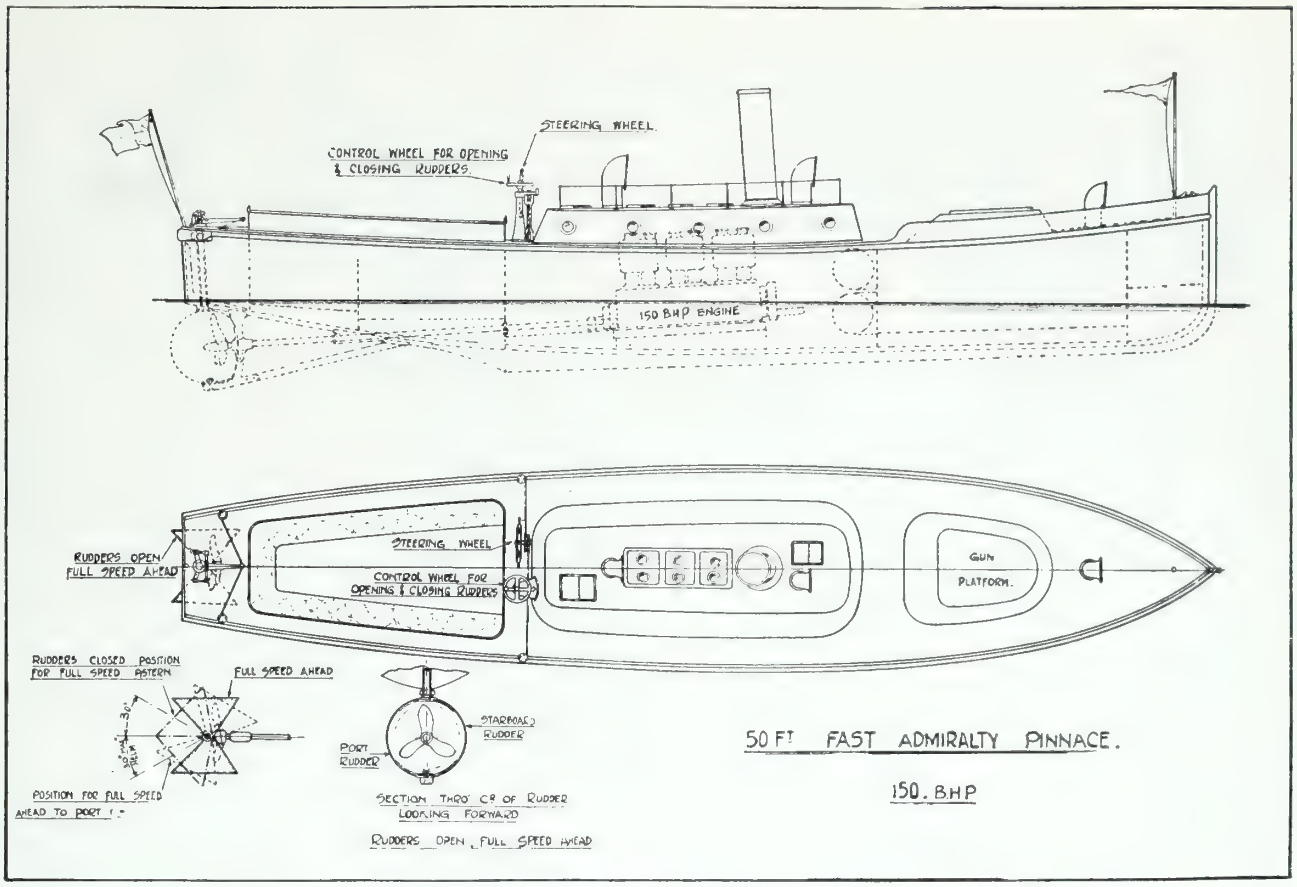


Fig. 1 Fig. 2 Fig. 3 Fig. 4
Fig. 5 Fig. 6 Fig. 7 Fig. 8

Sketches Showing Various Positions of the Kitchen Reversing Rudder

During the war considerable experiment was carried out with these rudders on small vessels with very satisfactory results. Among others the British Admiralty fitted out a fast pinnace 50 feet in length and powered with 150 H. P. oil engines, which boat was given numerous trials, developing the following facts: That with the engine running full speed ahead it was possible to obtain an astern speed of one-quarter to one-third the full speed ahead. By closing the rudders with the engine running full speed the boat was brought to a dead stop in slightly less than 50 feet. At full speed with the rudders open and hard over the boat described a circle with a diameter of one and one-half times her own length. The time taken to reverse with the Kitchen rudders was very much less than that taken in reversing by the ordinary engine reversing gear. The Admiralty decided from these tests that there was plenty of scope for these rudders on all motorboats, including those carried on passenger vessels.

The results of experiments with small and medium sized boats have encouraged the inventor and the distributors of these rudders to recommend their application on larger vessels, and a considerable amount of design work has been undertaken preparing plans for this application. We illustrate herewith the outline of a design for the application of these rudders on a 300-foot twin screw steamer. Plans have been prepared for their application to a standard American single screw freighters up to 8000 deadweight tons. On this latter design the inside diameter of the Kitchen rudder would be 16 feet for a propeller whose outside diameter was 14 feet over the tips of the blades. The over-all length of each blade of the Kitchen rudder would be 13 feet, and the rudder plates would be 1¼ inches in thickness. The circular shape of these rudders gives them plenty of stiffness so that a simple plate only is needed except at the pivots. The diameter of the bottom pintle of these rudders for an 8000 deadweight ton vessel would be 8 inches; the solid stock would be 10 inches in diameter, and the outside diameter of the hollow stock 13 inches. In this connection it is very noteworthy that the stresses developed in the sudden stopping of a

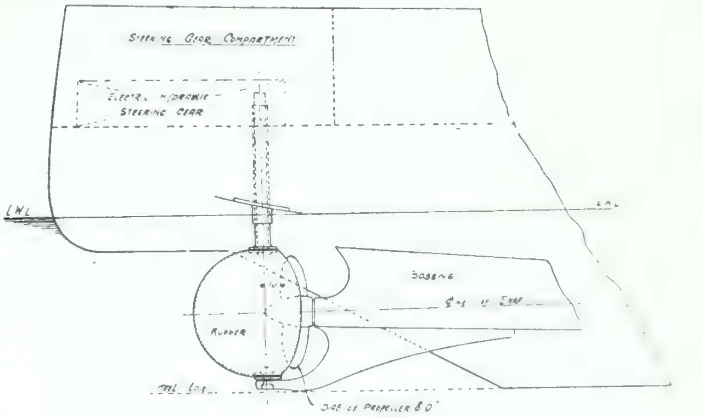

STEERING WHEEL.
CONTROL WHEEL FOR OPENING & CLOSING RUDDERS.
150 BHP ENGINE
RUDDERS OPEN FULL SPEED AHEAD
STEERING WHEEL
CONTROL WHEEL FOR OPENING & CLOSING RUDDERS
GUN PLATFORM.
RUDDERS CLOSED POSITION FOR FULL SPEED ASTERN
FULL SPEED AHEAD
30°
POSITION FOR FULL SPEED AHEAD TO PORT
STARBOARD RUDDER
PORT RUDDER
SECTION THRO' C^R OF RUDDER LOOKING FORWARD
RUDDERS OPEN, FULL SPEED AHEAD
50 FT FAST ADMIRALTY PINNACE.
150. BHP

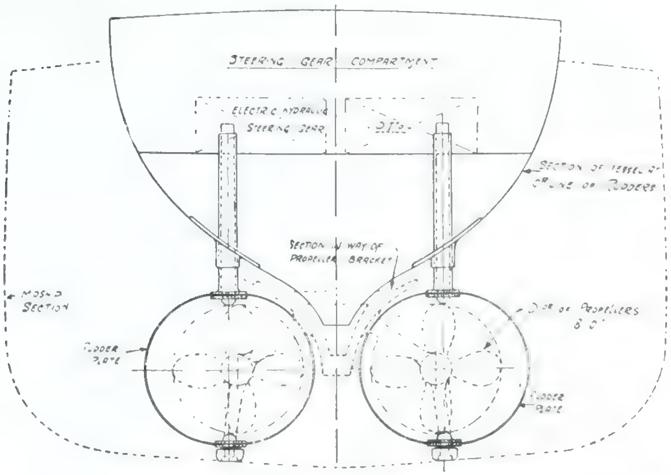
Fast Admiralty Pinnace Equipped with Kitchen Reversing Rudder

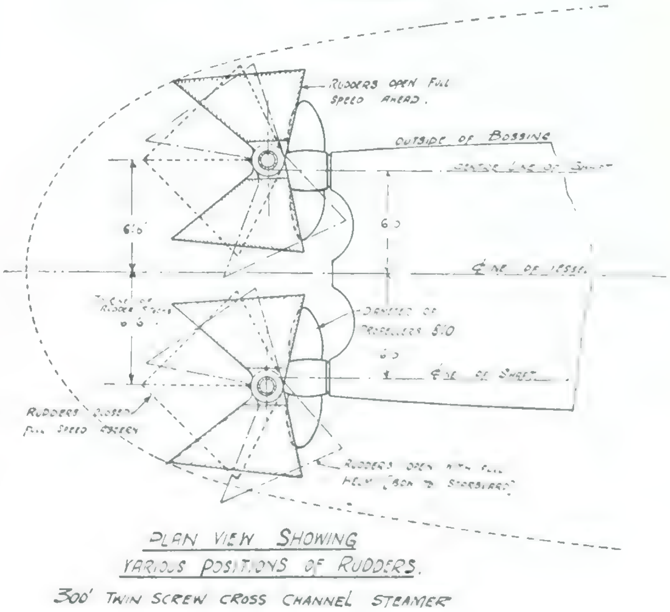
vessel by this reversing rudder are very much less than would be expected.

Assuming a steamer 350 feet in length moving at 24 knots speed and brought to a dead stop in twice her own length, the maximum force required, neglecting water and propeller resistance, would be about 220 tons. This would represent a working sheer stress of about 4½ tons per square inch on an ordinary steel rod 8 inches in diameter, which is well within the limits of safety. An ordinary rudder fitted to a vessel of this size would have a rudder stock of about 11 inches in diameter so that any stresses coming on Kitchen rudders through the stopping and reversing of ships are well within the limits of ordinary practice. The circular shape of these rudders would tend to less stress and strain upon them through storm conditions, and they are so positioned with regard to the propellers as to form a very efficient protection to the propeller wheel.

Experiments with Kitchen rudders have uniformly shown a gain in propelling efficiency. With the same power applied, there has been a uniform gain in speed of approximately 8 per cent over that obtained with the ordinary rudder installed.




STEERING GEAR COMPARTMENT
ELECTRIC HYDRAULIC STEERING GEAR
SECTION OF VESSEL AT C^R LINE OF RUDDERS
SECTION IN WAY OF PROPELLER BRACKET
MOSH'D SECTION
DIA OF PROPELLERS 8'0"
RUDDER PLATE
RUDDER PLATE


RUDDERS OPEN FULL SPEED AHEAD.
OUTSIDE OF BOSSING
CENTRE LINE OF SHAFT
6'0"
6'0"
C^L OF VESSEL
DIAMETER OF PROPELLERS 8'0
6'0
C^L OF SHAFT
RUDDERS CLOSED FULL SPEED ASTERN
RUDDERS OPEN WITH FULL HELM (BOW TO STARBOARD)
PLAN VIEW SHOWING VARIOUS POSITIONS OF RUDDERS.
300' TWIN SCREW CROSS CHANNEL STEAMER

Sketches Showing Application of the Kitchen Rudder to a 300-foot Twin Screw Cross Channel Steamer

THE AMERICAN SHIPBUILDING COMPANY

THE American Ship Building Company of Cleveland, Ohio, operates, in addition to its own plant, those of five subsidiary companies—the Detroit Ship Building Company of Detroit, the Chicago Ship Building Company of Chicago, the Superior Ship Building Company of Superior, the Buffalo Dry Dock Company of Buffalo, and the Milwaukee Dry Dock Company of Milwaukee. During the past year they have organized a steamship operating company for the purpose of taking title to the steamers under construction for the company's account. This is known as the Independent Steamship Company of Cleveland, Ohio. All of the capital stock of this steamship company is owned by the American Ship Building Company.

In the twenty-first annual report of the American Ship Building Company just issued appears a statement to the stockholders by M. E. Farr, president of the company, which sets forth in a very clear and concise manner the work of the company during the past fiscal year ending June 30, 1920. We quote this statement in full:

> The various plants of the company have been moderately active during the fiscal year just closed, in completing ships ordered by the United States Shipping Board Emergency Fleet Corporation, the construction of bulk cargo lake type and general cargo ocean type steamers for company account, and in repairing, reconditioning and replacing equipment on lake steamers. The hope that the volume of the world's trade would develop sufficient tonnage to provide cargoes for all vessels available for deep sea service has not been realized, which situation has depressed the shipbuilding industry throughout the world. The company's statement of net earnings, it will be noted, shows a decrease over last year. Considering the decreased volume of business and lack of orders for new tonnage, this showing is all that could be expected. Large appropriations recommended and approved by the company's Federal tax committee and auditors have been set aside out of accumulated surplus, as reserves, to meet such demands as may develop in connection with the settlement of Federal income taxes, and amortization of the cost of plants expanded during the war period.
>
> During the year sixty-three ocean cargo ships of 255,900 gross tons carrying capacity were completed and delivered to the United States Shipping Board Emergency Fleet Corporation. In order to keep the three construction plants at Cleveland, Lorain and Detroit in operation, the construction of four bulk cargo lake type and ten general cargo ocean type steamers was authorized for company account. Six of the ocean type ships are practically completed, and the others are expected to be completed within the next four months. The prospects for obtaining buyers for these ships at fair prices appear good.
>
> During the four fiscal years ending June 30, 1920, the company completed and delivered 250 steel ships of the highest class with an aggregate deadweight capacity of 1,010,500 gross tons. During the same period 1075 vessels, not including tugs, barges, dredges and other small craft, aggregating 4,749,940 tons carrying capacity, were dry docked and repaired.
>
> The plants located at Superior, Chicago and Buffalo were abandoned as construction plants, and all equipment not necessary for repair work dismantled. During the year $106,185.59 was expended for equipment, replacements and changes in various plants, and $50,000 appropriated for hospital accommodations for injured employes, of which $30,690.33 was expended.
>
> Negotiations have been concluded for leasing the Viaduct office and machine shop building, boiler shop and foundry building (known as the Viaduct property), and the Globe foundry and pattern shop property, at Cleveland, for a period of ninety-nine years, at an annual rental of $13,815.84 for the first ten years and $14,215.84 thereafter, free from taxes, maintenance, and all other expenses. This unused property has been carried at a loss for many years. The entire capital stock of the Wyandotte and Lorain housing companies, carried on the books of the company at $2, has been turned over to the United States Shipping Board Emergency Fleet Corporation for this amount.
>
> The property of the company is in good condition and free from incumbrance. The indebtedness shown in the annual balance sheet is current, and there are no known contingent liabilities. The fire losses during the year were neglibible.
>
> Inventories have been taken on a basis of cost at the time of purchase, but not in excess of the prevailing market prices.
>
> The cost-plus agreement with the United States Shipping Board Emergency Fleet Corporation, dated October 24, 1918, for construction of 176 ocean cargo ships, referred to in the annual report for the year 1919, was superseded by a fixed-price agreement, dated October 4, 1919, the consideration amounting to $131,787,310, which amount is approximately $20,000,000 less than the aggregate of the original contracts.
>
> The results obtained by the company in carrying its own workmen's compensation and public liability insurance are gratifying. The policy of insuring workmen under the group plan was discontinued June 5, 1920, as experience proved that this form of protection was neither appreciated nor desired by a majority of the workmen.
>
> The percentage of labor turnover has increased slightly during the year, notwithstanding there has been plenty of work at all times in the active construction yards of the company, at high wages. Excessive labor costs have increased the total cost of new construction to a level much higher than the prevailing costs of British and other foreign competitors, with the possible exception of the Japanese. While steel and other basic materials cost the British shipbuilder nearly double the price paid by the American builders, the advantage in lower labor costs, together with economies in yard management, enables the British builder to produce ships from $20 to $30 per deadweight ton less than the American shipbuilder. Increased efficiency and application on the part of the American workman will help reduce construction costs, but American shipbuilders cannot hope to compete with foreign builders until a substantial part of the handicap in wages, which now amounts to nearly 100 per cent, is removed.
>
> The Independent Steamship Company was organized March 9, 1920, under the laws of Delaware, with a capital of $500,000, for the purpose of taking title to the steamers under construction for company account, when documented. All of the capital stock of the steamship company is owned by the American Ship Building Company.
>
> Government bonds of various issues, aggregating $253,000 par value, bought and held for the account of employes, were sold at a loss of $22,018.84. Many employes failed to make payments, and others were unwilling to subscribe for these bonds, which made their sale advisable.
>
> There is at the present time practically no American market for the type and size of ships this company is able to build for deep sea service. The inquiries for ships for foreign account, while limited in number, are still persistent. The foreign exchange situation, embargoes and unsettled conditions abroad have made the closing of ship sales extremely difficult. Until the foreign exchange situation is nearer normal, the sale of ships to responsible foreign interests will necessarily be restricted. Lake vessel owners are not inclined to contract for tonnage at the prices builders are obliged to quote for 1921 delivery, although a limited number of orders may be released for replacements or to meet urgent needs. The prospects for repairs, replacement and reconditioning work on lake vessels are good. All repair plants are well equipped and organized to care for the company's full share of lake business, economically and with dispatch.

Marine Insurance

DEVELOPMENTS IN MARINE INSURANCE

By C. F. HOWELL

BY many the 20 per cent reduction in the marine premium rates on cotton shipments to Europe is regarded as a significant indication of the satisfactory condition of marine insurance in this country at the present time. For it is argued that unless the situation were healthy such a downward revision would never have been undertaken. As has already been frequently pointed out in these columns, there are two cotton marine insurance pools in the United States—the old combine, made up for British companies chiefly; and the new pool, known as the Cotton Fire & Marine Underwriters, which is overwhelmingly American. The former made the first cut, and the latter promptly met it. Some adherents of the former contend that certain interests outside of either combination began cutting the rates to get in on the supposedly profitable cotton lines, and that the rate had to be met if the business were to be held. Free shore-end cover is thrown in. The reduction carries back to September 1. Hendon Chubb, in a public interview, has stated that the systematic and constructive efforts of the underwriters have resulted in a material reduction in the risks and losses of the business, especially on shore in the United States. The rates, he says, would undoubtedly have been reduced last year had it not been for the uncertainty arising from abnormal war conditions, but a material reduction for this season has been under discussion ever since April. With a broad spread of business and protection against excessive liability through division of risks, the cotton underwriters can afford to be satisfied with a very moderate profit, and that is all the rates made for this season contemplate. "It remains to be seen," says he, "whether the results of the business in the future will justify this substantial reduction, but it was made because the underwriters believed the time had come for such recognition of the improved conditions of the business."

The changes in the rate schedule of the Cotton Fire & Marine Underwriters effect the 20 per cent reduction on shipments from all American ports except Savannah, the latter's cut being only 17½ per cent. On shipments to the United Kingdom the rates include twenty-one days from the commencement of the discharge of the steamer, and on shipments to the Continent the inclusion is fifteen days' shore risk after completion of discharge from the steamer without additional cost. When provided for in the certificate of insurance, the underwriters are willing to grant a further fifteen-day shore risk, which would make, in all, thirty days after completion of the discharge for an additional rate of 7½ per cent on shipments to all European ports except Genoa, for which an additional rate of 15 cents will apply. Additional changes are listed as follows:

Five cents additional will be charged on shipments to Dunkirk, Antwerp, Rotterdam, etc.

Ten cents will be charged on shipments to Hamburg, Bremen and the West Coast of Italy.

Twenty cents additional for shipments to Oporto, Christiania, etc.; also Venice, Trieste and Fiume.

Thirty cents additional for shipments to Piraeus.

The risk of transhipment at European ports and in the United Kingdom will be ten cents.

Transhipments at Atlantic ports by approved steamers — other than specified liners — will be twenty cents.

On over-age steamers, one-eighth per cent will be charged on vessels over fifteen years old and not less than one-quarter per cent on vessels over twenty years.

Owing to heavy fire losses, etc., in Japan on shipments of cotton to Japanese destinations, these rates have only been slightly reduced, but shippers have return of twenty cents on the rates if policy is endorsed to the following warranty:

"Warranted free from liability on craft and/or on shore after discharge from ocean steamer at port of destination."

Domestic rates have also been reduced all around approximately twenty cents.

The rates on C. I. F. shipments to Europe, etc., and on domestic shipments will be subject to a reduction of ten cents on cotton on which the risk originates at the port or is purchased under local bill of lading for concentration at a sea port. Thirty cents on cotton on which the risk commences only from the time of issue of railroad bill of lading to final destination, or forty cents from which the risk originates from the issue of steamship bill of lading.

Cost and freight rate, until on board steamers, is seventy cents and the deduction on such shipments will be ten cents for port cotton, or if purchased under railroad bill of lading for concentration at a sea port, thirty cents on which the risk terminates on issue of railroad bill of lading, thirty cents on local sales, thirty cents on which the risk commences from issue of railroad bill of lading, or forty cents from steamship bill of lading to final destination.

The return on cotton concentrated at approved compresses will be: 28½ cents on compress classified Class "AA," 27 cents on "A," 25 cents on "BB," 20 cents on "B," 10 cents on "C."

The transfer charge on cotton from inferior to superior presses has been eliminated and on cotton transferred from interior compresses for concentration at a sea port will be charged ten cents upon shipment and rated as port cotton when subsequently shipped.

Owing to the large reductions mad ein the basic rates the return in connection with prepaid freight has been eliminated.

Additional premiums for average time at risk for the coming season will be as follows:

Two cents for each thirty days on premises, Class "AA"; 4 cents on "A"; 5 cents on "BB"; 12 cents on "B"; 22 cents on "C"; and 32 cents on "D."

THE SYNDICATES

Interest continues, very naturally, to follow the initial operations of the insurance syndicates. All three are now effective. Risks are being bound daily, and in amounts never before known in the history of American marine insurance. The only unsatisfactory element of the situation is the continued delay on the part of some of the smaller subscribers to legally complete their acceptance agreements. This is hold ing up the issuance of policies and is embarrassing the syndicate managers. The subscription deficiency, which was about 20 per cent, has been temporarily made good by additional capacity extended by a group of the more powerful companies; but it would be much more satisfactory all around if the subscription facility could be definitely determined and signed up. It is only reasonable that the assured should want to know just what companies are to carry their lines and whose guarantee stands back of their coverage. As soon as the list of subscribers has been made up it will be at once published in this department of Pacific Marine Review. It ought to be known, in view of the disparaging reports cir-

FIREMAN'S FUND
Insures Hulls, Cargoes,
HEAD OFFICE: CALIFORNIA AND SANSOME

JOSEPH HADLEY, European Agent
3 LOTHBURY, E. C.
LONDON

E. A. VALENTINE, Special Agent
714-715 BOARD OF TRADE BUILDING
PORTLAND, ORE.

FRANK G. TAYLOR, GENERAL AGENT FOR WASHINGTON, OREGON, ALASKA

culated abroad on the subject, that the American brokerage houses are loyally supporting the syndicates. Practically every one of their risks have first been offered to the syndicates. They have accorded their cordial and entire approval to the forms employed, although the knockers in foreign newspapers have been industriously circulating rumors of alleged dissatisfaction with the syndicate forms on the part of the brokers, and are even saying that the "super-brokers" dominate the American market and are imposing a form of their own to the displacement of the syndicate form, and that they have drafted a form and sent it to the Institute of London Underwriters for approval and use. No one has so much as heard of these brokers' forms, on this side. So much in refutation of the aspersion that the new syndicates "have proved a failure and are practically dead." With minor alterations, the form in use by the syndicates is that of the old American Hull Underwriters' Association, which has always been regarded as an excellent and satisfactory contract.

LAKE BUSINESS FLOURISHING

This year's marine insurance experience on the Great Lakes has been entirely satisfactory to the underwriters, both as regards hull and cargo; although they are quite aware, from years of reversals, that such a statement comes under the category of whistling while still in the woods. Canada is now engaged in moving the greatest grain crop of her history, practically all of which will have to come down the Lakes from Duluth, Port William and Port Arthur. Every style of craft that gives promise of carrying grain in safety is being rushed to the three ports above mentioned to take care of the big transportation problem involved. Lake earnings is an underwriting proposition that some of the large New York insurers are handling very skillfully this year. There has been but one serious damage so far this year—the sinking of the Superior City by the Willis L. King, a few weeks ago. It occurred in White Fish Bay, which is a dangerous bit of water, and both vessels appear to have been off their proper course. The discrepancy in the statements of the two captains is notable; one declares that it was a perfectly clear night, while the other insists that it was very foggy. The Superior City was owned and operated by the Pittsburgh Steamship Company, a subsidiary of the United States Steel Company, and its insurance was carried in the Steel company's fund; there will therefore be no risk to the underwriters so far as this vessel is concerned. The King was covered in the New York market. The value of the sunken ship, with disbursements, will probably reach $700,000. Were the King to be found at fault she will be liable for this amount. She was insured for $800,000, and, with costs included, it would run close to a total loss.

WILL DECLINE BROKERS' CERTIFICATES

One of the most far-reaching innovations of recent years, so far as regards the transaction of marine insurance between brokers and banks is concerned, has just been announced by the National City Bank of New York, the Irving National, and the Guaranty Trust Company. Hereafter brokers' certificates will not be accepted by them—and their lead will undoubtedly be followed by a long line of similar institutions. It will undoubtedly lead to a revolution in this form of transaction, and the vast majority of brokers will be dealt a staggering blow. It comes as a culmination of discussions on this subject that have extended over the last five years. The banks feel that they are being saddled with collateral that might readily prove of an undesirable character, and that it is a question of contract plus banking risk. Doubtless the large brokerage houses were not had in mind by the banks, but the less responsible brokers have brought the storm down on the heads of all. Mr. William G. Marvin, head of the legal, insurance and merchandise departments of the National City Bank of New York, whose extensive investigations into the legal and insurance phases of the banking business have succeeded in effecting far-reaching reforms and important changes in the policies and procedure of American banks in those fields, makes the announcement in The Weekly Underwriter, of New York, in the following terms:

> This institution has recently received a great many letters from brokers, requesting us to give our blanket approval of their certificates; and we have also received inquiries from shippers and others asking whether we have any objections to the acceptance of such certificates as part of our collateral upon drafts.
>
> For some time past we have uniformly refused to apply a policy of general approval to brokers' certificates, as such action would be contrary to the dictates of sound banking practice, and any attempt to discriminate in favor of particular brokers would seriously interfere with the regular and efficient operation of our established procedure in the handling of insurance documents. In the future we shall follow the general policy of refusing to accept such brokers' certificates. It is our desire that brokers' certificates be eliminated wherever possible, and their acceptability in specific cases which might arise in the future will be determined solely on the basis of an individual credit risk.
>
> I trust that the reason for this decision will be clearly comprehended. To accept such brokers' certificates would greatly enlarge the hazards incident to banking transactions, because, after all, the insurance policies, in case of loss, become the sole collateral to our advances upon shipments; and if this insurance collateral is merely brokers' certificates, then our acceptance of such certificates would be equivalent to the granting to such brokers of contingent deferred credits which, in the aggregate, would run into millions of dollars. No bank can afford to add this risk to those hazards which are already inherent in such banking transactions. In case of such a loss as would leave the brokers' certificates as the only basis for our recovery, the banks might find that, through some mistake or fraud, no insurance contract covering such goods had actually been effected with the underwriter; or it might be that some other perfectly honest mistake on the part of the broker kept us from having recourse against the underwriter. In such cases the only security which the banks or the shipper of the goods would have would be a right of action against the broker, and even such right of action would be based upon a contract which the courts have held to be defective.

MARINE MORAL HAZARD

Havana just now is supplying our best illustration of what a port becomes when moral hazard dominates it. According to the best information, no less than forty vessels are lying in her roads with cargoes from all over the world, and which have not been unloaded for months. The fall

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Freights and Disbursements
STREETS, SAN FRANCISCO, CALIFORNIA

W. H. WOODRUFF, Special Agent
LOS ANGELES
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F. H. & C. R. OSBORN, Managers
ATLANTIC MARINE DEPARTMENT
72 BEAVER STREET NEW YORK

AND BRITISH COLUMBIA, 309 COLMAN BUILDING, SEATTLE, WASHINGTON

in the market prices of sugar, coffee, and especially rice, has had the result of a refusal of delivery on the part of consignees who had bought at the higher levels, and the commodities are now lying depreciating on lighters and on wharves. The Cuban government has been forced to take cognizance of the situation, and has notified the merchants that they must have their consignments unloaded or else the authorities will do it for them and will store the merchandise in the warehouses. The state of minds of the underwriters may be readily imagined. The timely sinking of a lighter, for example, would help some beleagured merchant out in fine shape and insurance would be called upon to make everything right. Claims for depreciation and damage, due to prolonged exposure, are probable. Many of these vessels and consignments are covered under open policies. Practically no new business is being written at Havana or for Havana consignment, and what is taken is at greatly increased rates. The liability is limited to a certain period after making port, the time differing with different companies; ten days with some, a month with others. It is customary to take out further insurance after the expiration of the period allowed for delay in unloading. In the same way, shipments to the River Plate are handled with special care in this particular, because trouble is continually arising there. River Plate certificates usually carry clauses limiting the coverage to ten days after the arrival of the vessel; thereafter the charge is generally one cent per hundred dollars per day, if the goods are on wharf or on lighters; and this additional may continue indefinitely. Some such arrangement may have to be made with Havana shipments if present conditions continue much longer.

WILLCOX, PECK & HUGHES

THE new offices of Willcox, Peck & Hughes in San Francisco occupy the entire eighth floor of the Robert Dollar building, 311 California Street. The firm formerly occupied the fifth floor of that building, which was built up five floors during the last year. In making arrangements for the eighth floor, Willcox, Peck & Hughes were enabled to have it laid out and completed to meet the requirements of a modern brokerage office, and today their San Francisco plant is considered generally by underwriters, merchants and shipowners as being by far the best equipped office west of Chicago.

The office is laid out with the elimination of the usual halls and partitions, so that the three elevators stop in the middle of the entrance lobby, which is cut off from the office proper by large solid oak counters for the transaction of the usual counter business.

PANEL SIGNIFICANT OF BUSINESS

Directly opposite the elevators, a panel has been painted that is significant of the business of the firm, setting forth, as it does, in the first panel a full-rigged ship sailing through the Golden Gate, the artist's idea being to feature marine insurance of all kinds, in which Willcox, Peck & Hughes specialize—namely, hull insurance, cargo insurance, protection and indemnity insurance, and other kindred marine lines. The center panel sets forth the business of the non-marine department, and incidentally features Willcox, Peck & Hughes' own building, 3 South William Street, New York, which is in the heart of the business insurance district in that city. The panel is intended to feature the non-marine lines of insurance handled by that department, namely, fire and casualty insurance. The third panel is a picture of the sinking of the large steamer Dakota in the Inland Sea, and, of course, is typical of the average adjusting department of Willcox, Peck & Hughes, which deals with the settlement of marine losses of every nature pertaining to both hulls and cargoes. This panel acts as a screen between the office proper and the elevators and is very artistically done by Ray Coyle of San Francisco. Mr. Coyle purposely left out any mention of business in his painting and inserted rather, in the center, the following Shakespearean quotation, "To the business that we love we rise betime, and go to't with delight," which, in his opinion, expressed the spirit of the organization of Willcox, Peck & Hughes.

BRANCHES IN UNITED STATES

The business of Willcox, Peck & Hughes, established some 70 years ago, is world-wide, with the head office at 3 South William Street, New York, and branches located in the principal commercial centers of the United States—namely, Chicago, Cleveland, Buffalo, New Orleans, San Francisco, Seattle, Los Angeles and Vancouver, B. C.

Each of the Eastern branch offices is under the management of a resident director, but the Pacific Coast organization is operated as one department, under the management of H. S. Bates, who is the only director of the corporation on the Pacific Coast. The Pacific Coast department of Willcox, Peck & Hughes is so equipped as to give service to the clients of the firm in all lines of insurance from Canada to Mexico and in the Orient as well. Willcox, Peck & Hughes, Pacific Coast department, have established their own offices in Vancouver, Seattle, San Francisco and Los Angeles. They have also found the necessity of an Oriental department and are opening an office in the Robert Dollar building, Shanghai, which office is tributary to the Pacific Coast department, reporting to the resident director in San Francisco as do all other Pacific Coast offices.

DIRECT LONDON CONNECTIONS

The business of Willcox, Peck & Hughes, Pacific Coast department, is that of insurance brokers and average adjusters exclusively. They have no underwriting connections or affiliations of any nature whatsoever and are, in effect, buyers of insurance for their clients in the markets of the world. The Pacific Coast department has its own London connections for the handling of European business and, of course, in addition to the facilities above set forth, has the full facilities of the parent house in New York, with its comprehensive organization and ramifications throughout the world.

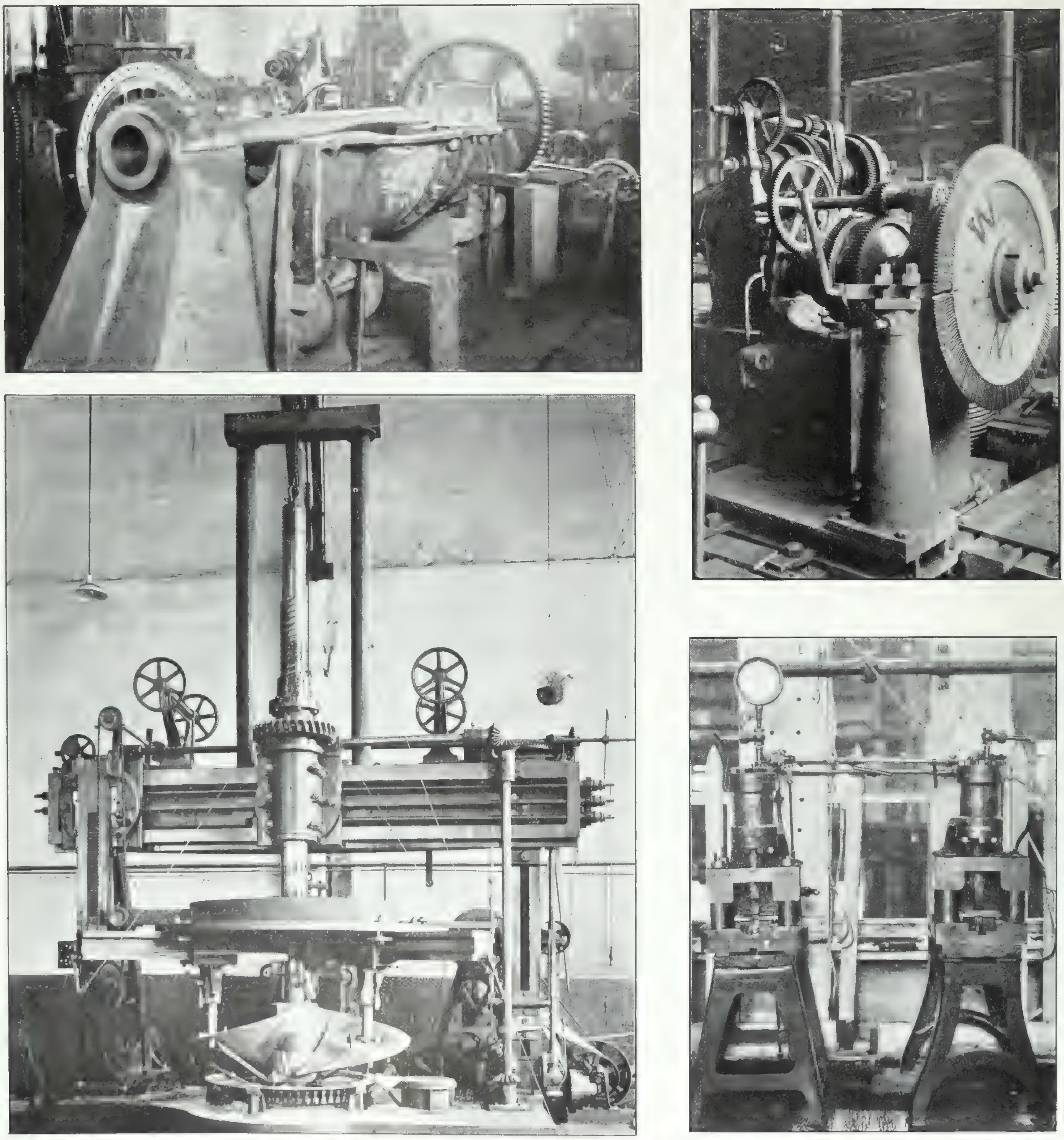
The Pacific Coast Department of Willcox, Peck & Hughes is comparatively new, having been established on its present lines just two years ago. Prior to that time the business of the firm was handled through an agency established by Mr. Bates in 1908, which transacted Pacific Coast business for the firm, but cleared it largely through the New York office.

BUSINESS GROWS GREATLY

Willcox, Peck & Hughes preferred not to give figures as to the volume of their business, but it is a matter of common knowledge that their Pacific Coast business has grown phenomenally in the last two years. Mr. Bates, when questioned on this point, advised that the entire scheme of things, as laid out by the executive committee of Willcox, Peck & Hughes, was in the nature of a plan for the future, as the officials of the corporation believed firmly that all lines of business on this coast will grow rapidly in the near future, and particularly marine insurance will increase in volume, following the export business from the United States to the Far East. Therefore, every move that Willcox, Peck & Hughes have made has been anticipating this future development, and also, and more particularly, assisting their clients in facilitating their development of the export business, as the marine insurance broker necessarily must blaze the trail for the merchant.

One phase of the "Willcox System, as expressed by a prominent banker, which must appeal to all, is the fact that full facilities and data referring to Oriental, European, South American and other foreign conditions always are available to merchants and others seeking the information, whether or not they are clients of the house. Doubtless it is through this service that the tremendous business of Willcox, Peck & Hughes has been built up.

SOME TOOLS FROM THE UNION PLANT



Upper left—Boring Bar Rig for Simultaneous Machining of the Main Bearings of Turbine Casings. Lower Left—Attachment Fitted to a 12-foot Bement Boring Mill for Machining Propeller Blades. Upper right—Headstock of an Old Gisholt Lathe Adapted as a Machine for Assembling Blades on Turbine Rotors. Lower right—Hydraulic Presses for Sizing Turbine Blades.

PACIFIC MACHINERY

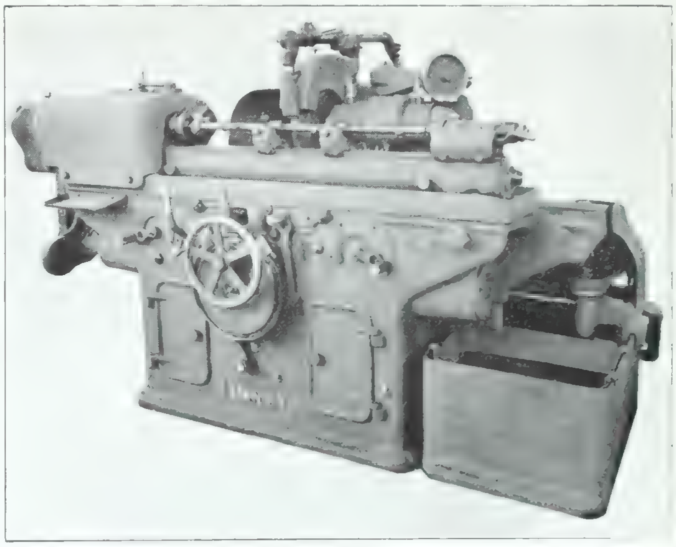
SEMI-AUTOMATIC CAM GRINDING

IN designing cams of various shapes, the tolerance has gradually been reduced so that grinding machines are called upon to produce many of the most difficult shapes, to meet the requirements of accuracy. In order to obtain a silent cam, clearances have been reduced and at the opening and closing points in some cases there is a slight rise in a number of degrees; for example, .005 inch in from 20 to 25 degrees.

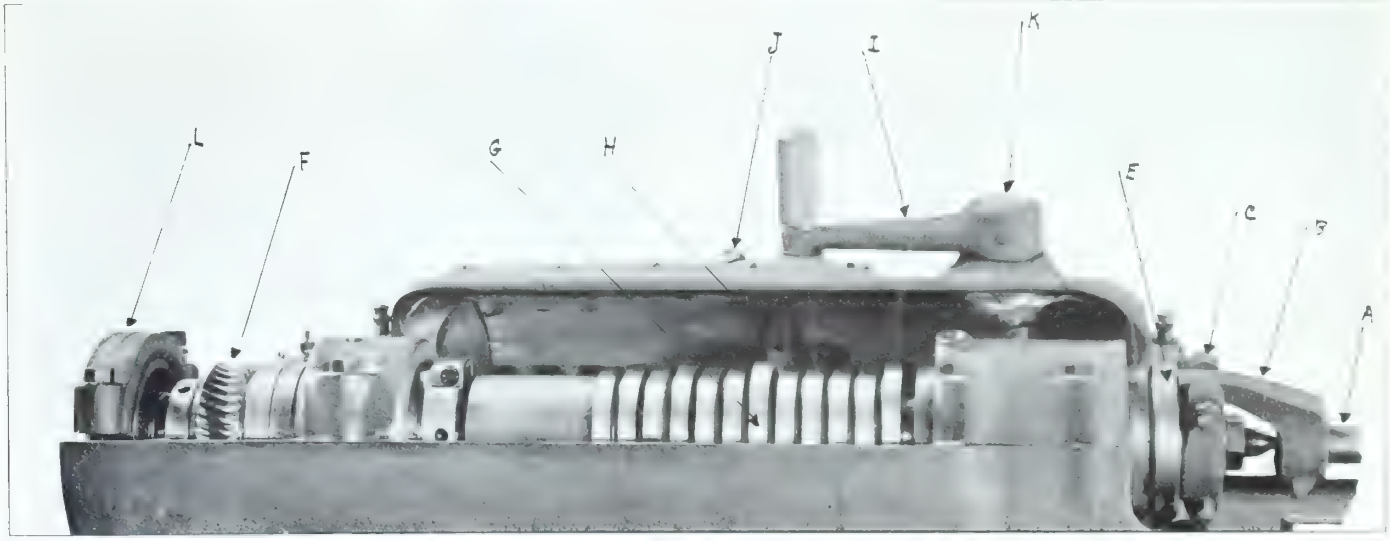
The present cam requirements have been responsible for the development of a new Landis attachment of the underslung type. Its outstanding features are: (1) Rigidity. The swinging bracket is tubular in cross section and is well supported directly under the master cam and work centers close to the machine bed. This construction balances the swinging bracket, eliminating all strain. (2) The work being carried directly over the fulcrum center, reduces the vertical movement, thus cutting down to a minimum the difference in contour of cams caused by the changing diameter of the grinding wheel. (3) The master cam being mounted directly on the headstock spindle, substantially connected to, and in line with, the work, eliminates lost motion and errors. The master cam is kept in contact with the master cam roller by means of compression springs, the tension being adjustable to suit different conditions.

Accurate work is secured when the grinding wheel is of a diameter equal to that of the roller used in contact with the model cam when generating the master. This condition is caused by the contact between the work and grinding wheel, traveling above and below the wheel center. The more the grinding contact varies from the wheel center, the more pronounced the variation in the contour of the cams ground with different sized wheels. Due to the work being swung equal distance from a point directly over the fulcrum center, the movement of the work is practically in a horizontal plane, reducing to a minimum the travel of the grinding contact above and below the wheel center.

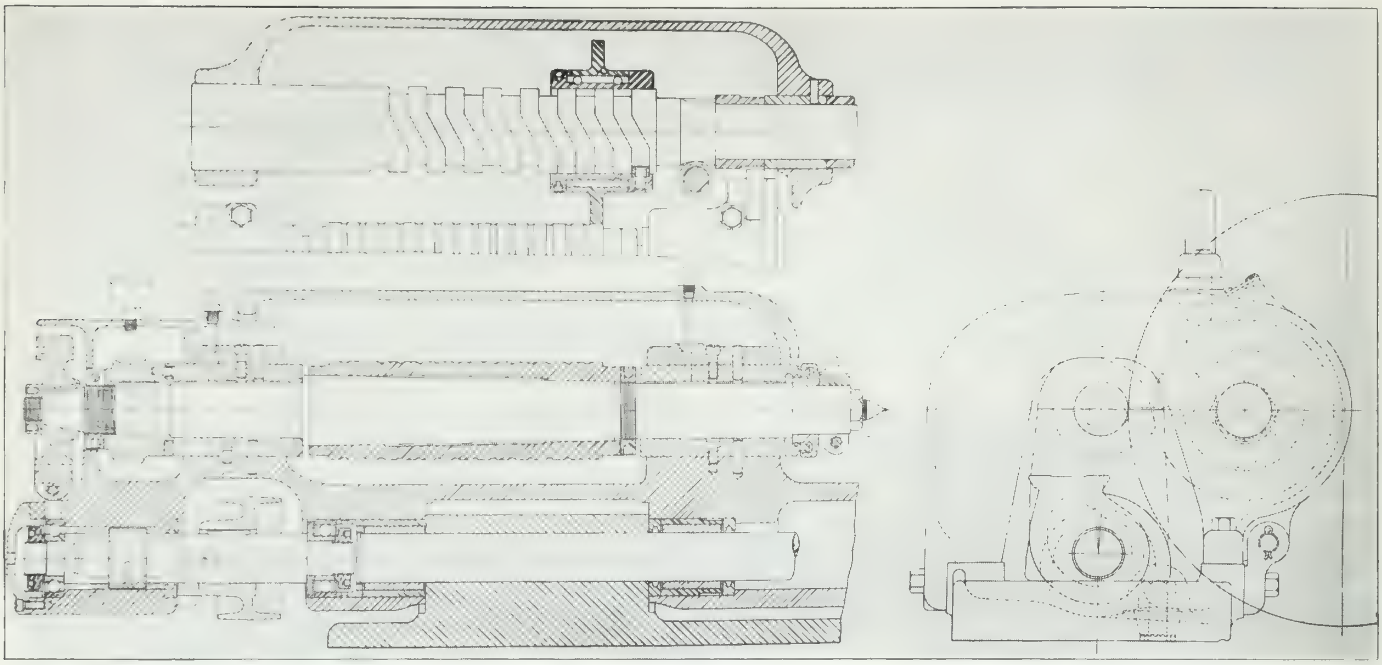
The accompanying photographs show the attachment mounted on the Landis 10-inch plain self-contained machine. The camshaft A is driven by dog B, which in turn is driven by driver C mounted on spindle E and is adjustable to facilitate setting camshaft in proper relation to master cam. On this spindle is worm wheel F, the spindle being worm driven throughout. On spindle E is master cam G, which is made from solid steel and mounted on spindle by means of taper and nut. In contact with the master cam is roller H, which is moved from cam to cam by means of lever I. The relative position of the roller is indicated by pointer J. By means of a cam on shaft K the roller and master are disengaged by a half turn of lever I and the roller shifted to the next cam by completing the turn. Thus, the roller and master cam are disengaged and roller shifted to proper position by a single



The Landis 10-inch Plain Self-contained Grinding Machine Fitted with Cam-grinding Attachment



The Landis Cam-grinding Attachment from the Rear with Cover Partially Removed Showing Operating Mechanism



Sectional Plan and Elevation and End View of the Landis Cam-grinding Attachment

movement. On spindle is also placed brake L, its object being to compensate for any lost motion which would be reflected on cam as the pressure is reversed when passing over the nose.

The judgment of the operator is an important factor in cam grinding, as the work speed, wheel speed and flow of water, all govern production and accuracy, and these factors should at all times be considered. Care should be taken that the wheel used for finish grinding does not become glazed, as it would then not be free cutting and the cams would become full.

This new cam grinding attachment can be furnished in the following sizes: 5½ inches by 26½ inches; 5½ inches by 36 inches; and 5½ inches by 52 inches.

CONTINUOUS MILLING MACHINE

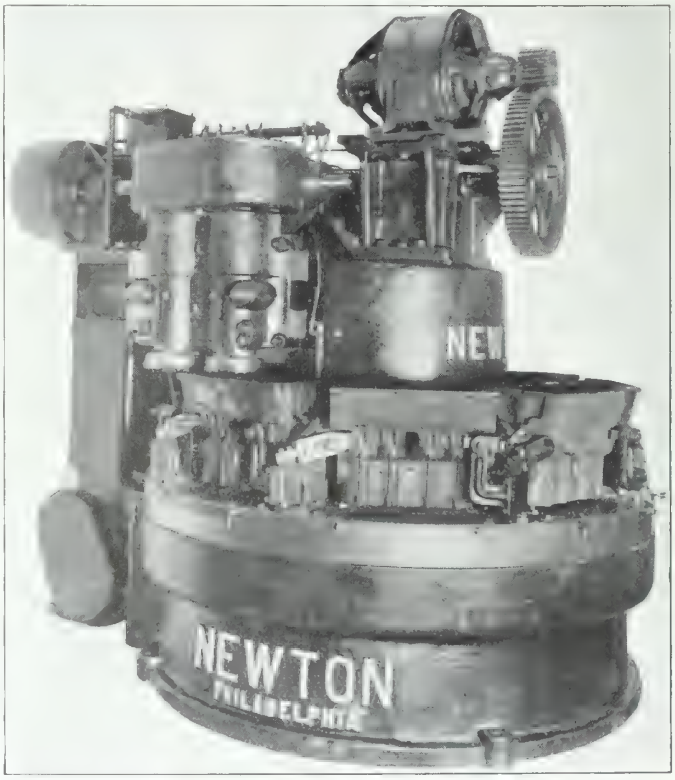
IN Pacific Machinery Department for last month we illustrated and described the first of a series of milling machines of the continuous operation type manufactured by the Newton Machine Tool Works of Philadelphia. The present article has to do with the second machine of this series, in which the same fundamentals of construction referred to on the first machine have been observed.

This second machine is of the ring table type, the base being circular in form providing a central taper column. The table casting is fitted to a bearing on this column and is also provided with an annular bearing close to the periphery of the table. It will be noted in the illustration that the cross rail and the central upright are made in one piece, providing a very rigid construction.

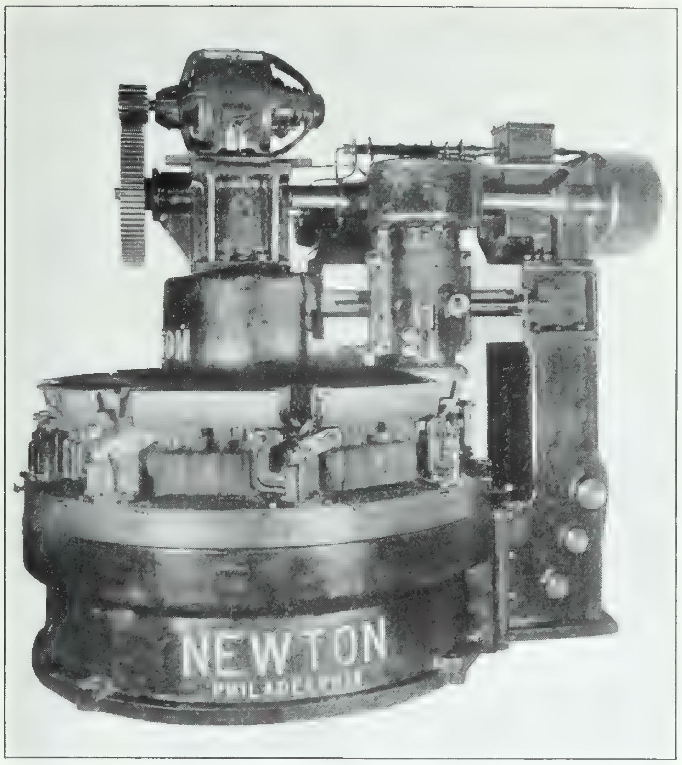
The table of this machine is 84 inches in diameter, the depth from the annular bearing to the top of the table being 12 inches. The least diameter of the taper fit between the base column and the table is 36 inches, and the table is provided with a finished hub 42 inches in diameter which materially assists in locating jigs on the table. The cross rail is fitted on the front side of the machine with one housing containing two spindles, both of which are used for roughing cuts. On the back of the cross rail is a similar housing carrying a single spindle, which is used for the finishing cut. Both housings are adjustable for position on the cross rail so that the spindles may be located for the most economical arrangement of the jigs upon the table and the jigs made with the least angularity and the least loss of space.

The driving motor is bolted to the top of the central column and drives a jackshaft through a simple spur gear reduction. This jackshaft runs to a box on the top of the outer column at the outer end of the cross rail. In this box gears are provided for transmitting the motion of the jackshaft to the roughing and finishing spindles, and provision is made for varying the speed of these spindles independently of each other. As in the first machine of this series, this speed control is fixed for any one operation and locked, only being altered when the work, material or size of cutters is changed.

The rotative movement of the table is also controlled by a fixed feed, provision being made to change this fixed feed for changes in the work, but no possibility being allowed operator of the machine to increase or decrease the speeds which have been predetermined by the foreman, the whole design of the machine being arranged for a predetermined production figured on a given number of pieces per hour passing the loading position. The table is rotated by a herringbone gear 81 inches in diameter.



Front View of Newton Continuous Milling Machine of the Ring-table Type Showing Two Roughing Cutters at Work



Rear View of Newton Continuous Milling Machine of the Ring-table Type Showing Single Finishing Cutter

The distance of 42 inches between the center of the roughing cutters and the center of the finishing cutters fixes the condition that with all ordinary work the roughing operation has been finished on any one piece before the finishing operation commences, and hence the finishing cutter is relieved of any influence due to vibration or other causes on the part of the roughing operation. As a very slight cut is necessary for finishing, any inaccuracy resultin from dull roughing cutters or inequality of castings is picked up by the finishing cutter, and thus accuracy of both finish and dimension is assured. This design tends to reduce the loss of time due to grinding and changing of cutters.

It will be noted that a lubricating tank is provided at the top of the outer column, and all of the bearings are plentifully supplied with lubricating oil by the cascade system, the oil finding its way into a sump at the bottom of the outer column, from which it is pumped again to the tank at the top.

This design of machine lends itself very readily to the use of jigs of the open front design which permit of quick loading and unloading from a roller conveyor. Bases of cylinder blocks for automobile engines with over-all dimensions 18¾ inches by 32 9/16 inches can be machined in this mill at the rate of two minutes to each casting. The usual practice, however, is to run these through at the rate of from two and a half to three minutes each. This speed is kept up on a 24-hour day service. The extreme ruggedness of all of the operating parts of the machine and the great weight of the parts tend to absorb all vibrations so that these machines are able to handle machining operations of this character at high speeds over long periods of time with a minimum of wear on cutters and a maximum of accuracy and finish in the machined surfaces.

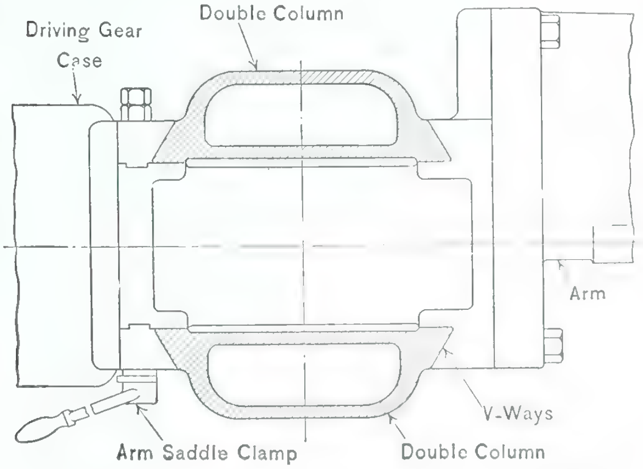
The Newton Machine Tool Works attribute much of the success of the operation of this type of machine to the worms and worm gear used in the drives, which are produced by a method which is peculiarly their own and is a result of many years of experiment and study carried out by the company.

RIGHT LINE RADIAL DRILLS

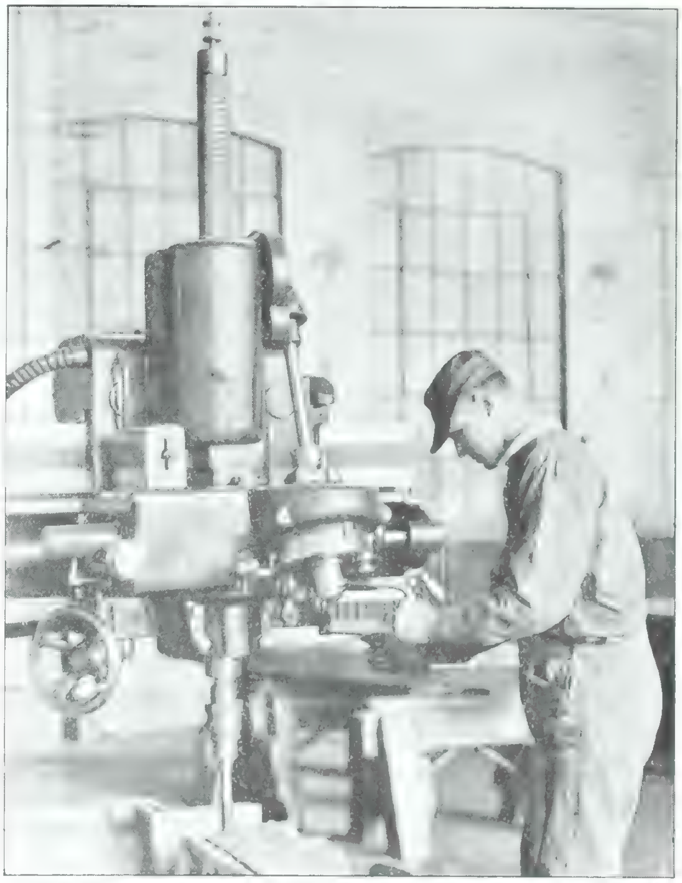
THE Niles-Bement-Pond Company, after many years' experiment and study, have recently brought out a radial drill embodying many radical changes from the ordinary type. As will be seen from the illustrations, the column instead of being circular in shape and surrounded by the arm is made in the form of a double hollow girder carrying four V-guides so that the arm passes through the center of the column and the column is revolved on its base. This construction develops a number of very decided advantages.

In the first place, the form itself gives increased rigidity. The V-guides on each side of the column allow of ample bearing surface. The back of the V-guide forms an excellent base for the gear change box and the driving motor, and the hollow column allows of a straightaway drive direct from the motor to the drill spindle with the intervention of only four gears and the positioning of the drive at the most advantageous point close to the drill spindle.

This new method of construction allows also of very convenient control of every movement of the machine close to the hand of the operator. The column clamp, for instance, is controlled both by a hand lever and a small elec-



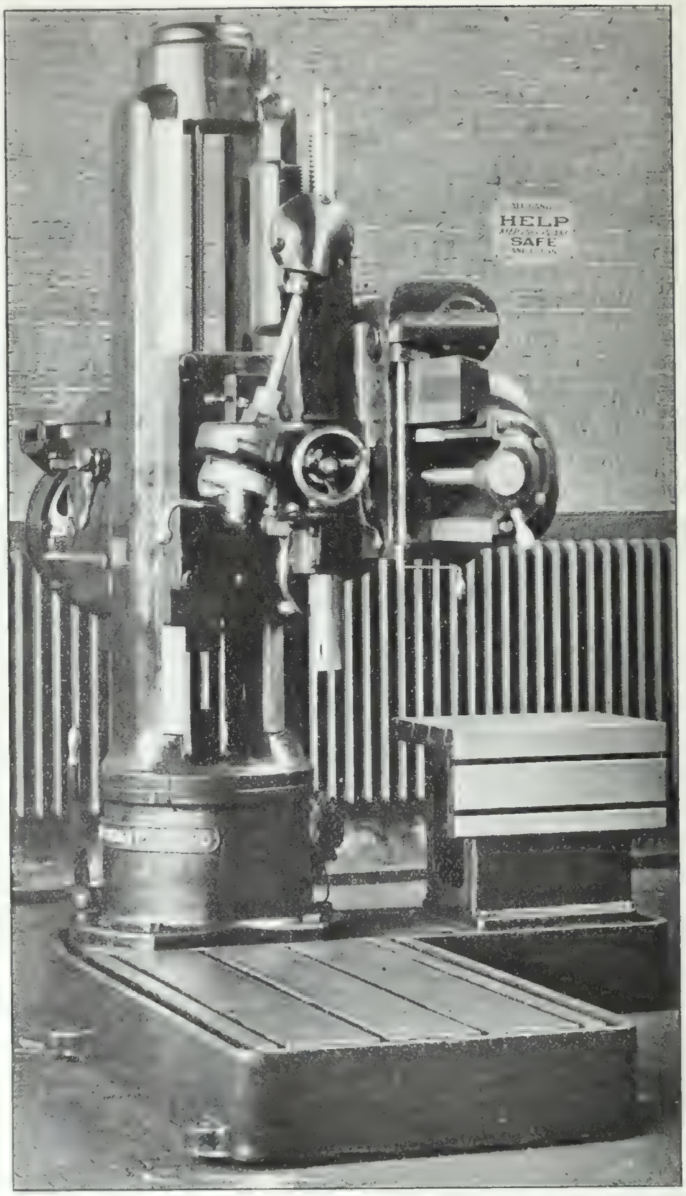
Section Through the Column of the New Right Line Radial Drill Showing Patented Double Hollow Girder Construction



View Showing Details of Spindle Housing of the Right Line Radial Drill. Note at Left of Spindle Switchbox for Controlling Electric Column Clamp tric motor operating through a worm and worm wheel. The switch controlling this motor is mounted on the side of the drill spindle housing. A slight movement of the switch in the downward direction locks the clamp. A slight movement of the switch in the upward direction releases the clamp. There are no belts needed at any point on this drill, and a very simple lever control of the spindle is arranged at the spindle housing, giving absolute control of the driving motor itself, which can be started, stopped, reversed, or varied in speed by a single hand lever.

The entire side arm and column is supported at the bottom on a ball thrust bearing, and all side thrusts are taken by two roller bearings. The arrangement of the gear box and motor at the back of the column almost exactly balances the weight of the arm and spindle housing in front so that the bearing at the bottom of the column is almost directly under the center of gravity. This feature not only tends to increase the rigidity and accuracy of the tool but makes the arm very easy to handle. Steel springs are fitted in such a way that when the clamping mechanism is released, the column is lifted just enough to relieve the friction at the top where the column flange bears on the pedestal so that a child can easily swing the heavy swinging arm and column with the slightest effort.

The swinging arm has a patented section with narrow V-guide at its upper edge and the square lower surface bearing set back in such a way as to bring the spindle driving shaft as close as possible to the spindle itself, thereby eliminating tortional strains. The spindle drive is of the simplest character through spur gears and bevel pinions direct from the motor without the intervention of any clutch or belt or jack shaft.



The Niles-Bement-Pond Company Right Line Radial Drill

A STEEL CASTING RECORD

CORRESPONDENCE tells of a large steel casting for the U. S. S. Dobbin, made in the navy foundry in the three-ton Greaves-Etchells electric furnace, supplied by the Electric Furnace Construction Company, 908 Chestnut Street, Philadelphia. Fourteen thousand eight hundred and fifty pounds of material was charged into the three-ton furnace, and the power consumption for this exceptionally large heat was only 801 K. W. H. per ton. The engineering officer reported that the casting was of very fine quality and showed the following chemical analysis:

Carbon	.38	Sulphur	.022
Manganese	.89	Silicon	.33
Phosphorus	.008	Nickel	.69

Physical tests obtained from test specimens cast on this casting were:

	Yield Point	Tensile Strength	Elongation
Specimen No. 1	58,000 lbs.	89,500 lbs.	25%
Specimen No. 2	55,250 lbs.	89,000 lbs.	25%

The electric furnace in the Philadelphia Navy Yard has been in operation for about a year, but it is believed this charge constitutes a record for this class of casting and shows the great adaptability of the electric furnace when properly operated.

GREAT LAKES ENGINEERING WORKS

AT a meeting of the stockholders of the above company, held at its main office, shipyard, River Rouge, Michigan, September 24, the stockholders elected to adopt the old corporate name—Great Lakes Engineering Works—and then proceeded to elect six directors, making the full directorate as follows:

Antonio C. Pessano, Detroit, Michigan.
John A. Ubsdell, Detroit, Michigan.
George B. Turnbull, Detroit, Michigan.
Frederick G. Morley, Detroit, Michigan.
C. Henry Hecker, Detroit, Michigan.
T. W. Palmer Livingstone, Detroit, Michigan.
Joseph Boyer, Jr., Detroit, Michigan.
Isaac W. Frank, Pittsburgh, Pennsylvania.
John T. Webster, Cleveland, Ohio.

After the stockholders' meeting, the directors convened and elected the following officers:

Antonio C. Pessano, chairman board of directors.
John A. Ubsdell, president and general manager.
George B. Turnbull, vice-president and assistant general manager.
John T. Webster, vice-president.
Frederick G. Morley, secretary and treasurer.

The following appointments have been made:

Charles E. Baisley, manager River Rouge shipyard.
Frank C. Pahlow, manager Ashtabula shipyard.
Robert Jackson, manager Detroit engine works.
Charles Short, secretary to the president.

The most remarkable part of this company's recent reorganization is that the employes of the company, on their own initiative, subscribed and paid for immediately in cash over one-third of the entire capital stock of the company, which they were allowed to take at the exact cost price paid for the properties. Possibly nowhere in the entire shipbuilding industry of the world has this been equaled. The Great Lakes Engineering Works will continue, as heretofore, the business of designing, building and repairing ships.

WITH THE EXPORTERS AND IMPORTERS

Steamship Import and Export Rates

Among shipping developments of the month is one that, because of its extraordinary nature, will command more than usual interest on the Atlantic and Pacific seaboards and in the interior. This is the decision of the Pacific Coast-North Atlantic Eastbound Conference, composed of the lines operating intercoastal services, to put into effect special rates on imported freight moving from Pacific Coast ports to the Atlantic. Import and export rates, which are lower than the domestic, have been in effect on railroads for several years, but the application of the idea to steamship lines is entirely new practice.

As the railroad import rates are materially less than the domestic, the steamship import rates also will be less than those charged for the goods of domestic origin and consumption, and also less than the rail import rates. How much of a reduction will be made cannot be stated, the tariffs not having been drawn at the time this is written, and, moreover, they will not bear any direct percentage relation to those of the railroads; each rate will be considered separately and on its own merits. But intercoastal steamship rates now are materially lower than transcontinental rail rates; for example, the new westbound schedule, Atlantic to Pacific, is approximately 85 per cent of the rail schedule as it was prior to the recent increases—in other words, 85 per cent as opposed to 133⅓.

Inasmuch as the lines engaged in eastbound business are the same as those engaged in westbound, the latter, which have their conference headquarters in New York, are expected to follow suit, and put into effect export rates. Other developments may follow within a few weeks that will make this decision of the steamship lines of even greater importance to the Pacific Coast.

This action by the steamship lines is not retaliatory as against the railroads, according to an authoritative statement made in San Francisco, although some of the transcontinental lines had been dilatory in adjusting the import and export rail rates in order to restore the balance between the Pacific and Atlantic, destroyed when the rail rate increases were made in August. The plan of steamship import and export rates had been under consideration since May, according to the same authority, but at the time it was first broached the tonnage plying in the intercoastal business was scarcely sufficient to handle all the freight offering, and the plan was suspended for the time being. Now, however, the number of vessels and of companies has increased greatly and the import and export business offers an excellent opening. Only commodities that move in large quantities will be granted the reduced rates.

The new water rates will have no bearing on the application of Section 28 of the Merchant Marine Act. The Shipping Board could forbid, if it desired, the granting of the rates to goods imported or exported in foreign bottoms.

In all essential respects the working of the water import and export rates will be identical with railroad practice. A consignment of gunnies from Calcutta for New York, for example, will be discharged at San Francisco, reloaded upon an American vessel engaged in the coastwise business and transported to New York at a lower rate than would similar cargo originating on the Pacific Coast. One of the consequences of the plan is that closer co-operation between intercoastal and off-shore companies will obtain, and another is that the Pacific Coast will be placed in a more advantageous position in its effort to retain business against the competition of the vessels plying between the Orient and the Atlantic Coast via the Panama Canal. Those vessels have held the whip hand in the past because of the dependence of the Pacific Coast upon the railroads.

In view of this decision of the Pacific Coast-North Atlantic Eastbound Conference, the railroad import and export rates become of less importance to the Pacific Coast. Those rates remain in an unsatisfactory state. The readjustment by some lines, those of Group D (Chicago and the Missouri River) and West, was filed with the Interstate Commerce Commission, to be effective October 23, except for cotton, which becomes effective November 16; but the Eastern lines have not concurred and prospects of immediate action are not promising. A short haul to the Atlantic seaboard at a relatively large local rate appeals more to the Eastern railroads than does a longer haul to some Middle Western junction at a relatively small export rate. The Pacific Coast, therefore, although again able to compete with the Atlantic in handling commodities originating in the Chicago district and westward, is at a disadvantage in attracting goods from the Eastern states. But such a condition will be remedied by the application of the water import and export rates; and, moreover, the Southern Pacific has announced that it would apply the Chicago rates from New York piers in connection with the Morgan Line and the Sunset route.

One of the Western railroads recently suggested to the steamship companies operating to the West Coast of Mexico, Central and South America that business from the ports of Latin America might be increased by the application of import and export rail rates to commodities moving to Pacific ports of the United States. The suggestion is being considered and some action may be taken soon. By bidding for goods moving between Latin America and the interior of the United States the Pacific would be competing with the Atlantic and Gulf. It is improbable that any attempt will be made to transport Latin American goods by water from the Pacific Coast to the Atlantic, because transshipment at Panama would be far cheaper.

Japanese Lines Join Conference

Efforts of Shipping Board representatives in the Orient to organize a conference to have control of eastbound rates at length have been successful. Advices received in San Francisco from the Orient early in October stated that the Trans-Pacific Conference had been formed with the following members: Canadian Pacific Ocean Services, China Mail Steamship Company, Nippon Yusen Kaisha, Osaka Shosen Kaisha, Toyo Kisen Kaisha, and all the operators of Shipping Board vessels.

The tentative membership of an Atlantic-Oriental conference was: Nippon Yusen Kaisha, Osaka Shosen Kaisha and Shipping Board operators. The membership of a European conference was not announced.

By the organization of these conferences and the inclusion therein of the three principal Japanese lines, the Shipping Board has gone far in preventing a trans-pacific rate war, which more than once during the last few months had appeared imminent. An important British interest is represented by the Canadian Pacific; but the Blue Funnel, it will be observed, has not joined. This line is the most conspicuous exception, inasmuch as all the important American companies have joined in their capacities as Shipping Board operators. Several of the Japanese lines remain outside. In the aggregate they command vast tonnage (the Kokusai Kisen Kaisha is one of the four largest companies of Japan; and others, especially the Mitsubishi, Suzuki and Mitsui fleets, are important not only in operation but also in being allied to the strongest commercial houses of the empire. But perhaps the absence of these companies from the conference may be taken too seriously, inasmuch as the Kokusai has confined itself principally to chartering, and the vessels of the three great houses named are used largely in transporting cargoes for their own account. On the other hand, however, there are steamship companies not affiliated with commercial firms, which operate tramp steamers and liners on many routes; and these companies might cause trouble to the conference lines. As to that, time will tell.

The absence of the Blue Funnel is not taken seriously in well-informed quarters. Although that powerful British group had withdrawn from the various Oriental conferences, and in one noteworthy instance (the hemp rate from Manila) had cut rates to the bone, Pacific Coast shipping men attribute its withdrawal from the conferences to the rate-cutting of the Japanese and the desire of the Blue Funnel to be able to move as circumstances made necessary; and as for the Manila hemp rate, a well-informed American said that he could not find it in his heart to blame the Blue Funnel greatly, knowing, as he did, the reasons why that rate was cut to $1.25 a bale.

Negotiations are in progress looking to the entrance of Shipping Board lines into some of the conferences governing rates between foreign ports. The most immediately important of these foreign conferences is the Hongkong-Calcutta, with which the Oriental feeder service of the board is concerned. Relatively little is known of the progress of negotiations, for they were initiated and have been carried on by Washington and London; but a recent dispatch from Consul-General Skinner of London said that a Shipping Board representative had been conferring with representatives of foreign lines operating from Europe to the Orient, with a view to American participation in that trade; and other statements are to the effect that admission of American vessels to the United Kingdom-Continental conferences also was discussed.

To an American spectator the most interesting phase of these negotiations is the fact that the conferences in question generally grant deferred rebates, and deferred rebates are forbidden by the Merchant Marine Act to lines doing business at American ports. But Section 20 of the act does not forbid membership in rebate conferences governing business altogether foreign, as one may determine from a reading of that portion of the law:

"Section 20. (1) That Section 14 of the Shipping Act, 1916, as amended, is amended to read as follows:

" 'Section 14. That no common carrier by water shall, directly or indirectly, in respect to the transportation by water of passengers or property between a port of a state, territory, district or possession of the United States and any other such port or a port of a foreign country,—

" 'First. Pay, or allow, or enter into any combination, agreement, or understanding, express or implied, to pay or allow, a deferred rebate to any shipper. The term 'deferred rebate' in this act means a return of any portion of the freight money by a carrier to any shipper as a consideration for the giving of all or any portion of his shipments to the same or any other carrier, or for any other purpose, the payment of which is deferred beyond the completion of the service for which it is paid, and is made only if, during both the period for which computed and the period of deferrment, the shipper has complied with the terms of the rebate agreement or arrangement.

" 'Second. Use a fighting ship either separately or in conjunction with any other carrier, through agreement or otherwise. The term 'fighting ship' in this act means a vessel used in a particular trade by a carrier or group of carriers for the purpose of excluding, preventing or reducing competition by driving another carrier out of said trade,

" 'Third. Retaliate against any shipper by refusing, or threatening to refuse, space accommodations when such are available, or resort to other discriminating or unfair methods, because such shipper has patronized any other carrier or has filed a complaint charging unfair treatment, or for any other reason.

" 'Fourth. Make any unfair or unjustly discriminatory contract with any shipper based on the volume of freight offered, or unfairly treat or unjustly discriminate against any shipper in the matter of (a) cargo space accommodations or other facilities, due regard being had for the proper loading of the vessel and the available tonnage; (b) the loading and landing of freight in proper condition; or (c) the adjustment and settlement of claims.

" 'Any carrier who violates any provision of this section shall be guilty of a misdemeanor punishable by a fine of not more than $25,000 for each offense.' "

At first blush the implied permission given to (or rather the failure to prohibit) American lines to enter into deferred-rebate conferences when American ports are not affected may appear inconsistent with the determination of the government to do away with rebates so far as United States territory is concerned. On a broad view, however, no inconsistency is manifest; rather, membership in conferences governing business between foreign ports probably is quite essential to the success of the American merchant marine, because, lacking such membership, and forbidden by law to grant deferred rebates, American shipowners would find themselves at a complete loss in competing with conference lines, inasmuch as the laws of the United States, although altogether adequate to prohibit deferred rebates as between American ports or American and foreign ports, is powerless as between foreign ports. The intent of the law, in short, is to place American shipowners on a basis of free competition with foreign; and the means used toward this end are those best adapted to the particular circumstances.

(That American steamship lines joining rebate conferences will give rebates is the expectation of well-informed men of the Pacific Coast and Orient. Admiral Benson is quoted, however, as saying that there was no intention of giving rebates, even though shipments concerned did not touch American ports, and this statement, if correct, casts quite a different light on the situation. It is difficult to understand how American companies could join the rebate conferences without giving rebates, and certainly the foreign lines will not be disposed to do away with the system and thus throw open their carefully guarded trade routes to anyone who wishes to enter.)

But no one can reconcile American membership in deferred-rebate conferences and the organization at the direction of the Shipping Board of non-rebate conferences, with the action of Francis G. Caffey, United States district attorney, Southern District of New York, in petitioning for disruption of a freight conference. Said Section 5 of his petition: "That the said Trans-Atlantic Associated Freight Conferences be declared illegal and in violation of said act of Congress, approved July 2, 1890, and acts amendatory thereof and supplementary or additional thereto." This is a peculiarly conspicuous instance of the inconsistency of the government in its maritime policy.

Shipping Men Have Tiffin

Shipping men of the coast, attending the meeting of the Pacific Coast Oriental Tariff Bureau, now the Pacific Westbound Conference, were the guests of K. Doi, manager of the Toyo Kisen Kaisha, on the steamship Shinyo Maru in San Francisco. Those in the group are:

Seated, left to right: F. F. Allen, Struthers & Dixon, San Francisco; R. D. Pinneo, freight traffic manager, Pacific Steamship, Seattle; C. E. Daymude, secretary, Pacific Westbound Conference, Seattle; K. Doi, manager, T. K. K., San Francisco; W. M. Miner, traffic manager, Shipping Board, San Francisco; James H. Kashmer, export department, N. Y. K., Seattle.

Second row, standing, left to right: C. J. King, freight traffic manager, Pacific Mail, San Francisco; Harry Scott, Trans - Oceanic, San Francisco; W. K. Sempey, general freight agent, China Mail, San Francisco; Edward Ostrander, traffic manager, Oregon Pacific, Portland; E. L. McDonough, Los Angeles Pacific, Los Angeles; S. Ogata, assistant manager, N. Y. K., Seattle; R. E. Lewis, McAlister & Company, Singapore; C. O. Burgin, secretary, Shipping Board conferences, San Francisco; J. V. Van Fossen, traffic department, O. S. K., Tacoma.

Back row, standing, left to right: Major Charles R. Crane, attorney for Shipping Board; Drew Chidester, manager, Trans-Oceanic, Vancouver, B. C.; R. M. Grosse, Los Angeles Pacific, Los Angeles; Percy L. Laing, Frank Waterhouse & Company, Seattle; H. Kenney, Trans-Oceanic, San Francisco; F. H. Glendenning, Canadian Pacific, Vancouver, B. C.; J. H. Johnson, Pacific Steamship, Seattle; Y. Yakota, manager freight department, T. K. K., A. S. Darrow, freight department, W. A. Chapin, claims department, T. K. K., San Francisco.

Pacific Coast shipping men entertained on Shinyo Maru

FULL SPEED AHEAD

Latest News From the Pacific

Gigantic Japanese Merger Reported

Reports are current in the vernacular press of Japan that the four largest steamship companies of the empire, the Nippon Yusen Kaisha, Osaka Shosen Kaisha, Kokusai Kisen Kaisha and Toyo Kisen Kaisha, are forming an operating merger to take over the management of all vessels owned by the four lines. Inasmuch as Japanese newspapers are in close touch with shipping and, on strictly Japanese news, are generally accurate, there is a disposition on the Pacific to give credence to the report.

This merger, if formed, would be one of the largest operators of tonnage in the world. According to Lloyd's 1919-1920 Register, the N. Y. K., O. S. K. and T. K. K. possess the following vessels:

Company	Number Ships	Aggregate Gross
N. Y. K.	97	435,987
O. S. K.	133	311,790
T. K. K.	10	91,223

Figures for the Kokusai Kisen Kaisha are not given, but that company controls probably 350,000 deadweight tons, or about 233,000 tons gross; the grand total for the four companies therefore being 1,072,000 gross tons, or slightly more than the tonnage of the 105 vessels of the International Mercantile Marine, recently announced as being 1,013,124. Many of the vessels of the T. K. K., O. S. K. and N. Y. K. are large passenger liners, so that the gross tonnage cannot be reduced to deadweight by a simple ratio. Inasmuch as all three of these companies have added vessels to their fleets during the year, the O. S. K. and N. Y. K. especially having planned large building programs, the total given above is less than the actual now operated or building. It will be noted that the average size of vessels of the T. K. K. is larger than that of the N. Y. K., which in turn surpasses the O. S. K. This is due to the fact that the O. S. K., and to a lesser degree the N. Y. K., have many small steamers, not suited for deep-water trade.

Reports from Japan are not at all specific as to the details of organization and the plans of operation. On the Pacific Coast, however, it is assumed that the merger would be somewhat comparable to the International Mercantile Marine, leaving the corporate identities of the different companies untouched but superimposing upon them the great operating combine.

If the reports be true and the company be formed, the Japanese government unquestionably has given its sanction to the plan, since three of the four companies involved, the N. Y. K., O. S. K. and T. K. K., are the principal subsidized lines of the empire, and, so far as their subsidized vessels are concerned, are supervised closely by the Department of Communications. No such merger as this could even be contemplated without the government's approval.

Seven years ago, shortly before the outbreak of the war, a plan similar to this was broached in Japan, and negotiations looking toward its consummation were in progress when the world went to war, upsetting all calculations and, within a few months, bringing unprecedented prosperity to the fortunate owners of tonnage.

The premier shipping company of Japan, and one of the first corporations of the world, is the Nippon Yusen Kaisha. It operates vessels over some forty or more trade routes, most of which center on Japan; its house flag is known in every port of the world. The beginnings of the N. Y. K. were in 1870, when the first Iwasaki founded the Mitsubishi line, which was amalgamated with the Kyodo Un-yu Kaisha in 1885 under the name of the Nippon Yusen Kaisha. Prior to that merger the Osaka Shosen Kaisha had arisen; and the Toyo Kisen Kaisha, founded by Soichiro Asano, came into being prior to the Russo-Japanese war. The Osaka Shosen Kaisha has vessels on probably forty trade routes; and the Toyo Kisen Kaisha on six. Those figures are not altogether accurate as expressing the relative importance of the services, however, as many of the lines of the O. S. K. and N. Y. K. are not served with the tonnage of the T. K. K. routes.

Youngest of the four companies is the Kokusai Kisen Kaisha, which was organized in 1919 by Kakichi Uchida, former vice-minister of communications, to take over and operate surplus vessels owned by the shipbuilding yards. At first the Kokusai desired 500,000 deadweight tons, all freight vessels, but latest reports are that it acquired about 350,000 tons, to which the Kawasaki Dockyard contributed the largest single portion. To date the activities of the Kokusai have been limited largely to chartering its vessels, although the plan when it was founded was ultimately to operate them.

The object of the merger is to strengthen Japan's position in the coming maritime struggle. Those in close touch with Japanese shipping doubt that the merger can be traced directly to the Mercantile Marine Act, which, after all, is only one phase of American maritime activity; and besides America, Great Britain and a reviving Germany certainly are reckoned with.

New Pacific Conference Formed

At a meeting of Pacific Coast shipping men held in San Francisco October 14 and 15, the Pacific Coast Oriental Tariff Bureau ceased to exist and in its stead was formed the Pacific Westbound Conference. The membership of the Pacific Westbound Conference is as follows: Pacific Steamship Company, Trans-Oceanic Company, Nippon Yusen Kaisha, Columbia Pacific Shipping Company, Mitsui & Company, Frank Waterhouse & Company, Struthers & Dixon, Osaka Shosen Kaisha, Canadian Pacific Ocean Services, China Mail Steamship Company, Pacific Mail Steamship Company, Java-Pacific Line, Toyo Kisen Kaisha, Los Angeles Pacific Navigation Company, and A. M. Gillespie, Inc.

No functions of the Trans-Pacific Outward Conference, the Shipping Board organization, will be done away with by the formation of the Pacific Westbound Conference, for the board requires its operators to form conferences and to work, when possible, in harmony with those already existing. The Trans-Pacific Outward Conference was organized in June and was composed of the Shipping Board operators having headquarters in San Francisco, with the addition of the China Mail, an American company, although it is operating no Shipping Board vessels. Although the Shipping Board conference remains in existence, it will have the closest relations with the Pacific Westbound Conference, inasmuch as all the board operators are members of the latter organization.

A desire to bring about better working agreements between the American and foreign operators led to the formation of the Pacific Westbound Conference; and that object has been achieved by the modification of some of the rules of the conference. C. E. Daymude, secretary of the Pacific Coast Oriental Tariff Bureau, remains secretary of the Pacific Westbound Conference, with headquarters in Seattle; C. O. Burgin, recently appointed Shipping Board conference secretary at San Francisco and also agent of the tariff bureau, will remain as agent of the Pacific Westbound Conference until his successor is appointed; and W. D. Benson continues as New York agent.

No changes in rates were made at the meeting in San Francisco. The meeting tabled discussion of a uniform rail and water bill of lading. Cancellation of the war-time permit system for freight, which continues to be used by the railroads, was recommended. A trans-Pacific rate on knocked-down steel cars has been set at $11.25. Heretofore there has been no quoted rate on such freight.

Contract for New Tanker

Announcement has been made by the Bethlehem Shipbuilding Corporation, San Francisco, of the closing of a contract with the Associated Oil Company for the construction of a 10,100-deadweight-ton tanker, a sister ship to the Algonquin, Franklin K. Lane, William H. Doheny and other 10,100-tonners building at the Alameda and Potrero works. The tanker will be 456 feet long over-all, 435 between perpendiculars; 56 in beam; 33 feet 6 inches deep; 26 feet in mean draft; and will have a loaded speed of 11 knots. She will have reciprocating engines of 2700 indicated horsepower, three Scotch boilers and a single screw propeller. Engines and boilers will be built by the Bethlehem corporation, so that the ship will be turned out complete by the yard. The keel was laid in October and the tanker probably will be delivered in April. She will replace the Associated Oil tanker J. A. Chanslor, which was lost.

Status of Shipping Board Work

On October 1, thirty-two steel vessels and two concrete vessels, of an aggregate deadweight tonnage of 316,750, were building on the Pacific Coast for the Shipping Board.

The status of Shipping Board work September 1 was thirty-seven steel and four concrete vessels, of an aggregate tonnage of 375,400. Of the thirty-four vessels still under construction October 1, ten were to be delivered in October.

In the following list, by yards, T indicates tanker and C freighter:

Bethlehem Shipbuilding Corporation, San Francisco—Hambro, T, 10,100 DWT, probable delivery April, 1921; Hamer, T, 10,100, May, 1921; Hammac, T, 10,100, June, 1921; Hanley, C, 11,800, November, 1920; Hannawa, C, 11,800, October, 1920.

Moore Shipbuilding Company, Oakland—Jalapa, C, 9400, October, 1920; Janelew, C, 9400, October, 1920; Mursa, C, 9400, October, 1920; Narbo, C, 9400, November, 1920; Narcissus, C, 9400, November, 1920; no name, T, 10,000, June, 1921; no name, T, 10,000, June, 1921; no name, T, 10,000, July, 1921.

Hanlon Drydock & Shipbuilding Company, Oakland—Jeptha, C, 5350, October, 1920; Medon, C, 5350, November, 1920; Memnon, C, 5350, January, 1921.

Pacific Coast Shipbuilding Company, Bay Point—Cuprum, C, 9400, November, 1920; Namasket, C, 9400, doubtful; Meanticut, C, 9400, doubtful; Nashaba, C, 9400, construction discontinued.

Union Construction Company, Oakland—Heber, C, 9400, October, 1920.

Western Pipe & Steel Company (Schaw-Batcher), San Francisco—West Carmona, C, 8800, October, 1920.

Long Beach Shipbuilding Company, Long Beach—West Kebar, C, 8800, December, 1920.

Los Angeles Shipbuilding & Drydock Company, San Pedro—Culberson, C, 8800, October, 1920; West Honaker, C, 8800, October, 1920; West Cusseta, C, 8800, November, 1920; West O'Rowa, C, 8800, December, 1920; West Lewark, C, 11,000, February, 1921; West Faralon, C, 11,000, April, 1921; West Greylock, C, 11,000, May, 1921; West Prospect, C, 11,000, June, 1921; West Chopaka, C, 11,000, July, 1921.

San Francisco Shipbuilding Company, Oakland—Peralta, T, concrete, 7500, December, 1920.

Pacific Marine & Construction Company, San Diego—San Pasqual, T, concrete, 7500, October, 1920.

Bethlehem Dock in Operation

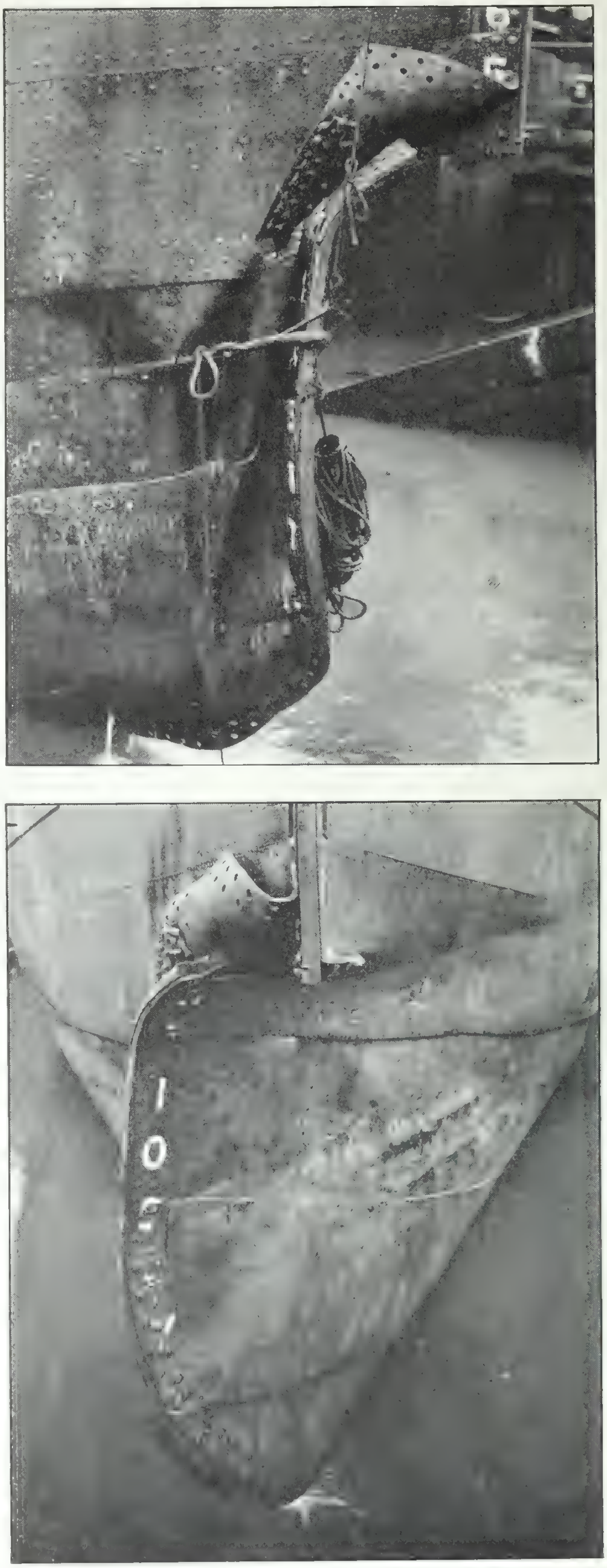
When the Pacific Mail freighter West Neris was docked at the Potrero works of the Bethlehem Shipbuilding Corporation, San Francisco, on October 8, the new floating drydock, bought by Bethlehem of the Ames Shipbuilding & Drydock Company, Seattle, was placed in operation for the first time, inasmuch as the dock never had been used by the Ames yard, some of the pontoons, in fact, still being under construction when the sale was made. The dock is of four pontoons, each 3000 tons' capacity, giving a total lifting capacity of 12,000 tons. The length is 421 feet over the apron. Tugs of the Rolph Navigation & Coal Company towed the pontoons from Seattle to San Francisco. Prior to being placed in operation, the dock was given a new deck.

The new outfitting wharf at the Potrero works also has been completed. With the end of this new work the Bethlehem corporation now has on San Francisco Bay eight drydocks, ranging in size from the 1020-foot graving dock at Hunters Point to a floating drydock 270 feet long.

Excellent dispatch has been given by the Bethlehem repair force on two jobs. The Standard Oil tanker Richmond, damaged in collision with the Union Oil tanker Lyman Stewart, was drydocked at 10 a. m., September 4; at 10 a. m. September 9, she was floated, having been on dock five days, during which the following repairs were made: Nine plates were replaced; the lower half of the stem, which was broken squarely in two at the top edge of the scarph, was removed, a new section was made in the shop and welded on; and nine frames and floors were replaced. The bid had been for eight days.

The Shipping Board steamship West Harts went on the dock at 2 p. m. September 9 and was floated at 1:30 p. m. September 29, having been on the dock twenty days. The following repairs were made: Fifty plates on the port side were removed, and many faired and replaced; more than 100 floors and frames on the port side were removed, faired and replaced; 200 feet of the keel was taken off, faired and replaced; all double-bottom tanks were tested; the lower half of the cast-steel stern-frame was taken out and renewed. The bid had been for completion in thirty-nine days, so that the time was cut almost in half.

An interesting repair job, similar to that of the ferry Contra Costa, but more extensive, is going forward on the Southern Pacific ferry Solano. As was the case with the Contra Costa, the Solano has been damaged badly by toredo worms, which attacked her when the waters in which she plied became increasingly salt. Every plank of the Solano was removed; the new planks copper-sheathed; the keel was stripped; in fact, all the bottom and sides to and above the water-line had to be removed. The Solano went on drydock August 28 and probably will not be off until the middle of November.



Two views of bow of Standard Oil tanker Richmond, damaged in collision with tanker Lyman Stewart. The Richmond was repaired at the Potrero plant, Bethlehem Shipbuilding Corporation.

Contract to Los Angeles

A contract for the repair of the Shipping Board freighter West Eldara, which grounded on Barber's Point, near Honolulu, has been let to the Los Angeles Shipbuilding & Drydock Company for $219,980, plus $17,930 ordinary repairs; time limit, sixty days from October 18. Repairs will include the replacing of 149 plates and several stanchions. The Los Angeles company's drydock recently was completed and placed in operation.

The West Eldara, bound from the Orient for San Francisco via Honolulu, ran ashore on a reef August 4. Although vessels passing Barber's Point usually give the lighthouse a berth of about three miles, due to the dangerous ground, the West Eldara struck about one-half mile from the light, the cause apparently being that she was much too close to land. Immediately after she struck, tugs took the vessel and work of lightering cargo began, about 2400 tons of sugar being taken off and sent to Honolulu. Before the steamship was light enough to float, however, she was badly battered on the reef by one of those sudden and unheralded southerly swells that occasionally are seen in the Hawaiian Islands, to which most of the damage can be traced. There were few undamaged plates in her entire bottom. About 125 tons of sugar was lost when a lighter foundered; otherwise, there was little damage to her cargo. After being pulled from the reef the West Eldara was taken to Honolulu; her entire cargo was discharged; and temporary rates, to assure water-tightness, were made by the Inter-Island Steam Navigation Company and the Honolulu Iron Works; after which the vessel was taken to San Francisco by Captain M. A. Madsen, territorial pilot at Honolulu. Although she had been leaking badly into her double-bottom prior to docking at Honolulu, little or no leakage was apparent on her voyage of nine days to the coast.

Vessels Tied Up

For the first time the San Francisco district of the Shipping Board has been compelled, by the shortage of cargoes, to tie up three vessels: Mursa, built by the Moore Shipbuilding Company and never assigned for operation; West Inskip, operated by the Pacific Mail in the Oriental service; and West Harts, operated by the Robert Dollar Company. All are freighters. The West Harts recently grounded in the Orient and was repaired by the Potrero plant, Bethlehem Shipbuilding Corporation. Whether other vessels will be tied up depends upon developments in the cargo situation. The present time is a slack season, and the usual dullness is accentuated by over-buying of Japan and by the panic. China holds up well.

The showing is by no means bad compared with that of other nations and other sections of the United States. Reports received from the United Kingdom during September said that 755 vessels of all flags were tied up in British ports; and at one time Antwerp had 170 idle vessels. At the end of September the Shipping Board had twenty-six vessels tied up. In Japan, according to the Japan Advertiser, the situation toward the end of September was by no means bright; latest figures were ninety-one vessels, of 157,335 tons, many wooden ships being included; but the Advertiser continued: "The official statistics cannot be taken as covering all the ships tied up. Shipping men estimate that the tonnage of all the ships now lying idle amounts to about 500,000 tons." Of the 157,000 tons listed, Kobe alone had 61,791 tons.

Bay Wage Scale Unchanged

The existing wage scale in San Francisco Bay shipyards will be continued for the present, says a statement issued by the California Metal Trades Association to employes. When the shipyards and other industrial plants reopened November 24, 1919, after a general strike had been called, the employes were assured that the wage scale as of September 30, 1919, would remain in effect until October 1, 1920. The expiration of that period led to the announcement, which follows:

"When the shipyards, commercial shops and manufacturing plants of the San Francisco Bay district reopened November 24, 1919, they promised through their association (the California Metal Trades Association) that the wages in force on September 30, 1919, would remain in effect until October 1, 1920. This promise has been fulfilled.

"It was expected that competition would be active as soon as wartime contracts were completed. This has proved to be the case to a greater extent than anticipated. The competition has been particularly strong in shipbuilding on account of foreign competition. Plants elsewhere that have not been able to meet competition are being compelled to close down.

"Last October, the metal trades industry of this district was tied up by a general strike following the refusal of the employers to grant increased wages. As we look back we can see that the fact that wages were not increased has been the means of the yards and shops securing the new contracts they now have.

"An increase of wages would have so handicapped the manufacturing plants of the San Francisco Bay district that they could not possibly have secured sufficient new business under present competitive conditions to assure continuous operation.

"The opportunity to operate continuously during the past year without interference from outside sources has encouraged the employers of the district to such an extent that **they have decided to continue for the present the existing wage scale.** It is believed that with the development of better efficiency and better management, our industrial activities can be carried on in this district without any revision of wages at this time.

"The employers will make every effort to secure business and to make it worth while for the men to help in meeting the competition here now and to come. They believe that the only way to meet it is through greater development of the good feeling and increasing efficiency which have existed during the past year in all the shops of the association.

"Bear in mind, however, that the maintenance of the present wage scale depends on whether or not the joint efforts of management and men in yards and shops of this district can produce ships, engines or other products of the metal industry as cheaply as these products can be manufactured in other districts or other countries."

Coast Guard Transfer Requested

President Wilson has been requested by the Pacific American Steamship Association to transfer the Coast Guard service to the Navy Department by executive order, no action having been taken by Congress on bills making the transfer and none being possible until the short session of Congress in December, when the winter storms will have begun.

The association sent the following telegram to Joseph P. Tumulty, secretary to President Wilson:

"We would most earnestly invoke President's attention to grave emergency existing because United States Coast Guard is unable to render adequate assistance to American merchant marine, which has increased from pre-war status of approximately 2,000,000 to over 10,000,000 tons, mostly of large-sized ships; and therefore respectfully urge that President by executive order transfer Coast Guard to Navy Department. This is only way in which existing emergency can be met immediately. It is impossible, in our opinion, for Coast Guard as a separate service to be raised to a point where adequate protection from disasters at sea can be afforded without needless expenditure of millions of dollars for additional equipment and lapse of a long period of time.

"The Coast Guard facilities for rendering assistance at sea, instead of being increased, have steadily decreased during this period. Of the thirty-six vessels listed as cruising cutters in the latest Coast Guard register, only a very small percentage is suitable to render assistance at sea in heavy weather. Five of the vessels listed as cruising cutters are yet in initial stages of construction. There is not a single cruising cutter between Cape Flattery and the Mexican border at present, nor is there a single life-saving station between San Francisco and Mexican border. On the other hand, the Navy is at all points ready and equipped with an ample number of the finest class of vessels for this purpose that can be designed and which can be put in service immediately at no additional expense to the government. It is inconceivable, if the present emergency is thoroughly understood, that the government would leave its enormous merchant marine manned by over 100,000 officers and men with practically no protection whatever.

"The season of winter gales is rapidly approaching. Only the President can effect the transfer of Coast Guard to Navy Department in time to meet the present grave emergency. To defer this action pending the passage of any form of relief legislation would needlessly jeopardize human life and property."

The request of the Pacific American Steamship Association has the support of other shipping and commercial organizations of the Pacific Coast.

Kerr Steamship Sailings

The Kerr Steamship Company is broadening out, entering new lines of trade and increasing its sailings on old routes. During the month of October it had six steamers on berth at New York for Hamburg; has announced three sailings for November with additional ones to follow; and also has monthly sailings from Philadelphia, New Orleans, Baltimore and Savannah for Hamburg. From New York it has semi-monthly sailings for the East Coast of South America and monthly sailings for India via Suez; from New Orleans, monthly sailings to Antwerp, Ghent and to Genoa and Naples; from Philadelphia, monthly sailings to Rotterdam; and from Galveston it has opened a new route to Barcelona with semi-monthly sailings.

Since the Kerr Lines were first established, the watchword has been "service," which has been so thoroughly applied by all employes that today the Kerr Lines are most popular on the Atlantic, as evidenced by the fact that all steamers go out with full cargoes.

Recently reduced rates on California commodities, such as canned goods, dried fruits, beans, rice, etc., have been made from New York, Philadelphia, Baltimore, New Orleans and Galveston to Continental ports. The office of the company in the Merchants' Exchange Building, San Francisco, will quote rates on application, obtain space and look after the cargo through to destination. Through bills of lading can be obtained from point of shipment to Europe.

Opens Offices as Surveyor

Captain E. C. Genereaux has announced the opening of offices at 280 Battery Street, San Francisco. He will act as an independent marine surveyor and salvage expert. For thirteen years Captain Genereaux was deputy surveyor of the Board of Marine Underwriters, San Francisco, in immediate charge of salvage work for the board, with headquarters in Seattle; and of late was an independent surveyor at Portland, acting for the Bureau Veritas and representing the French government for the Columbia River construction during the war.

Matson Returns Vessels

Two Shipping Board vessels, the Eastern Gale and Mohinkis, are being returned to the board by the Matson Navigation Company, which has used them in the Hawaiian trade. A third vessel, the Dellwood, also may be turned back. The heavy movement of sugar and canned pineapples has ended. By the time the sugar movement becomes large again, which will be in March, the Matson company expects to have its two new 14,000-ton freighters, now building at the Moore yard, Oakland, in service.

To Call at Savannah

Offices of the Pacific Mail in Portland, which were in charge of J. J. Melvin, agent, have been closed. Announcement is made by the Pacific Mail that steamships of the intercoastal service will call at Savannah on the eastbound but not on the westbound voyages, the first being the Point Judith, which discharged 865 tons of cargo in October.

Water Route for Apples

D. G. Smith, assistant secretary of the Yakima Commercial Club, has requested Seattle commercial organizations to assist Yakima fruit-growers in an attempt to move at least one-third of their crop of apples to the Gulf & Atlantic markets by water. Two reasons have actuated the growers in deciding to transport fruit by water: the shortage of refrigerator cars and the advance of 33⅓ per cent in transcontinental rail rates. The assistance of Seattle is sought in order that return cargoes from the Atlantic may be provided. A letter from Harry Saint, of the Shipping Board, to the Yakima club was in part as follows:

"I found the trouble to be twofold: first, the small number of refrigerator ships owned by the Shipping Board, and second, the cost of operating these vessels, which necessitates a high freight rate. However, I have taken the matter up again this morning with several of the men in the traffic department and they have promised to look into the situation and advise me what, if anything, can be done.

"The main difficulty in operating refrigerator ships from the Northwest to the Gulf, Atlantic Coast or Europe is the fact that little, if any, back cargo can be obtained for those boats. Consequently, the voyage outward from the Northwest must carry a freight rate to cover the expenses of a round trip."

Pacific Mail Plans Dock

Consideration is being given by the Pacific Mail Steamship Company to the construction of a dock at Manila, where the situation is by no means good. Congestion is marked at intervals, and there is a marked need of terminal facilities and modern equipment. No announcement has been made as to whether the Pacific Mail will build; but, in the event that it does not, the insular government, according to well-informed Filipinos, will construct a new dock sufficiently large to berth four steamships at once. The Pacific Mail recently purchased the property of the Hankow Wharf & Godown Company at Hankow, China, which is one of the most important points served by Pacific Mail steamships. For years the failure of American companies to develop their own terminals and godowns in the Orient has been the subject of adverse comment; the active policy of the Pacific Mail, especially if emulated by other companies, will remove this cause of reproach.

Gulf Service Permanent

Swayne & Hoyt, San Francisco, state that published reports that the Pacific-Caribbean-Gulf service would be discontinued are incorrect. The service recently was opened to Columbia, the Caribbean and New Orleans. The first sailing from New Orleans for the Pacific was that of the Alvarado, which departed October 13, and she will be followed by the Eldorado, due to sail October 31. The Iris loaded on Puget Sound during October for New Orleans; she will be followed in November by the Alvarado.

Will Call at Singapore

Calls will be made at Singapore by the steamships Nile and China of the China Mail and at Manila by the Nanking. Heretofore the Oriental terminus of the China Mail vessels has been at Hongkong. By extending the service to Singapore the China Mail will work a pronounced improvement in trans-Pacific passenger service, inasmuch as the only direct sailings heretofore have been by the Pacific Mail steamships Colusa and Santa Cruz, and passengers going by other lines have been compelled to transfer at Hongkong. The new schedule provides for nine calls at Singapore during the year 1921 and four calls at Manila. The China Mail, in common with other companies in the trans-Pacific passenger service, is drawing a considerable volume of business from London for the Straits and India, the Suez liners in both directions being heavily booked until next spring. Francis Peek & Company at Singapore and Thomas Cook & Son at Manila have been appointed China Mail agents.

U. S. S. B. Cancellations on Coast

In reply to inquiries made by the Seattle Chamber of Commerce through Senator Wesley L. Jones, Admiral Benson has advised the chamber that the percentage of cancellations of vessels building November 11, 1918, was 31.23 for Puget Sound, 19.48 for the Columbia River, and 14.50 for the California district. But Admiral Benson continued:

"Regarding the percentage of contracts canceled in the California, the Columbia River and Puget Sound districts, this information given in percentages of contracts would be misleading. In deciding upon cancellations the cost of cancellation was the principal factor, and cancellations were ordered in general where keels were not laid and where machinery and equipment commitments were not made, or were of minor magnitude. For the purpose of comparison I am appending the following tabulation which, I trust, will prove of interest to you:

TABULATION BASED ON STATUS OF PROGRAM AT TIME OF ARMISTICE, NOVEMBER 11, 1918

"Under construction or to be constructed—California district, 193 ships, 1,761,400 tons; Columbia River, 77 ships, 625,400 tons; Puget Sound, 141 ships, 1,245,400 tons.

"Canceled after above date—California district, 28 ships, 247,450 tons; Columbia River, 15 ships, 124,800 tons; Puget Sound, 44 ships, 389,000 tons.

"Per cent canceled after above date—California district, 14.50 ships, 14.04 tons; Columbia River, 19.48 ships, 19.95 tons; Puget Sound, 31.20 ships, 31.23 tons.

"Active program after deduction of all cancellations made subsequent to above date—California district, 165 ships, 1,513,950 tons; Columbia River, 62 ships; 500,600 tons; Puget Sound, 97 ships, 856,400 tons.

"From the above tabulation you will note that the percentage of cancellations in the Puget Sound district is greater than those in the Columbia River district. The active construction in the former district exceeded the latter by thirty-five vessels, or approximately 50 per cent, and in tonnage by 355,800 deadweight tons, or 71 per cent.

"A separate comparison of either the Puget Sound (Seattle) or Columbia River district with the California district would hardly be fair on account of the size of the latter. The first two mentioned constituted for purposes of organization our Northern Pacific district, the California district corresponding to what was formerly our Southern Pacific district.

"The California yards are still working on uncompleted government contracts, but a greater percentage of work is being done for private account in which the Shipping Board has no interest.

"We have no information as to price a ton of vessels building for private account in the California district.

"During the six months ending July 31 repair work on the Pacific Coast, including reconditioning of vessels built in Japan, amounted to approximately the following figures:

San Francisco	$ 533,000
Portland	167,486
Seattle	1,574,000

"Of the vessels built in Japan, twenty were reconditioned at Seattle and two at San Francisco.

"I trust the above information will enable you to make satisfactory reply to the Seattle Chamber of Commerce, and I shall be glad to give you any further information which you may desire."

Cunningham Appoints Agent

Announcement is made by the Allan Cunningham Company, Seattle, of the appointment of the Maritime Engineering & Sales Corporation, 2 Rector Street, New York, as agent, controlling all Cunningham agencies in the Atlantic, Gulf and Great Lakes districts. George H. Jett is president of the Maritime Engineering & Sales Corporation.

E. F. R. De Lanoy, in charge of Pacific Coast business, Holland-America Line

The Allan Cunningham Company recently opened offices in San Francisco, to have charge of the increasing business in the San Francisco and Southern California districts.

Holland Service Opened

The Dutch steamship Eemdyk of 12,000 tons deadweight is the first ship in the new service of the Holland-America's North Pacific Coast Line to load cargo at Pacific Coast ports for Rotterdam, Antwerp, London, Liverpool, Hamburg and Havre. The Eemdyk sailed with a full cargo which consisted of flour, barley, canned pineapples, dried fruits, lumber and other products.

Of especial interest to Pacific Coast shippers is the large shipment of fresh fruits carried by the Eemdyk in cold storage. The cargo included 32,000 boxes of fresh apples, pears and grapes consigned to London and Rotterdam.

Holland-America steamship Eemdyk which opened the Pacific Coast service

The Eemdyk will be followed by the steamship Kinderdyk, loading late October, and the steamship Moerdyk, loading late November. Pacific Coast shippers have indicated their appreciation of the Holland-America's European service, and the large cool-rooms and refrigeration equipment with which these ships are equipped are of additional advantage in view of the high overland freight rates and shortage of cars in this country.

E. F. R. De Lanoy is in charge of the company's business on the Pacific Coast, with headquarters at 401 Market street, San Francisco, where attractive passenger and freight offices have been opened. Mr. De Lanoy spent over two years in the Rotterdam office of the Holland-America Line, and later came to their Chicago office, spending nine years as traveling agent in the Middle West. Before taking charge of the San Francisco office, Mr. De Lanoy spent a year in the New York office of his company handling freight and passenger traffic.

Agencies for this line have been established in Seattle under the direction of A. M. Gillespie, Inc.; in Portland with the Oregon Pacific Company, and in Vancouver, B. C., under C. Gardner Johnson.

Los Angeles Cargo Tonnage

During the fiscal year ending June 30, the cargo passing over wharves of Los Angeles totaled 3,528,280 tons, an increase of 1,147,558 tons over the total of the preceding year. Classified, the cargo was: Inbound, domestic, excluding lumber, 291,617 tons; lumber, 1,060,260 tons; foreign, 50,508 tons. Outbound, domestic, 1,732,732; foreign, 393,162. Domestic cargo, including lumber, totaled 3,084,609 tons, in and out, and foreign, 443,671. Commercial vessels arriving were 2996, net tonnage 2,908,791.

Bare-Boat Charters Suggested

In the discussion of a new Shipping Board agreement with the operators of government vessels, the latest proposal is that the fleet be chartered under the bare-boat form. Erskine Wood, acting admiralty counsel of the board, has proposed that the agreement drawn by the standing committee (details of which appeared in Pacific Marine Review for August) be made effective as of March 1, in order that business done since the abrogation of MO3 might be cleared up, and that the standing committee draft an agreement providing for charter of vessels by operators. If the board and the standing committee can agree on a charter form, this suggestion has a good prospect of success, because the operators have grown restive at the delay in drafting a new agreement, and the board on the other hand is tiring of the losses incurred under MO3, which, although abrogated, remains the only standard by which profits of operators and the board may be computed.

Inquiry was made of the Pacific American Steamship Association as to how it would regard this suggestion. The association approved the portion of the plan providing for the putting into effect of the proposed agreement, inasmuch as it earnestly desired a settlement of business done since March 1; and also was willing to acquiesce in bare-boat charter. In giving its approval to the bare-boat charter plan, however, the association made certain important reservations. One of these was that the board should not compete with operators chartering vessels; the other, that the charter rates be such as to permit of earnings being made.

That latter qualification may be made clear by reference to MO3, which provided that the value of vessels should be $200 a deadweight ton, in the absence of a specific agreement on another valuation; and that certain charges for depreciation, interest, etc., aggregating 23½ per cent in the first year, should be entered as part of the expenses of the vessel before net revenues were determined. Inasmuch as the board's vessels generally are returning losses under this plan, the operators have been earning only their minimum guarantees; and even these are being withheld since the abrogation of the MO3 agreement. The Pacific American Steamship Association, therefore, wished to make sure that charter rates were not based upon some such plan as this, which would not permit operators to make profits.

As for the first qualification, the association did not propose that the board resort to any general laying-up of vessels; but it did desire that operators who chartered vessels should not be forced to meet Shipping Board competition, particularly if the board should retain control of routes and rates. And, of course, if the government vessels are losing money, as they are doing on the Pacific even at a valuation of $150 a ton, the question arises as to whether the loss would not be less if some of the fleet were withdrawn from service. Many vessels, as is well known, have been tied up on the Atlantic Coast.

That the Shipping Board appears intent upon drawing up a new operating agreement comes somewhat as a welcome surprise to the managing companies, as repeated informal statements had been made to the effect that nothing would be done until a complete board had been appointed by President Wilson.

Last Schaw-Batcher Launching

When the steamship West Carmona was launched at the Western Pipe & Steel Company's (Schaw-Batcher) yard at South San Francisco October 2, the plant neared the end of its work, as the West Carmona was the last vessel of eighteen built for the Shipping Board. She was delivered in October, and a sister ship, the West Camargo, in September. All the eighteen were of the standard 8800-ton type. Although shipbuilding at the Schaw-Batcher yard ceased with the delivery of the West Carmona, the plant will continue in operation as a pipe and tank factory; and the Western Pipe & Steel Company, through its ownership of the Southwestern Shipbuilding Company, Los Angeles, will continue to build vessels.

J. J. Tynan, manager of the San Francisco plant of the Bethlehem Shipbuilding Corporation, acting on behalf of several officials of the Bethlehem corporation, presented J. A. Talbot, president of the Western Pipe & Steel Company, with a silver service on the occasion of the launching of the West Carmona. In presenting the service to Mr. Talbot Mr. Tynan said:

"No man deserves more credit than the man through whose loyalty to his country and through whose inspiration and integrity it has been possible to build up a modern shipyard from what was formerly nothing more than a dump. This man, when his country was sorely in need of vessels to carry provisions to our American soldiers in a foreign country, through his energy and untiring efforts accomplished one of the greatest feats of American ingenuity, and has gathered, through his fair and honest dealings, an organization such as any corporation would be proud of."

The West Carmona was launched about 92 per cent complete, engines and boilers being in and deck houses built. She was the farthest advanced of any Schaw-Batcher vessel at the time of launching.

Moore Boiler Shop Work

Up to September 17, the boiler shop of the Moore Shipbuilding Company, Oakland, had delivered 117 Scotch marine boilers, or three each for thirty-nine vessels, and had contracts for twenty-five more. Of the 117 boilers delivered, thirty were for vessels built by the Pacific Coast Shipbuilding Company, Bay Point, and twenty-four for vessels built by the Southwestern Shipbuilding Company, Los Angeles. On September 17 six boilers remained to be delivered to the Los Angeles Shipbuilding & Drydock Company and three to the Union Construction Company, Oakland; the other sixteen were for vessels building at the Moore yard. The diameters of the boilers ranged from 14 feet 9 inches to 15 feet 6 inches, and the length from 11 feet to 12 feet 4 inches. Five boilers are building for each of the 14,000 - ton freighters under construction for the Matson Navigation Company.

Concrete Tanker Construction

After the concrete oil tanker Cuyamaca had been launched by the Pacific Marine & Construction Company, San Diego, she developed a seepage leak in her fuel tanks and was returned to San Diego for repairs. Two days sufficed and the vessel departed for Tampico, under charter to the France & Canada Steamship Company. The concrete tanker Palo Alto, built by the San Francisco Shipbuilding Company, Oakland, has been turned over to McCormick & McPherson for operation. Two other tankers are on the Shipping Board program — the Peralta, building by the San Francisco Shipbuilding Company, probable delivery in December; and the San Pasqual, building by the Pacific Marine & Construction Company, delivered in October. All the four are 7500-tonners.

Install Oil-Burning Equipment

Oil-burning equipment is being installed by the Long Beach Shipbuilding Company in the steam yacht Louise, owned by E. D. Burge of Santa Ana, California.

Mary Luckenbach Launched

The 8800-ton oil-tanker Mary Luckenbach, laid down by the Southwestern Shipbuilding Company, Los Angeles, for builder's account and sold on the ways to the Luckenbach Terminals, was launched in October. She probably will be used by the Luckenbach company on the Atlantic.

Union Construction Builds

The Union Construction Company, Oakland, has completed a three-story building, the upper two stories of which will be used for a mold-loft. The ground floor will be used for the pattern shop and template storage. The window space is exceptionally large.

Traffic Management Course

The extension division of the University of California has announced a second class in traffic management and transportation under the direction of Walker L. Trammell, of the Southern Pacific. This new course will be more comprehensive than anything yet offered in San Francisco.

In the Navy Yards

Two dreadnoughts, the California and the Montana, and five destroyers are under construction by the Mare Island Navy Yard. The California is approaching completion, in anticipation of which the Navy is carrying on a vigorous recruiting campaign with the hope of making the personnel of the crew, officers and men, thoroughly Californian. The keel of the Montana was laid September. She will be a much larger vessel than the California: 42,200 tons displacement as against 32,300; 660 feet in length as against 600; will have eight feet more beam; three feet greater draft; two knots more speed, 23 as against 21; and her turbo-electric drive will develop 60,000 shaft horsepower as opposed to 26,800 of the California. All the five destroyers (Zane, Wasmuth, Trever, Perry and Decatur) are sister ships, 310 feet long and 31 feet beam.

Authority has been received at Mare Island to overhaul the battleship Vermont, so that she may be placed in commission on duty with the Pacific fleet. She was placed out of commission last summer with the Nebraska, Rhode Island and Vermont. The cruiser Brooklyn recently was overhauled at the yard.

At the Bremerton Navy Yard construction continues on the ammunition-carrier Nitro, the second of two sister ships, the first of which, the Pyro, was delivered August 10; and work also is going forward on the repair ship Medusa, a 460-foot, 17-knot vessel, the keel of which was laid January 2, and on the submarine tender Holland, the keel of which has not been laid, due to delay in steel delivery.

Both Mare Island and Bremerton are doing a great amount of repair work, virtually all of which is on naval vessels, although a few Shipping Board vessels are being handled.

The dreadnought Texas has been almost completely overhauled at the Bremerton Navy Yard, having had repairs from hull to masthead, entailing the greatest outlay of new material, improvement and workmanship ever handled on a ship of her type at the yard, where she has been for five months. The Mississippi also has undergone considerable overhauling.

Captain E. L. Beach, U. S. N., commandant at Mare Island, has sent out circular letters to the yard employes congratulating them on making the lowest shop expense record of the navy yards.

Mare Island has outfitted the submarine-chaser Earp as a Coast Guard cutter and the vessel will be taken to Honolulu by Lieutenant-Commander C. F. Howell, Coast Guard, to serve in island waters, which have been without a Coast Guard vessel since the departure of the old Thetis in 1916.

The recent observance of Navy Day at the League Island Navy Yard served to inform many thousands who visited the yard as to the importance of the Philadelphia station, and developed some interesting facts as to the work under way there. The government employs more than 9000 men in the yard at the present time and may take on 4000 more when work is actually commenced on the two new battle-cruisers that are to be constructed in the yard and for which the material is now being assembled. It is not commonly known to Philadelphians how important this yard is financially to the city, but the fact develops when it is stated that the Navy Yard payroll is now upwards of $40,000 a day. During September there were as many as 120 vessels in the yard at a single time, said the bulletin of the Atlantic Coast Shipbuilders' Association.

Supplemental to the recent wage decision of Secretary Daniels, the Navy Department has issued a circular letter, changing the maximum pay of clerical group including stenographers, typewriters and checkers from $4.56 to $4.80 a day and increasing also the wages of telegraphers and eliminating from the recent wage increase welfare specialists, educational specialists, song leader, librarian, etc. The letter also eliminates from the recent wage increase pilots, tug masters, ferry masters and mates by reason of the wage adjustment made to these classes in March. Readjustment is also made of employes in navy hospitals.

Ships Must Be Surveyed

The foreign trade department of the San Francisco Chamber of Commerce is in receipt of advices from Washington to the effect that there is little likelihood of a further extension of the time in which foreign-built ships, admitted to American registry, may comply with the laws of the United States respecting measurement, survey and inspection. The order of the President makes such compliance necessary by March 1, 1921. It is intimated that the Department of Commerce, under which the administration of the law is placed, feels that ample time has already been accorded for compliance, and as all shipowners are presumed to know the law, no further announcement need be expected from the Steamboat Inspection Service, which has immediate supervision of such matters. The law specifying requirements to which foreign-built vessels admitted to American registry must submit was passed August 18, 1914. Putting its provisions into effect was postponed until March 1, 1921.

Blue Funnel Back

Resumption of the Pacific Coast-European service of the Blue Funnel Line with the arrival of the steamship Myrmidon in October was announced by Dodwell & Company, agents of the Blue Funnel. The service had been suspended temporarily.

To Load at Antwerp

The Norway Pacific Line has notified the marine department of the San Francisco Chamber of Commerce that the motorship Borgland of 7600 tons deadweight will load during the first half of November at Antwerp for San Francisco, and take a return cargo for Bergen, Christiania and Copenhagen. Cargo for other Pacific Coast ports will be accepted on through bills of lading for transshipment via San Francisco.

Bolinas Operation Resumed

The Radio Corporation of America resumed operation of the wireless station at Bolinas October 1, and the government relinquished all commercial business to the corporation. Tests recently made indicate that it is now possible to talk by wireless telephony to ships that are 900 miles at sea. Reports of the position of merchant marine vessels will be made in the future by the wireless corporation.

Northern Route for Cable Urged

In a resolution adopted by Seattle Chamber of Commerce the International Cable Conference was urged to consider the Seattle-Aleutian route for a new trans-Pacific cable, because the route would be the shortest between America and Asia; would skirt the Aleutian Islands, which offer convenient landing stations; that no coral formations exist to cause trouble; and that there would be no difficulty because of ice.

Seeley & Company Resume

Seeley & Company, who discontinued marine underwriting in the spring, have announced that they would resume their Pacific Coast business. Thomas P. Kehoe will have charge of the underwriting on the Pacific, with headquarters in San Francisco, and will be assisted by Charles Vornholt, now of the San Francisco branch. Offices will be maintained also in Seattle, Portland and Vancouver, B. C.

Japanese Pig Iron

Before the war Japanese demand for pig iron amounted to 467,282 tons, 167,061 tons of which were imported, according to the Japan Times and Mail. In 1919 this demand increased to 845,000 tons, of which 200,000 were imported from the United States, England and China. The Japan Gazette calls attention to the increasing cost of production of pig iron experienced by iron and steel manufacturers in Japan. One ton of pig iron involves the expenditure of at least 125 yen ($62.31), the iron ore costing 45 yen, coke 55 yen, lime 5 yen, and labor 20 yen.

Fusan Work Projected

The harbor of Fusan, in Korea, is to be greatly improved. The present harbor facilities provided by the new works have been found inadequate to meet the growing trade to Korea, and a new plan is under consideration to build a breakwater 1800 yards long and to extend the two existing piers by 800 yards, reclaim 27,500 tsubo of land and to dredge 220,000 tsubo to a depth of 24 feet. (One tsubo is 36 square feet.) It is estimated that the work will cost over 9,000,000 yen and take six years for completion. Fusan is destined to be the most easterly terminus of the Asiatic railroads, and this fact shows its importance as a port, says the Yokohama Chamber of Commerce.

Coal In Great Demand

For all parts of the world there is a decided increase in tonnage available during August, and for the first time since 1914 the supply of berth and tramp tonnage has exceeded the demand, says Birt & Company's Australasian Shipping Bulletin for August. The large Continental orders now being placed for coal have attracted all classes of tonnage, especially from Japan; in fact, never before in the history of Australia has there been such a demand for coal, which has resulted in unprecedented congestion at Newcastle, owing to the supply of same being insufficient for the tonnage available. Several steamers are on the berth for America to both Pacific and Atlantic ports, but there is little cargo, outside of coal, offering. The regular Antwerp and Genoa lines, too, are experiencing the same difficulty, and are largely completing with coal. Eastern steamers, too, with practically no flour available, are in the same position.

To San Francisco District

Senator McNary, of Oregon, has advised the Portland Chamber of Commerce that Admiral Benson had promised that Portland would be placed under the jurisdiction of the San Francisco office of the Shipping Board. A vigorous protest was made when Portland was placed under the newly-created Seattle office.

Nile Is Overhauled

The China Mail steamship Nile was overhauled by the United Engineering Company, San Francisco, at her dock during October, the work consisting of cleaning and repairing boiler tubes and repairing parts of the engines. The United Engineering Company had only five days in which to do the work, but the Nile sailed on time for the Orient October 1.

Standard Oil Awarded Contract

A contract for supplying lubricating oil to vessels of the Shipping Board on the Pacific Coast for a year beginning October 24 has been awarded to the Standard Oil Company. Deliveries will be made at San Diego, Los Angeles, San Francisco, Oakland, Tacoma, Seattle, Portland and Honolulu.

To Open Five-Day Service

A five-day service between San Francisco and Portland will be opened November 1 by the San Francisco & Portland Steamship Company. The schedule is made possible by the chartering of the steamship Alaska of the Alaska Steamship Company.

Represents New Line

A. M. Gillespie, Inc., of Seattle, has been appointed Puget Sound representative of the new Pacific-Caribbean-Gulf Line of Swayne & Hoyt, San Francisco. This new line is the first direct connection Seattle has had with the Gulf and Caribbean.

Canadian Government Services

Announcement has been made that the Canadian Government Merchant Marine will operate a line between Montreal and India in conjunction with the British India Steam Navigation Company and from Vancouver to India with government vessels only. The government merchant marine and the Canadian National Railways and the Blue Funnel previously had announced a joint service between Vancouver and China and Japan.

Alaska Pulp Tonnage

Shipping men are confident that the manufacture of pulp in Alaska will give immense tonnage for Seattle. They point out that in the period between 1911 and 1920 Canada's pulp and paper exports increased nearly $100,000,000. Vessels going north from Seattle are carrying equipment for pulp mills now being developed under the new policy of the Department of the Interior.

Contract for Vancouver Pier

The Northern Construction Company, Vancouver, has been awarded a contract by the Canadian ministry of marine for the construction of the pier and sheds of the Ballantyne pier, Vancouver, B. C. The bid of the company was $4,500,000.

Last Japanese Vessel Arrives

On her voyage from the Orient to Seattle, the Shipping Board steamship Eastern Sword, built by Uraga, averaged 14.63 knots. She is a vessel of 5500 deadweight tons. With her delivery the Shipping Board's program in Japan has been closed, although four vessels are being built by the Kiangnan yard, Shanghai, the first of which, the Mandaria, is expected to sail for the United States soon.

Seattle Port Makes Profit

A profit of $86,468.16 for the first eight months of the year, after $64,000 for depreciation and $185,000 for interest had been charged off, was made by the properties of the Seattle Port Commission. Revenues for the period aggregated $959,214.12 and expenses, including interest and depreciation, $872,745.96. The August profit was the largest of the eight months.

Doran Awarded Contract

A contract for thirty manganese bronze propellers has been awarded by the Shipping Board to the Doran Brass Foundry Company of Seattle for approximately $250,000. This is the second large board contract to be awarded to the Doran foundry, the first having been for sixty propellers for vessels building at Hog Island and Bristol. Up to October 1 twenty propellers of the first contract had been delivered. Inasmuch as both contracts are for delivery of all by June 1, 1921, the Doran force will be increased so that manufacture may be facilitated.

"Outside Man" for Moore

Gordon M. Glidden, "outside man" for the Moore Shipbuilding Company, Oakland, is charged with the duty of "selling" the facilities of the yard to vessels in need of drydocking and repairs. A "salesman" of a shipbuilding company does not carry steel steamers as "samples," but he has the responsibility of making sure that another yard does not carry off the repair job. As a matter of course, competition is unusually keen, for a single ship will mean thousands of dollars; and some interesting stories might be told of the strategems of the different yards' representatives.

Gordon M. Glidden

Honolulu Discusses Dredging

Honolulu is discussing a project of the Navy to dredge Kaneohe Bay, a large landlocked harbor lying on the northern side of the Island of Oahu, about ten miles from Honolulu. Kaneohe Bay is filled with coral reefs, which grow more vigorously on the windward side of an island than on the leeward, and dredging would be extremely expensive, as the United States discovered in developing Pearl Harbor. Admiral Hugh Rodman, commander of the Pacific fleet, was quoted, however, as having said to the Honolulu Chamber of Commerce that the plans of the Navy include the dredging of Kaneohe.

Castings for Montana

The Columbia Steel Company, Pittsburg, California, will manufacture the stern-post and counter castings for the superdreadnought Montana, now building at the Mare Island Navy Yard, and also for dreadnoughts to be built in the East. Patterns for the Montana castings were prepared at Mare Island.

Fast Run by Great Northern

The U. S. A. T. Great Northern arrived at San Francisco October 3, four days and twenty-one hours from Honolulu. This run, although fast, is much slower than the record set by the Great Northern in December, 1915, of three days, eighteen hours and fifty-one minutes, Diamond Head to San Francisco lightship, a speed of about twenty-three knots an hour. At that time the vessel was owned by James J. Hill.

New Kerr Service

Starting November 10 with the sailing of the Toyooka Maru, the Kerr Steamship Company will operate a regular monthly line of steamers from New Orleans to the Orient. Although the Toyooka Maru is receiving cargo only for Kobe and Yokohama, if sufficient cargo offers she will make Shanghai, Manila and Hongkong, and it is contemplated future sailings will call at all ports named. Shipping Board rates, which are the same as from New York, will apply. Full information as to rates, space reservations, etc., may be obtained by applying to the office of the company in the Merchants Exchange, San Francisco.

Some Recent Losses

Mexican steamer Progresso grounded on Sacramento reef near San Antonio Point, Lower California; pulled off by Pacific Mail steamship San Jose October 14.

Power schooner Newark sunk on reef eighteen miles south of Geronimo Island September 29; 200 tons of onyx and fifteen of guano lost; no insurance.

Grand Trunk Pacific liner Prince Rupert beached in Swanson Bay, B. C., after striking rock September 29; 200 passengers taken off by steamship Prince John; vessel later slipped into deeper water, only her funnel and bridge showing; estimated time to raise her, sixty days.

Former destroyer Goldsborough, owned by motion-picture company, capsized and foundered at Seattle.

Steam schooner Centralia disabled at sea by boiler explosion while en route from Los Angeles to San Francisco; picked up by Peterson tug Wyadda October 12 after being adrift for sixty hours.

Steam trawler Carruthers in collision with U. S. S. Surveyor; Carruthers beached on White Sand Island, north of Prince Rupert Island, October 14; hole torn in Surveyor's bow; members of Carruthers crew missing.

Steamship Redondo lost propeller off British Columbia; towed to Seattle by steamship Santa Ana.

Pineapple Estimate Exceeded

Pineapple is king in the Hawaiian Islands for only a short period of the year, but at that period it reigns supreme with sugar recumbent. This is the period; and every freighter leaving Honolulu for the coast is carrying thousands of cases of the canned fruit. One of the heaviest cargoes of canned pines on record was that taken from Honolulu by the freighter Hoboken in the early part of October. The Hoboken loaded 217,000 cases and is carrying them direct to New York by way of the Panama Canal. All Matson steamers are heavily loaded with pineapples. It is evident that the year's estimated output of 6,000,000 cases will be exceeded by the close of the season in January.

Honolulu Work to Proceed

Although the appropriation of $380,000 for the construction of steel and concrete sheds on Piers 8, 9 and 10 in Honolulu harbor, together with the proposed erection of a clock tower at the front of Fort street to house the offices of the harbormaster and the pilots, is far below the bids opened in October, the harbor board has voted to buy the steel necessary at a cost of $159,000. This amount will purchase the steel framework for the entire three piers and tower. It is estimated that it will cost about $25,000 for the erection of the steel, which will leave $200,000 for the completion of the work. This amount will not complete the improvements proposed, but Governor Charles J. McCarthy is of the opinion that by the time the steel is delivered, in approximately eight months, it may be found feasible to put the wooden roofs on the sheds and cover them with tarred paper, as was originally planned in the specifications. The concrete walls may then be completed through another appropriation obtained from the legislature in January of next year.

Pallas Completes First Voyage

The steamship Pallas, of Swayne & Hoyt's Pacific-Argentine-Brazil Line, arrived at Pacific Coast ports from South America in October, completing the first round trip of the new service.

Air Service Base at Midway

Midway Island, now used exclusively by the Commercial Pacific Cable Company as a station, will become a United States air service base, according to announcements made in Honolulu to the effect that photographs will be taken of the island from airplanes in order to determine the nature of the surrounding water. Scout R. D. Kirkpatrick, U. S. N., commands the Pacific air detachment aboard United States Naval Eagle Boat 40 on its cruise to Midway, carrying a naval seaplane, which will be used for the photographing flights. The photographer in the seaplane will take photographs of the island and the surrounding waters from which a birdseye chart will be used by the air service for preliminary plans looking toward the establishment of a base.

Contracts for Packing Let

Contracts for packings for the year beginning October 15 have been awarded by the Shipping Board to the United States Rubber Company and the Anchor Packing Company. Deliveries are to be made at Portland (Maine), Boston, New York, Philadelphia, Baltimore, Norfolk, Newport News, Charleston, Savannah, Jacksonville, Mobile, New Orleans, Galveston, Los Angeles, San Francisco, Portland (Oregon), and Seattle.

French Grain-Carriers Arrive

French sailing vessels began to arrive at San Francisco during October to load grain for Europe. Prior to the war Frenchmen engaged extensively in that trade. Another service that has begun to revive is the transportation of coal from the Atlantic to San Francisco. The steamship West Cahokia, operated by Sudden & Christenson, arrived October 7 with a cargo of 3000 tons from Philadelphia for the King Coal Company. She also brought steel for the Moore Shipbuilding Company.

Monthly Sailings to West Coast

George S. Bush & Company, Seattle, Puget Sound agents of the Pacific Motorship Company, have announced monthly sailings of the Balcatta, Babinda, Benowa and Boobyalla to ports of Ecuador, Peru and Chile.

Los Angeles Pacific Opens Office

An office has been established by the Los Angeles Pacific Navigation Company at 485 California Street, San Francisco, in charge of R. M. Grose, formerly of the Southern Pacific, Admiral, Matson and Pacific Mail companies, who will act as assistant general freight agent.

Record Grain Movement

Statistics compiled by Fred W. Clark, manager of the Merchants' Exchange, Seattle, indicate that all records for grain shipments from the Northwest were broken in the three-month period, July to September, during which grain and flour shipments aggregated 11,911,818, as compared with 6,340,615 for the corresponding period of last year. The former three-month record was made in the first three months of the 1913-1914 season, shipments totaling 9,245,992 bushels.

Completes Trip Around World

The Shipping Board steamship West Kasson, operated by the Pacific Mail, arrived at San Francisco October 4, completing the first round-the-world voyage of that company's service. The West Kasson arrived at San Francisco later than had been expected because of drydocking at Baltimore.

Cruiser Rainbow Sold

Nieder & Marcus, of Seattle, have purchased the old Canadian cruiser Rainbow, which was built in England in 1891 and sent to Canada in 1910. She is a protected cruiser, 300 feet long, 43 feet 9 inches in beam, and with a maximum draft of 18 feet. Her engines are of 8000 horsepower. She was sold intact except for her guns, which had been removed. During the war the Rainbow was used for patrol duty in the Pacific, although she had been partially dismantled prior to the beginning of hostilities.

Cholberg Builds Barkentines

Four wooden barkentines for Victoria Shipowners, Ltd., are being built by the Cholberg Shipyard, Victoria. Mr. Cholberg has promised that they will be the staunchest wooden vessels ever built on the Pacific Coast and he is devoting unusual pains to making good his pledge.

Would Remit Canal Tolls

Remission of Panama Canal tolls to Shipping Board vessels was advocated by Senator Wesley L. Jones, of Washington, in an address at Seattle. "The canal is ours, built with American money, and there can be no valid reason why ships operated under the Shipping Board should not pass through the waterway without charge," he said. "It is our property and should be used as we see fit."

Open Bids for Warehouse

Bids for a five-story navy warehouse to be erected in San Diego were opened October 5. Lange & Bergstrom, San Francisco, bid $950,604, and Clinton & Company, San Diego, $873,593. Both bids were double the amount appropriated.

Yacht to Become Tug

Captain R. Andrus, owner of the Lake Union Boat & Towing Company, Seattle, has purchased the steam yacht Mouting of the Wells-Trans Trading Company, Vancouver, B. C., and will convert her into a tug. She is 74 feet long and has 110-horsepower engines.

Would Improve Waterway

Improvement of the Duwamish Waterway, Seattle, is the aim of the Industrial Association of the South End, which asserts that the waterway is inadequate. A survey of the waterway was authorized by the last Congress.

To Meet in Seattle

Announcement has been made in Seattle by T. S. Lippy, president of the Seattle Port Commission, that the American Association of Port Authorities, which held its annual session in Chicago in October, would meet in Seattle next year.

Panel in the San Francisco offices of Willcox, Peck & Hughes. On the left is a full-rigged ship sailing through the Golden Gate; in the center, Willcox, Peck & Hughes' building, 3 South William Street, New York City; and on the right, the steamship Dakota, a wreck in Tokyo Bay. See page 93)

Fast Voyage Made

The steamship City of Spokane, built by Skinner & Eddy and operated by the Pacific Steamship Company, arrived at Seattle in October after a voyage of eighty days from Seattle to Singapore via Yokohama, Kobe, Moji, Manila and Hongkong, on which she averaged 260 miles a day. On one day she logged 311 miles, or 13 knots an hour. She was commanded by Captain Thomas Quinn.

Manages Wooden Motorships

The Universal Shipping & Trading Company, Seattle, has been appointed manager of the wooden motorships Cethana, Culburra, Coolcha and Challamba and of the sailing schooner Commodore, formerly Blaatind.

Barges for Swift

Keels of two fuel barges for Swift & Company were laid by the St. Helens Shipbuilding Company, St. Helens, Oregon, September 1. The barges will be 130 feet long, 34 feet in beam and 7 feet in loaded draft.

Ferry Is Launched

The ferryboat Aven J. Hanford, built by the Robertson Shipyard, Alameda, for the Rodeo-Vallejo Ferry Company, was launched October 10. She was designed especially for carrying automobiles. Her length is 140 feet and beam 50.

Intercoastal Rates Cut

Reductions were made in some eastbound intercoastal rates by operators in October. Rice was reduced from 65 to 52½ cents a hundred pounds; pearl barley 80 to 70 cents; and green hides from $1.25 to $1.

Altering Japanese-Built Vessels

The United States government spent $1,720,000 in shipyards since the first of the year, making alterations and doing other work on ships built in Japanese yards for the Shipping Board, says a report by the Seattle Chamber of Commerce. There have been twenty-five Japanese-built steamships turned over to the Shipping Board at Seattle. These vessels were built in Japan under war-period contracts by which Japanese built ocean-carriers for America while America furnished the steel necessary to keep Japanese industries going. The vessels were built as coal-burners and all have been turned into oil-burners. The amounts expended in Seattle range from $34,000 to $138,000 fot the various ships.

Richmond Harbor Work

By a vote of 2872 to 400, Richmond, California, has approved an expenditure of $400,000 on the harbor. A bond issue of $150,000 for a municipal warehouse carried—2776 to 459. The harbor work will consist of dredging, construction of a turning basin and of a wall from Brooks Island to deep water. Two inner harbor bulkheads, 1,000 feet apart, already are in place. The channel will be dredged a distance of 600 feet to a depth of 24 feet at low tide. When these works have been completed Richmond will have a deep-water frontage of 20,000 feet.

Dismiss Sloan Suit

The suit of Sloan Shipyards Corporation against the United States Shipping Board for approximately $3,000,000 damages for the alleged seizure by the Shipping Board of vessels on the ways at Anacortes and Olympia plants of the company, has been ordered dismissed by Federal Judge Neterer, Seattle, on the ground that the Federal court has no jurisdiction, but that the controversy should go to the government's court of claims. Suit in equity was then brought by the government against the Sloan Shipyards Corporation, Capitol City Iron Works, Anacortes Shipbuilding Company and the Emergency Fleet Corporation asking for receivers for the Sloan and subsidiary companies, on the ground that the companies owe the United States $2,970,338.98, the unpaid balance of $11,000,000 advanced during the war.

Victoria to Be Overhauled

The Nome liner Victoria, although one of the oldest steel steamships in Pacific waters, is to have extensive overhauling. The cabins and superstructure will be altered, and Steven Birch of New York, president of the Alaska Steamship Company, has been asked to approve the expenditure of approximately $300,000.

Liebre Launching Soon

Union Construction Company Hull No. 12, a 10,200-ton tanker for the General Petroleum Company, probably will be launched at the Oakland yard late in November. She will be christened Liebre.

Todd Given Contract

The Todd Drydocks, Seattle, received a contract from the Shipping Board for the conversion of the Japanese-built steamship Eastern Sword from a coal-burner into an oil-burner at a cost of about $85,000. The White system was installed. Alterations in the crew's quarters also were made.

Havana Freight Received

Stanton & Berry, San Francisco, agents of the Matson Line, have announced the resumption of freight bookings from Atlantic ports to Havana. An embargo had been declared because of the acute congestion.

Offices in Los Angeles

Norton, Lilly & Company, agents of the Isthmian Line and of the French Societe Generale de Transports Maritimes a Vapeur, have established offices in the Van Nuys building, Los Angeles.

World Service Announced

Gerritsen, Curtis & Company, Portland, have announced that a round-the-world service would be established from Pacific Coast ports to the United Kingdom, Scandinavia, Mediterranean, East Indies, the Orient and thence to the Pacific Coast. Cargo will be received after November 15. Chartered vessels will be used. Gerard Gerritsen, president of the company, has gone to Europe to establish agencies.

Portland Pier Completed

Pier 5, the new 3500-foot structure of Portland, has been completed except for minor work. Revenue of Portland municipal docks during September was $21,116.84.

To Load at Canadian Ports

Permission has been given by the Shipping Board to Struthers & Dixon, San Francisco, to send the steamship West Ison to British Columbia to load for the Orient. This will be the first instance of a Shipping Board vessel loading at a Canadian port for the Far East, as westbound vessels heretofore have had to take their cargoes at American ports. The decline in American export freight led the board to grant permission for the West Ison to go to British Columbia, which has been served heretofore by British, Japanese and other foreign vessels.

British Columbia Launchings

An 8100-ton freighter, the Canadian Traveler, building for the Canadian government, has been launched by the Harbor Marine Company, Victoria, B. C. This was the second vessel built by the yard for the government, and the last of any considerable size, the principal work remaining on hand being a car ferry for the Canadian Pacific. The Wallace yard, Vancouver, has launched the Canadian Highlander, also for the government merchant marine, and has laid the keel of the Canadian Skirmisher, a sister ship. Work will be begun on a new passenger vessel for the Canadian Pacific early in November.

Ferris Barge Completed

The Ferris-type barge Griffson, owned by James Griffiths & Sons, Seattle, was towed to Portland to load lumber for Panama. She will carry about 2,000,000 feet. When the Shipping Board canceled some of its contracts, the Griffson was on the ways at the Nilson & Kelez yard, Seattle; she was launched as a skeleton ship and was completed for the Griffiths company by the Winslow Marine Railway & Shipbuilding Company.

Service Is Suspended

Announcement is made by the Rolph Mail Steamship Company that the steamships Joan of Arc, Annette Rolph and Georgina Rolph have been withdrawn temporarily from the West Coast service because of inability to obtain fuel oil at ports of call, and will be used in the Pacific lumber trade, plying coastwise.

East Asiatic Building

Otto Jelstrup, United States agent of the East Asiatic Company, who was in San Francisco in October, announced that his company was constructing six new motorships for its Copenhagen-Pacific Coast-Orient service.

Won't Declare Embargo

Admiral Benson has refused to accede to the request of the Tacoma Chamber of Commerce that he request the Interstate Commerce Commission to declare an embargo on the movement of freight from the Atlantic to the Orient via Panama, which was requested in order that the Pacific Coast might obtain a greater portion of the business. The admiral held that the problem was primarily domestic.

Empress of Canada Tour Off

Advices have been received in Vancouver that the Canadian Pacific has canceled the world tour of the new steamship Empress of Canada, which was to sail from Liverpool for Vancouver in the spring. Labor disturbances made delivery of the liner extremely uncertain, and the company chose to cancel the voyage.

Keeps West Hixton

That the Shipping Board steamship West Hixton would be permitted to sail for the Orient under management of the Los Angeles Pacific Navigation Company was announced in Los Angeles. When the West Hixton was about to depart she was withdrawn by the San Francisco office of the board because she had insufficient cargo. An appeal to Admiral Benson resulted in a reversal of the decision.

Wiley Receives Service

Executive officers of the Todd Drydocks, Seattle, and the Todd Drydock & Construction Corporation, Tacoma, have presented C. W. Wiley, president, with a silver service for his new yacht, Hopestill.

Submarine Boat's Service

Sudden & Christenson, San Francisco, have announced that steamships owned by the Submarine Boat Corporation would be placed on the intercoastal service. The first sailing will be that of the Surichco, which will depart from the Submarine Boat terminal at Port Newark, New Jersey, early in November, and she will be followed within a few days by the Sewarinco. On the Pacific calls will be made at Los Angeles, San Francisco, Grays Harbor, Willapa Harbor, Portland and Puget Sound ports.

Page Brothers' Freight Report

San Francisco, October 14, 1920.

Our last circular was dated August 12. Shortly after that day, several foreign steamers were chartered for wheat, flour or barley, option of loading either at San Francisco, Portland or Puget Sound, for the United Kingdom or Continent with freight payable at destination—namely, the Niceto de Larrinaga and Pilar de Larrinaga, at 120/-, and the Ullstad and Isis at 115/- per ton. With the exception of the Ullstad, we understand that all the above-mentioned steamers will load at Portland. Since then there has been only one charter reported, namely, the Pacific Steam Navigation Company's steamer Orca, carrying about 15,000 tons. She has a draft of about 35 feet 6 inches loaded, and therefore was not able to charter for Portland loading, and was eventually taken by M. H. Houser for United Kingdom or Continent at 110/- per ton.

The United States Shipping Board steamers have not cared to follow these rates down. We believe that if $20, freight prepaid, for United Kingdom were offered, they would release tonnage at that figure.

From San Francisco two French vessels have been chartered by Strauss, one the General de Somis at 125/- for a full cargo of barley to United Kingdom, Havre, Antwerp, Dunkirk; and the Touraine, chartered October 13 by the same firm, at 130/-, both less 6¼ per cent, half freight payable in advance, the rest at destination.

There has been quite a business in general charters since our report in August.

J. J. Moore chartered the bark Harvard at 150/- for a full cargo of coke from Sydney to Valparaiso. They also chartered the bark Gladbrook at $35, Canadian currency, redwood to Sydney from Eureka; and the schooner A. F. Coates at $32 Puget Sound to Adelaide, and the French sailer Marechal de Turenne at $35 from Eureka and British Columbia to Melbourne; also barkentine Fort Laramie at 97/6 coal from Australia to a nitrate port.

The Ocean Lumber Company chartered the steamer Margaret Coughlan at $45 for ties from British Columbia and/or Puget Sound to two ports in United Kingdom. They also chartered the Green Star liners Clauseus and Chincha at the same rate, and the British steamer City of Vancouver at $42.50.

Three Shipping Board vessels have at last met the market for sleepers, Ocean Lumber Company having taken two for November/December at $42.50, and Sudden & Christenson one at the same rate.

The H. R. MacMillan Export Company, Ltd., chartered the United States Shipping Board steamer Topa Topa for ties to two ports in United Kingdom from British Columbia at $45, and also chartered a sister ship of Margaret Coughlan for ties to United Kingdom, loading at British Columbia, at $44. This was previous to the break to $42.50.

Burns-Philp & Company chartered the Bertie Minor on private terms for round trip to Ravati and return; also the Golden Shore for copra from the South Seas to San Francisco at $15, and the Fred J. Wood for copra from the South Seas to San Francisco at $16.

W. R. Grace & Company chartered the schooner Camano for nitrate to Honolulu at $13.50. The same firm took the brigantine Griffson from Puget Sound to Balboa at the rate of $22, and the steamer Griffco at $30 from Puget Sound to Callao, and the steamer Forest King from Puget Sound to Callao, also at $30.

The Hawaiian Fertilizer Company took the ship Annie M. Reid at $15 for nitrate to Honolulu. This was an old charter.

The steamer Western Cross was taken at $45 and $50 for ties and lumber to United Kingdom by Balfour, Guthrie & Company. The same firm also took the Br. steamer David Evans at 120/- for coke from Sydney to Valparaiso.

A United States Shipping steamer was taken by the Du Pont Company at $9.50 for nitrate to Dupont.

Hind Rolph & Company took the schooner Commodore, loading Puget Sound, to one port in Africa, Durban, at $42.50, charterers paying all insurance on the freight.

G. W. McNear Company chartered the Br. bark Dartford on private terms for case oil hence to New Zealand. They are also reported to have chartered their tank steamer Ascunsion on a one year's time charter at a lump sum of $500,000.

The schooner Defiance was taken by the Mohns Commercial Company at $30 from the North to Callao.

W. L. Comyn & Company chartered the schooner Edward R. West from Puget Sound to one port Peru at $28.50 net.

The schooners Resolute and H. D. Bendixen were both taken by Atkins, Kroll & Company for copra from the South Seas to San Francisco at $17.

The bark C. D. Bryant was taken by Andrew Weir & Company for nitrate to the West Indies at $10.

Hagens & Company chartered the schooner Dauntless for nitrate to Honolulu at $14.

The barkentine Hawaii was chartered by Balfour, Guthrie & Company to load North Pacific to Melbourne at $32.50.

The United States Shipping Board steamer Eastern Belle has been chartered by the American Export Lumber Company, loading at Puget Sound for Nuevitas and/or Nipe, Cuba, at $25.

Cape Romain Arrives

With the arrival of the Atlantic-Gulf & Pacific steamship Cape Romain at Pacific Coast ports during October, the new service of that line was opened. The Atlantic-Gulf & Pacific Steamship Corporation purchased ten vessels of an aggregate of 90,000 tons of the Shipping Board; three of the vessels, the Cape Romain included, are 7371-tonners, and the others range from 8521 tons to 11,713. The company's announced intention is to operate both in the intercoastal and foreign services, five vessels at least being allotted to the former, with which a two-weekly service will be maintained.

After a round-trip voyage to South America, the Forest King, first Ferris-type hull from the Shipping Board's Lake Union, Seattle, fleet of uncompleted wooden carriers finished as a steam schooner, has arrived at Seattle in excellent condition, and shipping men say that this is additional evidence of the splendid qualities of Douglas fir for ship construction. The vessel's lumber capacity is 300,000 feet greater than the capacity of a Ferris-type steamship and she handles her cargo much easier. She makes eleven knots and is considered an economical carrier. She will load 1,500,000 feet for the West Coast of South America. The Forest King was built by the Grant Smith-Porter yard and is owned by the Grays Harbor Motorship Corporation.

Given Reciprocating Engines

The Shipping Board vessel Imlay, built by the Moore Shipbuilding Company, Oakland, and the Westboro, built by J. F. Duthie & Company, Seattle, have been equipped with reciprocating engines, replacing turbines. Both the reciprocating engines are of 2800 horsepower. The Shipping Board also is replacing electric telemotors with hydraulic in several vessels.

Coughlan Launches Freighter

An 8800-ton steel freighter, building by J. Coughlan & Sons, Ltd., of Vancouver, B. C., is scheduled to be delivered in November, following a sister ship, the City of Vancouver, built for Vancouver Steamships, Ltd., delivered in October. Two other steel freighters, the Canadian Transporter and the Canadian Freighter, both 8350-tonners, will be built for the Canadian government, with keel-laying probably in December.

Radio Stations Planned

Surveys have been completed by the Thirteenth Naval district, Puget Sound, for the establishment of a number of radio compass stations on the Alaskan Coast at points between southern Alaska and the eastern tip of the Aleutian Islands. Plans call for the construction of four or five stations.

Thermit Corporation to Build

The Metal & Thermit Corporation, 333 Folsom Street, has awarded a contract for the construction of a group of concrete and hollow-tile manufacturing buildings to be erected in South San Francisco, San Mateo County, to cost $100,000. The main office of the Metal & Thermit Corporation is Chrome, New Jersey. Its selection of a location in South San Francisco was obtained through the assistance of the industrial department of the San Francisco Chamber of Commerce.

New Shed at Seattle

Construction of a 500-foot, two-story transit shed on the public Smith Cove Pier B, Seattle, the largest ocean dock in the world, has begun, to provide passenger accommodations for the use of the Nippon Yusen Kaisha's fleet of trans-Pacific liners. A similar shed has just been completed on the opposite side of the pier for passenger accommodations for the Pacific Steamship Company's new fleet of Shipping Board passenger liners, which will make the run between Seattle and ports of the Orient. Work was made possible by the purchase of $350,000 port of Seattle bonds by a combination of Seattle banks. The contract was let to Scherer & Carlson for $122,240. The Port Commission has authorized the installation of a heating plant on the pier at a cost of $14,000.

Moore Delivers Jalapa

The Moore Shipbuilding Company, Oakland, delivered the Shipping Board freighter Jalapa, 9400 deadweight tons, October 2. She was one of the last six freighters building by the Moore yard for the government, later board contracts having been for tankers. The trial of a sister ship, the Mursa, was held later in the month. Hull 160, the tanker S. C. T. Dodd, building for the Standard Oil Company of New Jersey, was launched, and the keel of the tanker F. H. Hillman, a Diesel-driven tanker for the Standard Oil Company of California, was laid in October. The engines and boilers of the Dutch steamship Arakan have been removed and repairs to the hull, including the replacing of 109 plates, are proceeding. A contract for this work was awarded to the Moore company for $297,854; time limit, 90 days.

Deliveries by Hanlon

The Hanlon Drydock & Shipbuilding Company, Oakland, launched the 5350 - ton freighter Memnon September 29. She probably will be delivered in December. The freighter Jeptha, a sister of the Memnon, was delivered in October and allotted to the General Steamship Corporation, which is discovering the small Hanlon vessels to be better adapted to its West Coast trade than are the larger vessels previously assigned by the Shipping Board. This is because much of the work is in relatively shallow roadsteads.

Dredging has been begun by the Hanlon yard in preparation of a site for the new floating drydock.

To Deliver Schooner

The auxiliary schooner Doris Crane, building by W. F. Stone & Son, Oakland, for the Fanning Island copra plantation, represented on the Pacific Coast by Wightman & Crane, is nearing completion, and probably will be delivered in November. The steam schooner Bee, sold by Fred Lindermann to the Hawaii Meat Company, Honolulu, has been refitted at the Stone yard for the Hawaiian interisland cattle trade: the deck was sheathed; the forecastle and quarters aft enlarged; boat decks built on each side aft; davits installed for four 26-foot cargo boats, besides calking. The Stone yard also has overhauled and calked submarine chaser 297.

Toyo Kisen Kaisha Sailings

Seven vessels of the Toyo Kisen Kaisha arrived at San Francisco during October and six departed. Besides vessels of the San Francisco-Orient and the South American services, three freighters arrived, the Choyo Maru, a 10,000-ton vessel, from the Atlantic via the Panama Canal, bound to the Orient; the Koyo Maru, another 10,000-tonner, from Panama, where she was repaired after grounding; and the Meiyo Maru, of the same size, a new vessel making her first call at San Francisco. The Meiyo Maru will sail from San Francisco to Portland, where she will load phosphate and other cargo for Japan. Although most of the vessels being used in the new Portland service are freighters, calls also are being made by the combination vessels of the South American line, among which will be the Anyo Maru, which, on her next northbound voyage, will call at Portland. The freighter Taisho Maru will take a cargo of nitrate from South America to the Atlantic, sailing thence for Japan via Panama.

Seattle and American Ships

In the fiscal year ending June 30, 1914, American vessels plying out of Seattle and other Washington ports to Asia and Oceania were 4.8 per cent of the total; in 1920 they were 43 per cent. Among the foreign carriers Japanese stand first in number, having seven times as many vessels as the British. The number of American steamships will be increased materially by the five new 535's, to be operated by the Pacific Steamship Company, and these vessels will have a pronounced bearing on the northern passenger business. An investigation has demonstrated that, of passenger business to the Orient through British Columbia, 85 per cent originates in the United States, 10 per cent in Europe, and 5 per cent in Canada; in other words, the Canadian Pacific, N. Y. K. and O. S. K. carry American passengers for the most part. The new 535's doubtless will cut sharply into the foreign lines' business. The North Coast has not had an American passenger line to the Far East except for the Minnesota and Dakota, one of which was withdrawn and the other lost.

To Improve Yokohama Harbor

At a meeting of the Japanese Harbor Investigation Committee of the Home Office, held at the Home Minister's official residence, Tokyo, plans were considered for the construction and improvements to be made on the Yokohama harbor, as well as plans for reconstructing the harbors of Kobe, Shimonoseki and Kuratsu. The Yokohama harbor, however, is to have the most attention, the work to be done on an elaborate scale.

Accorded to the program adopted by the special committee, a great piece of reclamation work is to be raised along the present breakwater off Kanagawa, and the sea-bed of the harbor limit is to be dredged out to the depth of about forty feet to enable steamers of between 30,000 and 40,000 tons to come alongside the piers. The land to be reclaimed will be about 1000 ken in width.

The enterprise will take, it is estimated, about 14,000,000 yen, to be spread over a period of five consecutive years. In the event of the completion of this construction work, the present pier near Yokohama station will be used exclusively for passenger vessels, while the freighters will be moored at a hatoba to be erected on reclaimed land.

In the center of the reclaimed land, rails will be laid and a complete railway connection will be established, which will be used in transporting freight from the boat to the destination points. Many sheds and warehouses will be built in which to store goods landed from the steamers.

The aspect of the port of Yokohama will have undergone a complete change with the fulfillment of these improvements.

Unusual Dispatch Given

Due to the need of replacing four plates of the Pacific Mail Steamship Venezuela by the Moore Shipbuilding Company, the vessel, instead of being received by the company for loading Monday, September 13, was not received until 8 o'clock in the morning of Thursday, September 16, or only two days prior to her scheduled time of sailing for Honolulu and the Orient. Nevertheless, the Pacific Mail, by working at times as many as eleven gangs, completed loading 4432 tons of cargo and 200 tons of stores by 8 o'clock Saturday morning, September 18, so that the vessel steamed on time that afternoon. The Venezuela, being a passenger vessel, is not especially well equipped for freight handling, so that the work is the more remarkable. She has five hatches. For most of the time three gangs were employed in one hold.

Coal for Sweden

An unusual cargo was loaded in September by the Johnson Line motorship Pacific, which took 4700 tons of coal at Vancouver, in addition to general cargo at other Pacific Coast ports, for Sweden. W. R. Grace & Company, Pacific Coast agents, announced the following loadings at Pacific Coast ports: motorship Kronprinsessan Margareta, September/October; Buenos Aires, October/November; San Francisco, November/December; Pacific, December/January; and regular sailings thereafter; calls to be made at British Columbia and Puget Sound ports, as well as at San Francisco, and at Los Angeles, as freight offers. Cargo will be accepted for Calais and Norwegian, Swedish, Finnish and Baltic ports. The Calais service will be maintained regularly, that port not being congested so badly as others in France.

Fireman's Fund Happenings

The Fireman's Fund Insurance Company of San Francisco has purchased the building and lot on Sansome street adjoining the present headoffice. The building, a three-story brick structure, will be occupied as soon as existing leases may be terminated. The rapidly-growing business of the company has necessitated new office space. At first the company had considered adding stories to the present office building.

A. W. Follansbee, Jr., marine secretary of the Fireman's Fund Insurance Company, is spending several weeks in the Pacific Northwest and in New York, visiting the different marine agencies of the company. He spent October in New York, with headquarters at the offices of F. H. & C. R. Osborn, managers of the Atlantic marine department.

The Fireman's Fund has announced the allowance of an extra month's salary to all employes in the service of the company since July 1, 1919, and a pro rata bonus to those who joined the company subsequent to that date. This is the fourth bonus allowed the employes of the Fireman's Fund through the country since December, 1918.

New Japanese Subsidies

A formal statement issued by the Japanese Department of Communications in September said:

"With a view to extending the present service to the West Coast of South America and opening a new subsidized line to its East Coast, both from October, the government introduced a bill in the special session of the Diet making provision for the proposals. The necessary sanction of the Diet having been obtained, the government has arranged to revise the Ovearseas Shipping Subsidy Law in order to carry the proposals into execution.

"Under the new arrangement the present shipping resources for the line to the West Coast of South America will be doubled, and thus six ships will be used to maintain a regular monthly service, making twelve voyages a year.

"As to the new line to the East Coast of South America, it begins at Kobe and ends at Buenos Aires, the ports of call on the outward voyage being Yokohama, Nagasaki, Hongkong, Singapore, Capetown and Santos, and those on the return voyage Rio de Janeiro, Santos, Christobal and Yokohama. On this line six vessels of between 5000 and 7500 tons gross each, with a speed of between 14 and 16 knots, will be employed to keep up not less than two voyages in three months, or ten voyages a year."

One Month of Seattle Business

During August, 177 deep-sea steamships, aggregating 341,420 net tons, arrived at Seattle. Of these vessels, 145, aggregating 224,520 net tons, were of American registry; 14, of 33,736 tons, were British; and 11, of 58,736 tons, were Japanese. Vessels departing were practically the same as to number and tonnage. United States government vessels are not included in the above figures.

The number of passengers arriving during the month was 304,372, of whom 278,921, however, were local. The status of the others was: from Alaska, 2953; coastwise, 2573; foreign, 19,925. The totals of passengers arriving and departing were practically the same, except for Alaska, which lost 1200 persons during the month.

Import freight figures in tons follow: From Alaska, 21,085; from Atlantic, seaboard, 8797; from California, 151,408; from fishing banks, 1035; from Hawaii (all pineapple), 2507; local, 89,858; from the Philippines, 1935; from Australia, 1185; from British Columbia, 30,051; from East Indies, 296; from Great Britain, 4585; from India, 1257; from Norway, 132; from the Orient, 25427; from South America, 55; the aggregates being 276,623 tons from domestic ports and 62,988 tons from foreign ports.

Export freights were: To Atlantic seaboard, 6072; to Alaska, 19,869; to California, 4670; to Canal Zone, 112; to Hawaii, 4215; local, 36,257; to Philippines, 5321; to Australia, 23; to British Columbia, 4809; to East Indies, 282; to Great Britain, 1265; to Holland, 280; to India, 6; to the Orient, 44,667; to South America, 2893; the aggregates being 76,516 tons to domestic ports and 54,135 to foreign ports.

The total number of deep-sea vessels of all classes arriving during August was 438, of 371,148 net tons, as compared with 348, of 377,739 tons, arriving in August, 1919. In August, 1920, the number of local arrivals was 2013, of 539,149 net tons, as compared with 1935, of 505,686 tons, in August, 1919.

In terms of values, imports for August, 1920, fell off $17,820,005 as compared with August, 1919; and exports fell off $7,423,549. Both decreases are traced to the panic in Japan, inasmuch as business with other countries generally increased.

The Alaska and North Pacific salmon pack of the year is estimated at 6,055,000 cases, containing 290,640,000 one-pound tins. Much of this passed through Seattle.

Kukui Rescues Three

The Lighthouse Service Bulletin contains details of the unusual rescue of three men by the lighthouse tender Kukui in Hawaiian waters August 17. The schooner Annie E., having sailed from Honolulu for Hawaii August 8, became disabled the first day out because of several leaks. Three sailors were picked up August 10 by a sampan, and thereafter a careful search for the schooner was carried on; but without success, until on August 16 the U. S. A. T. Madawaska sighted a sailing vessel showing flares. Upon a report being received in Honolulu the Kukui was sent in search, departing from Honolulu the same day.

Captain Eriksen's account relates how the search throughout August 17 was fruitless, until the derelict was found in the evening in latitude 21:33 north, longitude 162 west, 225 miles west of Honolulu. The report goes on: "6:47 p. m., just about sunset, the second officer went aloft with marine glasses. The man who was then stationed aloft on lookout informed the second officer that he thought he saw small object on horizon. Second Officer Untermann also picked up the object and then reported it to me down on the bridge.

"I went up aloft myself and I saw at once that it was a sail of some kind. Whether it was a schooner sail or a sampan sail I could not tell then. We immediately headed for same, which bore about due west. It was getting dark fast, and as we steamed along we kept burning flareups, Coston lights, and played with the ship's searchlight. We soon saw a flareup from the other vessel, which kept on burning flareups continuously for about half an hour. We then surmised that it must be the missing schooner Annie E. We arrived alongside at 8 p. m.

"With the aid of the searchlight we could read the name of the vessel, Annie E., across the stern. The three survivors were standing on top of the deck house. We launched and manned our boat and sent it over to take the men off. Our boat was in charge of the second officer. The men were brought aboard the Kukui and given the best of care, although they had had nothing to eat for four days, however, they appeared to be in fairly good shape, but acted kind of dazed for a time."

The Annie E. was in such condition that the Kukui found towing her to port out of the question, so the derelict was fired.

Nothing is given in the Lighthouse Service Bulletin to account for the failure of the Madawaska to go to the rescue when she first sighted the Annie E.

Deaths of a Month

Captain Richard Seike, master of the Hanlon salvage steamship Homer, in San Francisco, October 3.

Captain Edwin L. Littlefield, retired, in Oakland, October 4.

Captain Herbert Williams, port captain of the Todd Drydock & Construction Corporation, and formerly marine superintendent of the Foundation yard, in Tacoma, September 21.

Captain George R. Slocum, U. S. N., retired, formerly commandant, Bremerton Navy Yard, in Palo Alto, California, September 23.

Captain John B. Kelly, of the motorboat Wakena, lost at sea in the Gulf of Georgia, September 27.

Atherton Macondray, president of Macondray & Company, San Francisco, in San Mateo, California, October 7.

Captain H. H. Lloyd, formerly master of vessels of the Pacific Steamship Company, in Santa Rosa, California.

Captain A. Erickson, master of the motorship Santa Flavia, in Callao, Peru.

Comings and Goings

Ryozo Asano, son of Soichiro Asano, arrived at San Francisco from Japan on the T. K. K. steamship Korea Maru October 27. Mr. Asano is managing director of the Toyo Kisen Kaisha, of the Asano Shipbuilding Company, and, in fact, is in active charge of the several corporations headed by his father.

At the meeting of the Northwest Rivers and Harbors Convention at Portland the following officers were elected: Garret Fisher, Tacoma, president; J. N. Teal, Portland, vice-president; R. C. Beach, vice-president; Dr. G. H. Douglas, Crescent City, Cal., vice-president; Alfred A. Aya, Portland, secretary; W. H. Clay, Everett, treasurer; B. F. Stone, Astoria, L. E. Bean, Eugene, E. A. Cox and Wallace Stanton, Lewiston, Idaho; E. F. Blaine, Seattle; Clement Scott, Vancouber; James McNulty and Sam Morrison, Crescent City, directors.

Walter J. Peterson, formerly chief of police of Oakland, has been appointed manager of the San Francisco Waterfront Employers' Association.

C. J. Lehman has been appointed Los Angeles agent of the Gulf Mail Steamship Company. Mr. Lehman formerly was general manager of the Los Angeles Pacific Navigation Company.

Passenger agents of Pacific Coast steamship companies attended the convention of general passenger agents in Chicago during October.

Ralph T. Johns, of Seattle, has resigned as Seattle manager of the Trans-Oceanic Company to become the Seattle agent of the Columbia Pacific Shipping Company.

Captain Harry L. Chase, formerly with the Shaver Transportation Company, Portland, has become a member of the Association of Columbia River Pilots.

J. F. Beede has taken charge of the Seattle office of Willcox, Peck & Hughes. He formerly was with Johnson & Higgins, Seattle.

William C. Fogarty has been promoted to be superintendent of construction and repairs of the H. C. Peterson Company, San Francisco. The company recently completed a new machine shop and repair slip. New construction done by the company is principally of launches and tugs.

J. C. Brown, assistant director of supply and sales, San Francisco district of the Shipping Board, has resigned and has been succeeded by T. G. Baird.

Captain Joseph J. Meany, local and traveling inspector of hulls at San Francisco, and during 1915 and 1916 local inspector at Honolulu, has resigned to take command of the Shipping Board freighter Hannawa, which has been assigned to the Luckenbach Steamship Company. Captain Meany has been succeeded by Frank Turner, assistant inspector.

F. C. Devine, recently appointed Northwest traffic manager of the General Steamship Corporation, with headquarters at Seattle, has assumed his new position. He has been succeeded as manager of the Portland office by J. G. Euson.

A. A. Moran, fire marshal of the Harbor Island terminal, East Waterway Dock & Warehouse Company, Seattle, has resigned to enter the service of the Danwill Company.

Howard D. Cosgrove, attorney for the Shipping Board in Washington and Oregon, has resigned. Frederick R. Conway, senior assistant United States district attorney, Western district of Washington, has resigned to take a position with the Admiralty division, Shipping Board.

John H. McCallum, president of the State Board of Harbor Commissioners, San Francisco, attended the meetings of port officials in Chicago, New Orleans and Seattle in September and October.

Baron Mandat de Grancey, a retired commander of the French Navy, has been on the Pacific Coast investigating shipping with a view of purchasing vessels for French interests.

H. W. Sanderson, of the International Mercantile Marine, made a tour of Pacific Coast ports in September and October. He said that the Panama-Pacific Line would resume its intercoastal sailings soon, although no definite date of resumption had been fixed.

Captain John Beuret, U. S. N., has been ordered to Mare Island Navy Yard to serve as hull division officer.

W. L. Comyn, president of W. L. Comyn & Company, San Francisco, returned in October from a trip to England. The Royal Mail Steam Packet, represented by W. L. Comyn & Company, is considering the establishment of a passenger service between the Pacific Coast and United Kingdom.

J. Harry Philbin, of Baltimore, has been appointed manager of the ship sales division, Shipping Board. He had been acting manager. Erskine Wood, of Portland, Oregon, has been appointed admiralty counsel, succeeding Charles F. Dutch, resigned.

E. D. Pinneo has been promoted to be freight traffic manager of the Pacific Steamship Company, and E. Grant McMicken to be passenger traffic manager.

Large Contracts Reported

Reports are current that the Standard Oil Company of California has placed contracts with the Potrero, San Francisco, works of the Bethlehem Shipbuilding Corporation for the construction of three 15,000-ton deadweight oil tankers. Details are lacking. The reported contract is the largest placed in quite a time and the most important since the Anglo-Saxon Petroleum Company ordered seven 8400-ton tankers of the Union Construction Company and Southwestern Shipbuilding Company. Other Pacific Coast yards are negotiating for contracts and may have something to announce soon.

North Atlantic & Western Buys

Among sales of vessels recently announced by the Shipping Board is that of the steamship M. C. Brush, named for the president of Hog Island, to the North Atlantic & Western Steamship Company, which will replace the Lehigh, assigned by the board to the company pending adoption of a sales policy. The M. C. Brush, a vessel of 7825 deadweight tons, was sold for $185 a ton. She has a length of 401 feet and beam of 54.

West Kebar Approaching Completion

The 8800-tonner West Kebar, the last vessel under construction by the Long Beach Shipbuilding Company for the Shipping Board, was scheduled for launching October 30, and probably will be delivered about the middle of December.

American-Hawaiian Sailings

Williams, Dimond & Company, general agents for the Pacific Coast for the American-Hawaiian Steamship Company, announce that six American-Hawaiian steamships have been assigned to the Panama Canal Line, which includes express freight service between New York and Boston and Pacific Coast ports.

The first ship in the new service will be the Hawaiian of 8000 tons, to be followed by the Oregonian and Sudbury of 8000 tons, the twin-screw steamship Mexican of 12,000 tons, the Ohioan of 10,000 tons and the 12,000-ton twin-screw steamship Texan.

The personnel of Williams, Dimond & Company's offices includes Major John E. Cushing, general manager. Major Cushing, while in the army transport service during the war, was in charge of the Bush Terminals, and was later director of operations for the United States Shipping Board, succeeding J. H. Rosseter.

F. A. Hooper is general freight agent in the new organization. During the war Mr. Hooper was a captain of the quartermaster corps in the army transport service. He was formerly with the American-Hawaiian service for more than ten years, and prior to that was for twelve years in the traffic department of the Southern Pacific Company. Dearborn Clark is assistant to Mr. Hooper, and F. Holland is office manager.

J. D. McGill is contracting freight agent in charge of eastbound traffic, and was formerly with the Rock Island route for many years. J. H. O'Brien is the westbound contracting freight agent, and is also a well-known railroad man, having been with the Chicago & Northwestern for twenty years.

Minimum weights of cargoes to be accepted by the American-Hawaiian Steamship Company have been reduced from 30 to 50 per cent, according to an announcement by Williams, Dimond & Company, San Francisco, Pacific Coast agents of the American-Hawaiian. This action will be of great benefit to shippers, in that they will receive the carload rates on smaller quantities of goods. Practically all commodities are affected; bu the following reductions in minimum weights are the more important: Canned goods, net weight reduced from 60,000 pounds to 40,000 pounds; iron, from 80,000 to 40,000; cotton piece goods, from 40,000 to 24,000; paint, from 40,000 to 36,000; tinware, from 22,000 to 18,000; talc, from 60,000 to 36,000; felt shoes, from 30,000 to 20,000; sodas, from 60,000 to 36,000; nails, from 50,000 to 36,000; marble, from 60,000 to 36,000; zinc sulphate, from 60,000 to 36,000; wire rods, from 80,000 to 40,000; wire cable, from 50,000 to 36,000; pumice, from 60,000 to 30,000, etc.

Steamship Iowan, one of the vessels of the great American-Hawaiian fleet

ALONG THE ATLANTIC

Keel of Saratoga Laid

The New York Shipbuilding Corporation on September 18 laid the keel of the battle-cruiser Saratoga. The length of the cruiser will be 874 feet and the beam will be 105 feet 5 inches, while the displacement tonnage will be 43,500 and the shaft horsepower 180,000. She will burn oil for fuel. The Saratoga is one of six cruisers to be built for the Navy. Two are to be built at League Island Navy Yard, two at Newport News and one at Fall River.

Grace Tanker Launched

The tanker Nora, named after Nora Grace, daughter of Joseph P. Grace, president of the William R. Grace Steamship Company, was launched at the north yard of the New York Shipbuilding Corporation September 18. The sponsor was eleven-year-old Lilias Kent, niece of President Grace. She was the youngest sponsor ever to christen a ship at the plant and it was the first privately-owned ship launched at the plant since America entered the war. The tanker was built in fast time and was launched almost completed. The keel was laid March 15 and the vessel was launched in six months and ten days. She is 485 feet 2 inches in length and has a beam of 62 feet 8 inches and depth of 39 feet 6 inches. The time for launching is claimed to be a record for a shelter-deck tanker.

Continue Industrial Board

At a meeting in Philadelphia September 28 of the Atlantic Coast Shipbuilding Industrial Board, attended by shipyard executives and international officers of labor organizations, it was decided that the continuation of the board as a medium for the adjustment of disputes, conditions of employment and compensation was warranted. The representatives of both labor and employer unanimously voted to continue the existing agreement, which otherwise would have expired October 1, until further conference can be held for the purpose of adopting a definite program by which the adaption of the wage scale to changed conditions can be accomplished, says the bulletin of the Atlantic Coast Shipbuilders' Association. The activities of the board during the coming year will be to endeavor to provide uninterrupted employment for the large body of men engaged in shipbuilding as well as to avoid any cessation of employment with the consequent loss imposed on the community as the result of strikes and labor controversies.

535's Cost $6,500,000 Each

The cost of the Shipping Board's new 535-foot steamships will be about $6,500,000 each. Some will cost $6,250,000 and others in excess of $6,500,000. Gross register will be 13,500 and deadweight 11,000; the cost, therefore, will be $481 a gross ton and $590 a deadweight ton. Costs were increased by the numerous changes made in design of the vessels.

Receiver of Fox Company

George W. Stirling, assistant director of the division of operations, Shipping Board, has been appointed receiver of Victor S. Fox & Company, which recently purchased six steamships and six sailing vessels of the government. J. W. Linck will be retained as operating manager.

Engineers' Increase Refused

The American Steamship Owners' Association and the Shipping Board have refused to grant increases in pay to marine engineers. The association issued a statement explaining its attitude and submitted the following comparison of the present American and British scales:

ENGINEERS—WAGES PER MONTH

	American.	British.
Chief Engineer—		
Class A	$387.50	$199.26
Class B	346.25	194.40
Class C	332.50	189.54
Class D	318.75	184.68
Class E	305.00	179,82
First Assistant Engineer—		
Class A	241.25	150.66
Class B	235.00	150.66
Class C	228.75	145.80
Class D	222.50	140.94
Class E	216.25	136.08
Second Assistant Engineer—		
Class A	212.50	119.07
Class B	206.25	116.64
Class C	200.00	114.21
Class D	193.75	111.78
Class E	187.50	111.78
Third Assistant Engineer—		
Class A	188.75	99.63
Class B	182.50	99.63
Class C	176.25	97.20
Class D	170.00	97.20
Class E	163.75	97.20

Normal exchange of $4.86 was used in converting the British pound into the American dollar.

502 Nears Completion

The steamship Old North State, being built by the New York Shipbuilding Corporation, will be ready for service soon. She will be a sister ship of the Panhandle State, the first passenger vessel constructed for the United States Shipping Board and now on her maiden voyage to British and French ports.

Of 21,500 tons displacement, the two vessels measure 522 feet over all in length and have a beam of 62 feet. Both are oil-burners with twin four-cylinder triple-expansion engines; can develop a speed of sixteen knots and are equipped with fuel oil tanks giving them a cruising radius of 15,000 miles without replenishing the supply. While the staterooms of both vessels vary in size, all are identical in design and furnishing.

Transport on Trial Trip

The army transport St. Mihiel completed a successful trial trip to the Delaware Breakwater and returned to Hog Island September 18 despite a dense fog. The ship averaged 16.72 knots an hour in three runs over the measured mile course as against a contract speed of 15 knots. The run lasted fourteen hours.

Work on Battlecruisers Begun

The historic names of the frigates Constitution and United States will be given to the two battlecruisers whose keels were laid at the Philadelphia Navy Yard September 18. These vessels will be 874 feet long, of 43,000 tons displacement; will mount eight 16-inch guns; and their 180,000-horsepower engines will drive them at a speed of not less than 33 knots an hour.

Naval officials and men stationed at the yard witnessed the laying of the keels of these two leviathans of the sea, which will cost approximately 25,000,000. Four other battlecruisers of the same size and type will be built in the other navy yards.

Launchings on the Delaware

The destroyer Paul Jones, the last of the forty-six vessels of that type ordered for the United States war program, was launched September 30 at the yard of the William Cramp & Sons Ship & Engine Bulding Company. The Paul Jones is 314 feet 5 inches long, with a beam of 31 feet 9 inches and a displacement of 1215 tons. Her speed is thirty-five knots.

The 9000-ton carrier George F. Weed, named for a pioneer shipbuilder and built for the Emergency Fleet, was launched September 30 at the Chester yard of the Merchant Shipbuilding Corporation. It is the twenty-ninth vessel launched at the yard and is 90 per cent completed.

The Emergency Aid, a cargo carrier of 8800 tons and named for the Emergency Aid of Pennsylvania, was launched in October at the Harriman yard of the Merchant Shipbuilding Corporation for the Emergency Fleet Corporation.

Destroyer Commissioned

The destroyer McFarland, recently completed at the New York Shipbuilding Company's plant in Camden, was placed in commission at the Philadelphia Navy Yard early in October. The McFarland is capable of thirty-five knots, has a horsepower of 26,000 and a tonnage of 1215. She is 318 feet long, and is up-to-date in every way.

Rochester Socony Launched

The Rochester Socony, a steel single-screw, self-propelled bulk oil barge, built for use on the New York State barge

SHIPBUILDING SHOPS—IV

This page is the fourth of a series devoted to the application of NILES-BEMENT-POND MACHINE TOOLS and allied products to marine engineering practice in every department and shop that the modern shipyard comprises.

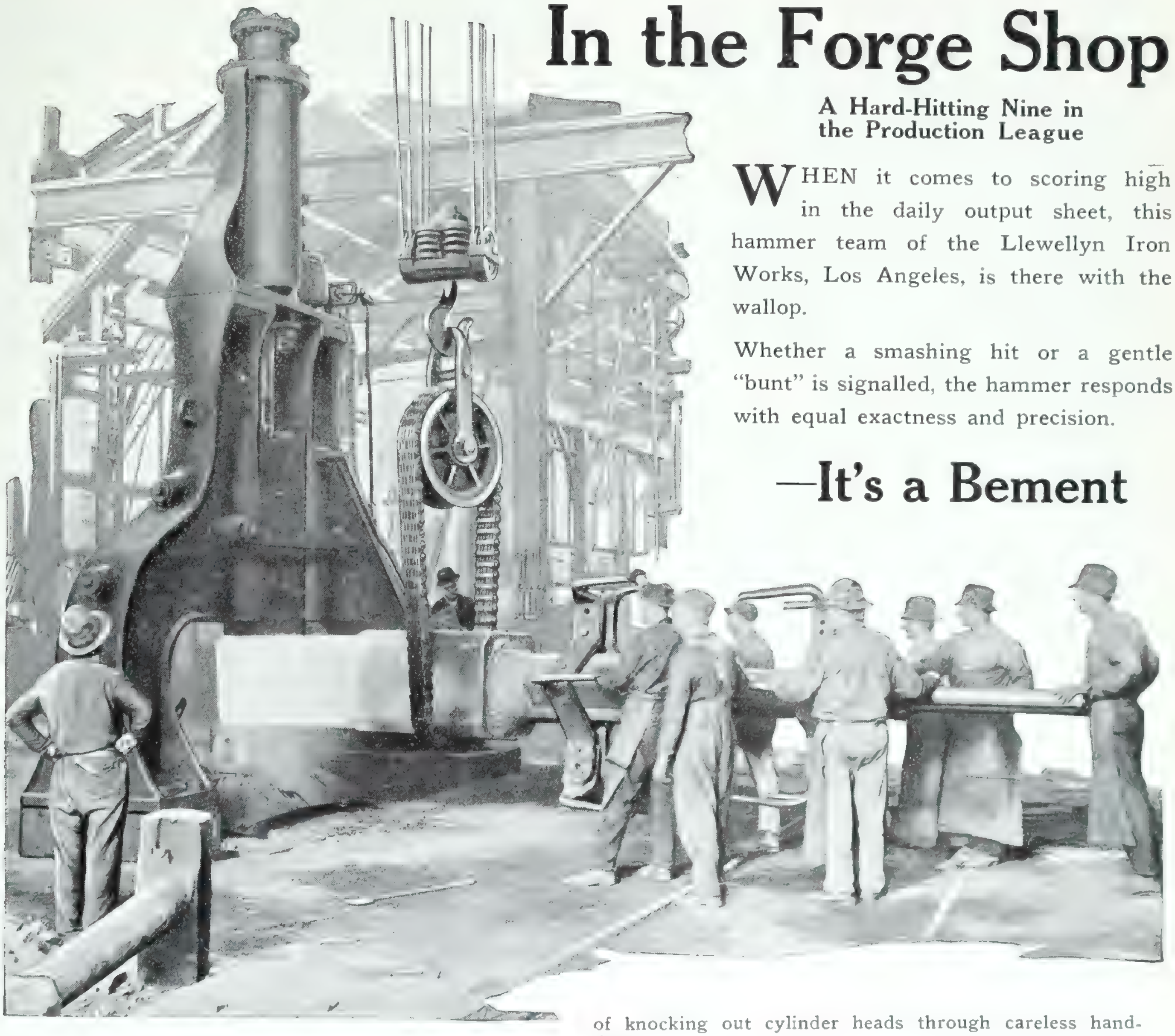
In the Forge Shop

A Hard-Hitting Nine in the Production League

WHEN it comes to scoring high in the daily output sheet, this hammer team of the Llewellyn Iron Works, Los Angeles, is there with the wallop.

Whether a smashing hit or a gentle "bunt" is signalled, the hammer responds with equal exactness and precision.

—It's a Bement



N-B-P Steam Forge Hammers in single or double Frame, sizes up to 2400 lbs., possess in ideal combination—enormous power, massive strength, simplicity and hair-trigger control. They are safe-guarded against over-travel by internal buffer springs, which, together with the usual external springs, do away with all danger of knocking out cylinder heads through careless handling.

Other Niles-Bement-Pond Forge Shop Equipment prominent in representative shops on both coasts includes Hydraulic Flanging and Forging Presses, Wall Cranes and Electric Traveling Cranes, of which we will be glad to send catalogues.

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NILES-BEMENT-POND CO.

GENERAL OFFICES, 111 BROADWAY, NEW YORK

canal and the second of an order of three for the Standard Oil Company of New York, was launched by the Bethlehem Shibpuilding Corporation, Moore plant, September 30..

Radio Contract Renewed

The Shipping Board has renewed its contract with three radio companies for the maintenance of its wireless apparatus on approximately 1200 vessels. The companies concerned are the Radio Corporation of America, the Shipowners Radio Service and the Independent Wireless Telegraph Service.

Shipping Board Reduces Staff

During the fiscal year ending June 30, the force of the Shipping Board was reduced by 3224 persons, with a consequent saving of $5,530,372 in salaries. On July 1, 1920, the board was employing 8482 persons, the aggregate of whose salaries was $16,769,304. The number has been reduced still more since that date.

New Feeder Service Opened

The success attendant upon the Shipping Board's feeder service in the Orient has actuated the board in deciding to open a similar service in the Mediterranean, in charge of the International Freighting Corporation, New York. Lake-built vessels are being used. Inasmuch as several of these vessels are tied up in Atlantic ports, the new service appeals strongly to the board, apart from the actual results of operation.

Contracts Must Be Filed

In order to carry out the provisions of Section 18, Merchant Marine Act, the Shipping Board has directed that two copies of all charters and contracts of affreightment made for American and foreign vessels be filed at the offices at 45 Broadway, New York. The order was effective October 1.

First Hamburg-American Sailing

The Danish steamship Mette Jensen, the first vessel of the joint service of the Hamburg-American and United American Lines (Harriman), sailed from New York early in October for Hamburg. She was chartered by the Hamburg-American. Monthly sailings for the present are projected.

Longshoremen Renew Agreement

Announcement has been made by T. V. O'Connor, president of the International Longshoremen's Association, that the longshoremen of the Atlantic and Gulf had voted to renew the present working agreement for one year, the schedule being 80 cents an hour, with $1.20 an hour for overtime. An increase of 20 cents an hour, asked for by the men, was denied by shipping interests, but they did increase the number of men in the gang from nineteen to twenty-one.

Federal Delivers Steel Ranger

The Federal Shipbuilding Company, Kearny, New Jersey, delivered the 9400-ton freighter Steel Ranger to the Isthmian Steamship Lines September 20. She was the ninth vessel delivered during the year by the Federal to the Isthmian; five of the nine were sisters of the Steel Ranger and three 9700-tonners. The Steel Ranger developed 14.3 knots on her trial trip. She is equipped with Scotch boilers and Parsons geared turbines, and is fitted to burn oil, although coal can be used if necessary.

To Operate Baltimore Tankers

Reports are current to the effect that the Baltimore Drydocks & Shipbuilding Company would organize the Calvert Navigation Corporation to operate four tankers being constructed by the yard for its own account. One of the tankers, the Clement C. Smith, was launched in September.

Cunard Opens Offices

The Cunard and associate lines, Anchor and Anchor-Donaldson Lines, have leased an office on the ground floor of the Book Building, 35 Washington Boulevard, Detroit, Michigan, to have charge of the entire State of Michigan. The new office will be opened about November. The Cunard and associate lines have just opened their own office in the Reise Bureau, Hotel Bristol, at Berlin.

Collectors Personally Responsible

The secretary of the treasury has sent out to the collectors at the various ports of the United States the opinion of Lawrence Becker, solicitor of the Treasury Department, upholding the provisions of the new Merchant Marine Act which make the collectors personally liable for failure to record mortgages. The act provides that "if any person enters into any contract secured by, or upon the credit of a vessel of the United States covered by a preferred mortgage, and suffers pecuniary loss by reason of the failure of the collector of customs, or any officer, employe or agent thereof, properly to perform any duty required of the collector under the provisions of this section, the collector of customs shall be liable to such person for damages in the amount of such loss."

Support Insurance Syndicates

Admiral Benson has issued an appeal to American steamship companies to give support to the new insurance syndicates formed with the co-operation of the Shipping Board. He points out that previous experience has shown that foreign insurance companies are willing to cut rates below cost in order to drive competitors out of business, and that such a policy probably is being followed at present. His argument is that American companies will benefit permanently through the payment of reasonable rates temporarily, resulting in the establishment of American insurance companies on a sound basis, rather than giving foreign competitors the opportunity of killing American companies with the purpose of advancing rates later.

Kosmos Steamer Uses Canal

The Danish steamer Alssund, chartered by the Kosmos Line, arrived at Balboa on September 4, bound from Punta Arenas, Chile, via Callao, for Hamburg. This is the first vessel operated directly by German interests to use the Panama Canal. A number of German vessels have passed through the canal, mostly bound from Chile to Europe, but these have been under the orders of the British Admiralty. The Alssund was carrying 5050 tons of general cargo. She is a vessel of 4123 gross tons, 315.8 feet in length by 44.8 feet beam.

Renown at Panama

The British battle-cruiser Renown, the largest ship to have used the Panama Canal, made her second transit on September 13, bearing the Prince of Wales on his return to Great Britain from visits in Pacific ports. The Renown is 795 feet in length, over-all, and her displacement is 33,379 tons.

Two Vessels to U. S. Mail

The cargo-passenger vessels, Creole State and Empire State, which are being completed at the yards of the New York Shipbuilding Corporation, will be assigned for operation to the United States Mail Steamship Company. They are sister ships to the Panhandle State, recently turned over to the United States Steamship Company, and will be allocated for service between New York, Queenstown, Boulogne and London.

Fuller Launches Last for U. S. S. B.

The Syros, the eighth and last ship of the contract for 9600-deadweight-ton freighters, which the George A. Fuller Company had with the Emergency Fleet Corporation, was successfully launched on September 18, making an average of a ship every seven weeks since the first launching about a year ago. The keels are laid and the work well under way for the two 9200-deadweight-ton tankers which the company is building for a British oil company. These tankers are to be delivered in January and February, 1921.

Staten Island Given Contract

A contract for the construction of four bulk oil barges for the Standard Oil Company of New York has been placed with the Staten Island Shipbuilding Company. The dimensions of each barge will be: length of hull molded, 150 feet; beam molded, 27 feet; depth molded, 11 feet 6 inches; rise of bottom, 4 inches; pitch of deck, 4 inches. Each barge will be built to carry 250,000 United States gallons of oil for five tanks. The barges will be built on the Isherwood system of longitudinal framing and will be of car-float type with deckhouse aft for crew, pump on the deck amidships, expansion trunks and complete equipment.

Another contract has been placed by the Standard Oil Company of New York with the Staten Island yard for the construction of three bulk-oil barges of the carfloat type, says the bulletin of the Atlantic Coast Shipbuilders' Association. The dimensions of the barges will be: length, 250 feet; beam, 40 feet; depth, 13 feet. The barges will have a central line bulkhead, deck house aft for crew, pumps on deck amidship and aft below deck. Cargo space will be divided into twelve tanks, six on each side. The Standard Oil Company of New York has placed contracts with the company for thirteen barges during the last year.

Discuss Mortgage Forms

The counsels for the shipyards of New York engaged in repairing ships held a meeting to discuss the mortgage provisions of the Merchant Marine Act and to adopt, so far as possible, standard forms and uniform procedure to protect the interests of the repair yards. There was some discussion of waiver of mortgage and bond for payment of claims, which had been sent to the various members of the Atlantic Coast Shipbuilders' Association. The forms of waiver prepared seemed to meet with general approval. There also was discussion as to the form of the bond. General opinion seemed to be that it should be so amplified as to remove any question whether it would cover extra work outside of a contract. After this discussion a tentative form was prepared with the understanding that it would be submitted to surety companies to ascertain whether the form of the bond would be acceptable to them. It was also deemed advisable to have prepared a form of notice of claim against vessels covered by preferred mortgages and a general form of such notice was prepared.

British Wage Schedule

Much interest has been taken in the announcement made in London that an agreement had been made by British railroads with the dock and marine staffs of works controlled by the different companies. The new scale is retroactive from July 1. In the following summary the first figure is the new weekly minimum, to be effective so long as the cost of living remains at 150 per cent of the prewar standard, and the second the minimum below which wages shall not fall: porters, laborers, etc., $18.25, $12.17; sheeters, chairmen, etc., $19.22, $13.14; crane drivers, hydraulic men, etc., $19.95, $14.36; watermen, etc., $19.71, $14.36; gatemen, $19.71, $14.36; checkers, storekeepers, etc., $19.71, $14.36; timber checkers, etc., $20.44, $15.21; leading gatemen, $20.68, $15.21. Although reports received in America do not state specifically, the reduction to American currency apparently was made according to standard exchange.

Load-Line Committee Meets

At a meeting held in New York October 1, the Atlantic load-line committee recommended that coastwise vessels be excepted from the operation of the proposed law; but the committee urged that load-line legislation was imperative, citing statistics to demonstrate that the ratio of losses in the Atlantic and Gulf had increased from 48/100 of 1 per cent in 1912 to 5.07 per cent in 1918. Of the latter loss percentage, 1.27 per cent was due to the war. The Eastern committee is composed of: Professor George R. McDermott, Cornell University; H. H. Raymond, president of the Clyde-Mallory Lines; E. H. Rigg, chief naval architect, New York Shipbuilding Company; Hugo Frear, chief naval architect, Bethlehem Shipbuilding Corporation; Joseph E. Sheedy, Downey Shipbuilding Corporation; Samuel D. McComb, representing insurance interests; and Captain C. A. McAllister, American Bureau of Shipping.

American Shipping in U. K.

A consular report states that the aggregate net tonnage of American vessels entering British ports during the first six months of 1920 was 1,040,823, as compared with 287,612 for the first six months of 1919 and 338,407 for the first six months of 1913. Comparative figures for British and foreign vessels during the same periods follow: first six months of 1920, British 12,296,905 tons, foreign 4,560,979 tons; 1919, British 9,953,315, foreign 2,611,685; 1913, British 15,251,894, foreign 7,881,232. American tonnage, therefore, has increased from an inconsiderable portion of the total foreign to almost 25 per cent; or, in other words, has increased more than 200 per cent since 1913, as compared with an increase of 100 per cent by Japanese vessels.

Shipping Board Tonnage

The overwhelming preponderance of Shipping Board tonnage, as compared with privately-owned, is made manifest by a report of the Bureau of Navigation, which states that on July 1, 1920, the board owned 1630 sea-going vessels of 1000 gross tons and more, the aggregate being 6,903,128 gross tons, as against 1209 sea-going vessels of 3,942,974 gross tons owned by private persons or corporations. (These figures may be subject to slight corrections.) On January 1, 1918, the board owned only 105 sea-going vessels of 413,631 gross tons, whereas privately-owned sea-going vessels numbered on that date 1036 of 3,268,069 tons. During 1918 the number of government vessels increased to 608; it was 982 on August 1, 1919; and by January 1, 1920, had grown to 1465.

Since January 1, 1918, the figures of board tonnage have shown a steady and unbroken increase, due to the fact that relatively few sales have been made, and even during 1920 sales have not kept pace with building for the government's account. From January 1, 1919, to July 1, 1920, American shipping increased approximately 5,000,000 tons, the figure on the latter date being 16,350,000 tons. This total includes all vessels, sea-going and non-sea-going, of five net tons and more, owned by the board and private persons.

American tonnage made up between one-third and one-fourth of the total of the world, for, according to Lloyd's Register, the world's tonnage on June 30 was 57,314,065, and the number of vessels of 100 gross tons and more, 31,595. British tonnage of June 30 aggregated 20,582,652, of which the United Kingdom possessed 18,330,424.

Defends Section 34

Henry C. Hunter, secretary of the Atlantic Coast Shipbuilders' Association and of the Committee of American Shipbuilders, has issued a statement defending Section 34 of the Merchant Marine Act (directing the abrogation of portions of treaties that prevent the United States levying discriminatory tariffs on goods imported in foreign vessels), which President Wilson has refused to enforce. Mr. Hunter's statement is as follows, Section 34 and Section 14 of the Seamen's Act, which he quotes, being omitted:

"The statement authorized by the State Department to the effect that the abrogation of the treaties in question would be 'nothing less than the breach or violation of said treaties,' overlooks the fact that similar action with reference to similar treaties was required and taken by the present administration under the Seamen's Act of March), 1915. . . . Under Section 14 of the Seamen's Act, which . . . is followed very closely by the language of Section 34 of the Merchant Marine Act, notification was sent by the State Department to the several countries affected.

"Great Britain, Spain, the Netherlands and Sweden all protested. In some cases the protest was pressed to the point where the Secretary of State notified the countries concerned that if the notification was not accepted the whole treaty would stand abrogated. That is the last that was heard of the matter, and our treaties with all nations stand modified, so as to permit the operation of Section 16 of the Seamen's Act.

"Furthermore, it does not seem pertinent to advance, as a reason for failure to carry out the Marine Act, the assertion that the treaties affected are mutual, bearing equally upon the other governments which are parties to the treaties, and that the mandate of Congress was made regardless of the fact that the treaties contain no provision for their termination in the manner contemplated by Congress."

New Shops at Beaumont

The Beaumont Shipbuilding & Drydock Company, Island Park, Beaumont, Texas, has under construction several new shops. The new ship shed will be provided with plate and angle furnaces and several pieces of heavy fabricating machinery. The new blacksmith and machine shops will be fully equipped with modern machinery and appliances. A welding shop is also being provided. With these additions to the plant it will be possible to undertake the construction of all classes of vessels, and the extensive repair work, which is continually being directed to this yard, will be facilitated. There are at present under construction several oil barges of 8000-barrel capacity for the New England Fuel Oil Company. One of the jobs recently undertaken on the marine railway was the complete renewal of the cast-steel stern frame on the 150-foot tug Braddock, owned by the National Oil Company.

NEW CONSTRUCTION, DRYDOCKING, REPAIRS

ON October 1, shipyards of the Pacific Coast had under construction and under contract the equivalent of about 1,250,000 deadweight tons of shipping, according to returns compiled by Pacific Marine Review. Of the aggregate, 897,670 tons were merchant vessels, all steel except two concrete tankers; and other merchant work, not listed as to deadweight tonnage, would increase that figure considerably. On the basis of cost, naval and Coast Guard work was the equivalent of probably 325,000 deadweight tons, the estimated total being, as stated, 1,250,000 tons. Returns from some yards were not received, so that the figures presented herewith are less than the actual aggregate. Keels of several vessels had not been laid October 1. October deliveries are included.

A tabular statement of Pacific Coast merchant building October 1 follows:

	Vessels	Total DW
In American yards for U. S. S. B......	34	316,750
In American yards for private account	37	440,040
In American yards for foreign account	9	82,280
In Canadian yards for gov't account..	5	41,000
In Canadian yards for private account	2	*17,600
Total	87	897,670

* Plus a passenger steamship, size unknown.

All vessels of steel except two concrete tankers, 7500 tons each, for U.S.S.B.

In addition to the merchant shipping listed above, the following miscellaneous merchant vessels are to be added: 1 motor yacht; 1 motor coasting vessel; 2 fuel barges; 4 seagoing tugs (launched but still outfitting); 1 auxiliary wood schooner; 2 coal barges; 3 cargo barges. This list of miscellaneous vessels is not complete.

Government work was as follows: Bethlehem Shipbuilding Corporation, 26 destroyers, 12 S-type submarines, United States Navy; Navy Yard, Puget Sound, 1 ammunition carrier, 1 repair ship, 1 submarine tender, United States Navy; Navy Yard, Mare Island, 2 dreadnoughts, 5 destroyers, United States Navy; Todd Drydock & Construction Corporation, 3 scout cruisers, United States Navy; Union Construction Company, 4 cutters and one seagoing tug, United States Coast Guard.

Reports are current that additional contracts have been closed by Canadian yards for new steel tonnage; details are lacking and the reports have not been confirmed.

Shipbuilding

BETHLEHEM SHIPBUILDING CORP'N, LTD.
Potrero Works

Purchasing Agent: O. W. Street

Hannawa, hull 5277, freighter for USSB; keel laying June 26/19; launching May 11/20; delivery Oct. /20; 440 LBP; 56 beam; 28-6 loaded draft; 10½ loaded speed; 11,800 DWT; rec. engines, 2600 IHP; three Scotch boilers, 15 x 11-9.

Hanley, hull 5276, freighter for USSB; keel laid June 26/19; launching Oct./20; delivery Nov. 25/20, estimated; dim., etc., same as Hannawa.

William H. Doheny, hull 5301, tanker for Pan Amer. Pet. Co.; keel laying Feb. 24/20; launching Aug. 30/20; delivery Oct./20; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

Alameda Works

Hambro, hull 5272, tanker for USSB; keel laying Sept. 8/20; launching Jan. 15/21, estimated; delivery Apr. 15/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

[illegible], hull 5273, tanker for USSB; keel laying Nov. 1/20, estimated; launching Feb. 15/21, estimated; delivery May 15/21, estimated; dim., etc., same as Hambro.

Hammac, hull 5274, tanker for USSB; keel laying Nov. 15/20, estimated; launching Mar. 1/21, estimated; delivery June 1/21, estimated; dim., etc., same as Hambro.

Franklin K. Lane, hull 5302, tanker for Pan Amer. Pet. Co.; keel laid Apr. [illegible]/20; launched Aug. 31/20; delivery Nov. 15/20, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

Crampton Anderson, hull 5303, tanker for Pan Amer. Pet. Co.; keel laid June 11/20; launching Nov. 20/20, estimated; delivery Dec. 30/20, estimated; dim., etc., same as Franklin K. Lane.

Algonquin, hull 5304, tanker for Stand. Trans. of Del.; keel laid Dec. 24/19; launched Aug. 23/20; delivery Oct. 29/20, estimated; dim., etc., same as Franklin K. Lane.

W. S. Miller, hull 5305, tanker for Stand. Oil Co. of Cal.; keel laid Apr. 26/20; launching Oct. 28/20, estimated; delivery Nov. 30/20, estimated; dim., etc., same as Franklin K. Lane.

E. R. Kingsbury, hull 5306, tanker for Stand. Oil Co. of Cal.; keel laid July 2/20; launching Dec. 12/20, estimated; delivery Mar. 4/21, estimated; 440 LBP; 58 beam; 28 loaded draft; 11 loaded speed; 11,600 DWT; rec. engines, 3200 IHP; three Scotch boilers, 15-6 x 12-1.

Yorba Linda, hull 5307, tanker for Gen. Pet. Co.; keel laid May 17/20; launching Nov. 6/20, estimated; delivery Jan. 27/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

No name, hull 5308, tanker for Asso'd Oil Co.; keel laying Oct. 30/20, estimated; launching Feb. 7/21, estimated; delivery Apr. 1/21, estimated; dim., etc., same as Yorba Linda.

BETHLEHEM SHIPBUILDING CORPORATION
Potrero Works
Naval Work

Destroyers for U. S. Navy; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1308 tons; turbine engines, 27,000 IHP; four Yarrow boilers, as follows: Woodbury, hull 309, keel laying Oct. 3/18, launching Feb. 6/19; S. P. Lee, hull 310, keel laying Dec. 31/18, launching Apr. 22/19; Nicholas, hull 311, keel laying Jan. 11/19, launching April/19; Young, hull 312, keel laying Jan. 28/19, launching Apr. 8/19; Zeilin, hull 313, keel laying Feb. 20/19, launching May 28/19; Yarborough, hull 314, keel laying Feb. 27/19, launching June 20/19; La Vallette, hull 315, keel laying Apr. 14/19, launching July 15/19; Sloat, hull 316, keel laying Jan. 18/19, launching May 14/19; Wood, hull 317, keel laying Jan. 23/19, launching May 28/19; Shirk, hull 318, keel laying Feb. 13/19, launching June 20/19; Kidder, hull 319, keel laying May 15/19, launching July 10/19; Selfridge, hull 320, keel laying Apr. 28/19, launching July 25/19; Marcus, hull 321, keel laying May 20/19, launching Aug. 22/19; Mervine, hull 322, keel laying Apr. 28/19, launching Aug. 11/19; Chase, hull 323, keel laying May 5/19, launching Sept. 2/19; Robert Smith, hull 324, keel laying May 13/19, launching Sept. 19/19; Mullany, hull 325, keel laying June 3/19, launching July 9/20; Coghlan, hull 326, keel laying June 25/19 launching June 16/20; Preston, hull 327, keel laying July 18/19, launching Aug. 7/20; Lamson, hull 328, keel laying Aug. 13/19, launching Sept. 1/20; Hull, hull 330, keel laying Sept. 13/20; MacDonough, hull 331, keel laying May 24/20; Farenholt, hull 332, keel laying Sept. 13/20; Sumner, hull 333, keel laying Aug. 27/19; no name, hull 334, keel laying Sept. 15/20; no name, hull 335, keel laying Sept. 15/20.

Submarines for U. S. Navy: S-30, hull 135; S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145, S-41, hull 146.

CHOLBERG SHIPYARD, VANCOUVER, B. C.
Purchasing Agent: W. Meed.

S. F. Tolmie, hull 4, four-masted barkentine for Victoria (B. C.) Shipowners, Ltd.; keel laying May 1/20; launching Dec. 15/20, estimated; delivery Jan. 15/21, estimated; 250 OA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel, shaft logs fitted for auxiliary but no machinery installed.

Sir Henry Drayton, hull 5, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying May 15/20; launching Jan. 15/21, estimated; delivery Feb. 15/21, estimated; sister to S. F. Tolmie.

No name, hull 6, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying June 4/20; launching Feb. 25/21, estimated; delivery Mar. 25/21, estimated; sister to S. F. Tolmie.

No name, hull 7, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying Dec. 20/20, estimated; launching Apr. 30/21, estimated; delivery May 30/21, estimated; sister to S. F. Tolmie.

J. COUGHLAN & SONS, LTD., VANCOUVER, BRITISH COLUMBIA

City of Vancouver, hull 18, steel freighter for Vancouver Steamships, Ltd.; keel laying July/20; launching Sept./20; delivery Oct./20, estimated; 410-5½ LBP; 54 beam; 24-2 loaded draft; 11½ loaded speed; 8800 DWT; triple expansion engine, 3000 IHP; three Scotch boilers, 15-6 x 11-6.

No name, hull 19, steel freighter for own account; keel laying Aug./20; launching Oct./20; delivery Nov./20, estimated; dim., etc., same as City of Vancouver.

Canadian Transporter, hull 20, steel freighter for Canadian government; keel laying Dec./20, estimated; 400 LBP; 52 beam; [illegible] loaded draft; 11¾ loaded speed; [illegible] DWT; triple expansion engine, 3000 IHP; three Scotch boilers, 15-6 x 11-6.

Canadian Freighter, hull 21, steel freighter for Canadian government; keel laying Dec./20, estimated; dim., etc., same as Canadian Transporter.

CROWLEY LAUNCH & TUGBOAT COMPANY, SAN FRANCISCO

[illegible] barges, [illegible] LBP; 42 beam; 12 loaded speed.

HANLON DRYDOCK & SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: C. H. Brown.

Jeptha, hull 86, freighter for USSB; delivery Oct. /20; 305 LBP; 46 beam; 22-5 loaded draft; 10½ loaded speed; 5350 DWT; 1800 IHP engines.

Medon, hull 87, freighter for USSB; delivery Nov. 15/20, estimated; dim., etc., same as Jeptha.

Memnon, hull 88, freighter for USSB; launching Sept. 28/20; delivery Jan. 15/21, estimated; dim., etc., same as Jeptha.

HARBOR MARINE COMPANY, VICTORIA

Canadian Traveler, freighter for Canadian government; 8100 DWT.

Car ferry for Canadian Pacific.

LONG BEACH SHIPBUILDING COMPANY, LONG BEACH

West Kebar, hull 136, for USSB; launching Oct. /20; 410-5 LBP: 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; triple expansion engines, 2800 IHP; three Scotch boilers, 14-9.

Edythe, hull 142, motor yacht for J. F. Craig; 105-3 LBP; 21 beam; 8-10 loaded draft; 12 loaded speed; New London engines, 360 BHP.

Casco, hull 145, coaster for Cal. Mex. S. S. Co.; 119 LBP; 24 beam; 10 loaded draft; 9 loaded speed; 350 DWT; semi-Diesel engines, Fairbanks-Morse, 200 BHP; delivery Oct./20.

LOS ANGELES SHIPBUILDING & DRYDOCK COMPANY, SAN PEDRO

Culberson, hull 27, steel cargo for USSB; keel laid Feb. 19/20; launching July 29/20; delivery Oct. /20; 410 LBP; 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE engines, 3500 IHP; three watertube boilers.

West Honaker, hull 28, steel cargo for USSB; keel laid Mar. 21/20; launching Sept. 25/20; deliveray Oct./20, estimated; dim., etc., same as Culberson.

West Cusseta, hull 29, steel cargo for USSB; keel laid Apr. 19/20; launching Oct./20, estimated; dim., etc., same as Culberson.

West O'Rowa, hull 30, steel cargo for USSB; keel laid June 14/20; dim., etc., same as Culberson.

West Lewark, hull 31, steel cargo for USSB; keel laid July 30/20; 430 LBP; 54 beam; 2802 loaded draft; 10½ loaded speed; 11,000 DWT; TE engines, 3500 IHP; three Scotch single end, 15-9.

West Faralon, hull 32, steel cargo for USSB; keel laying Sept. 27/20; dim., etc., same as West Lewark.

West Greylock, hull 33, steel cargo for USSB; keel laying Oct./20, estimated; dim., etc., same as West Lewark.

West Prospect, steel cargo for USSB; keel laying Nov./20, estimated; dim., etc., same as West Lewark.

West Chopaka, steel cargo for USSB; keel laying Jan./21, estimated; dim., etc., same as West Lewark.

MOORE SHIPBUILDING COMPANY, OAKLAND

Jalapa, hull 2233, freighter for USSB; keel laid Apr. 28/19; launching Dec. 20/19; delivery Oct./20; 402-6 LBP; 53 beam; 26-4 loaded draft; 9400 DWT; Parson comp. engines; three Scotch marine boilers, 15-2 x 11.

Janelew, hull 2235, freighter for USSB; keel laid June 11/19; launching Dec. 20/19; delivery Oct./20; dim., etc., same as Jalapa.

Mursa, hull 2236, freighter for USSB; keel laid July 7/19; launching July 3/20; delivery Oct./20; dim., etc., same as Jalapa.

Narbo, hull 2237, freighter for USSB; keel laid Aug. 12/19; launching Apr. 16/20; dim., etc., same as Jalapa.

Narcissus, hull 2238, freighter for USSB; keel laid Dec. 31/19; launching Aug. 28/20; dim., etc., same as Jalapa.

Three tankers, no names, hulls 2862, 2863, 2864, for USSB; keel laying, 2862, Oct./20; others not laid; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec. engines; three Scotch marine boilers, 15-2 x 11.

No name, hull 158, freighter for Matson Nav. Co.; keel laid Aug. 5/20; 480 LBP; 62 beam; 30 loaded draft; 14,000 DWT; Parson engines; five Scotch marine boilers, 15-6 x 12-3½.

No name, hull 159, freighter for Matson Nav. Co.; keel laid Aug. 17/20; dim., etc., same as hull 158.

S. C. T. Dodd, hull 160, tanker for Stand. Oil Co. of N. J.; keel laid April 27/20; launching Oct./20; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2 x 12.

M. F. Elliott, hull 161, tanker for Stand. Oil Co. of N. J.; keel laid July 2/20; dim., etc., same as S. C. T. Dodd.

Tho. H. Wheeler, hull 162, tanker for Stand. Oil Co. of N. J.; keel laid July 28/20; dim., etc., same as S. C. T. Dodd.

F. H. Hillman, hull 163, tanker for Stand. Oil Co. of Calif.; keel laying Oct./20, estimated; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engines.

No name, hull 164, tanker for Vacuum Oil Co.; keel laid Sept. 13/20; 425 LBP; 57 beam; 2603 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2 x 12.

Tamihua, hull 165, tanker for S. P.-Atlantic S. S. Co.; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec. engines; three Scotch boilers, 15-9 x 12.

No name, hull 166, tanker for Vacuum Oil Co.; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2 x 12.

NAVY YARD, PUGET SOUND

Pyro, ammunition carrier for government; keel laying Aug. 9/18; launching Dec. 16/19; delivery Aug. 10/20; 460 LBP; 61 beam; about 21 loaded draft; 16 K loaded speed; turbine engine, 5300 IHP; four B. & W. watertube boilers.

Nitro, ammunition carrier for government; keel laying Mar. 19/19; launching Dec. 16/19; dim., etc., same as Pyro.

Medusa, repair ship for government; keel laying Jan. 2/20; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine engine, 7000 IHP; two watertube express type boilers.

Holland, submarine tender for government; date for keel laying not set; 460 LBP; 61 beam; about 20 loaded draft; 16 K. loaded speed; turbine engine, 7000 IHP; two watertube express type boilers.

NAVY YARD, MARE ISLAND

California, battleship for U. S. Navy; keel laying Oct. 25/16; launching Nov. 20/19; 600 LBP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 displacement; turbo-electric engines, 26,800 SHP; eight Bu's express boilers, 50,984 sq. ft.

Montana, battleship for U. S. Navy; keel laying Sept. 1/20; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 displacement; turbo-electric engines, 60,000 SHP; twelve Bu's express boilers, 74,040 sq. ft.

Zane, destroyer for U. S. Navy; keel laying Jan. 15/19; launching Aug. 12/19; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 displacement; geared turbine engine, 30,000 SHP; four Normand boilers, 27,000 sq. ft.

Wasmuth, destroyer for U. S. Navy; keel laying Aug. 12/19; launching Sept. 15/20; dim., etc., same as Zane.

Trever, destroyer for U. S. Navy; keel laying Aug. 12/19; launching Sept. 15/20; dim., etc., same as Zane.

Perry, destroyer for U. S. Navy; keel laying Sept. 15/20; dim., etc., same as Zane.

Decatur, destroyer for U. S. Navy; keel laying Sept. 15/20; dim., etc., same as Zane.

NORTHWEST BRIDGE & IRON COMPANY, PORTLAND

Seven 12,000-ton oil tankers for Swiftsure Oil Trans. Co. (France & Canada S. S. Co.); deliveries from Feb. to Aug./21, estimated; 465-7 LBP; 60 beam; 36-3 deep.

PACIFIC COAST SHIPBUILDING COMPANY, BAY POINT

Purchasing Agent: J. A. Smiley

Cuprum, hull 947, steel cargo for USSB; keel laying May 7/19; launching Feb. 18/20; 402-6 LBP; 53 beam; 26-6 loaded draft; 9400 DWT; 2800 IHP engines; three Scotch marine boilers, 11 x 15-6.

Namasket, hull 948, steel cargo for USSB; keel laying June 18/19; launching Aug. 2/20; dim., etc., same as Cuprum.

Meanticut, hull 949, steel cargo for USSB; keel laying July 18/19; dim., etc., same as Cuprum.

Nashaba, hull 950, steel cargo for USSB; keel laying Aug. 25/19; dim., etc., same as Cuprum.

Midway, hull 12, steel tanker for Associated Oil Co.; keel laying Mar. 17/20; 200 LBP; 38 beam; 15-6 loaded draft; 10,000 bbls.; rec. engine, 520 IHP; Scotch marine boilers, 12-6 x 10-10.

PACIFIC MARINE & CONSTRUCTION COMPANY, SAN DIEGO

San Pasqual, hull 1724, concrete oil-tanker for USSB; keel laid Dec. 9/18; launched June 12/20; delivery Oct./20; 420 LBP; 54 beam; 26 loaded draft; 10½ loaded speed; 7500 DWT; TE engines; 2800 IHP; three Foster boilers.

ST. HELENS SHIPBUILDING COMPANY ST. HELENS

Purchasing Agent: A. F. Barnett

No name, hull 52, fuel barge for Swift & Co.; keel laying Sept. 1/20; 130 LBP; 34 beam; 7 loaded draft.

No name, hull 53, fuel barge for Swift & Co.; keel laying Sept. 1/20; dim., etc., same as hull 52.

SAN FRANCISCO SHIPBUILDING COMPANY, OAKLAND

Peralta, hull 1662, tanker for USSB; keel laid Oct. 10/18; launching Oct. 25/20, estimated; delivery Dec. 20; 420 LBP; 56 beam; 26 loaded draft; 10½ loaded speed; 7500 DWT; rec. engines, 2800 IHP; three watertube boilers, 21,000 sq. ft.

SCHAW-BATCHER SHIPWORKS, SOUTH SAN FRANCISCO

West Carmona, hull 1157, cargo for USSB; keel laying Dec. 29/19; launching Oct. 2/20; delivery Oct./20; 410 LBP; 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE engines; 2800 IHP; three Scotch boilers.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

No name, hull 23, Isherwood tanker for Union Oil Co.; keel laying Dec./20, estimated; delivery July/21, estimated; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engines, 2800 IHP; three Scotch boilers, 14 x 12.

No name, hull 24, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Nov./20, estimated; delivery Mar./21, estimated; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engines, 2800 IHP; three Scotch boilers, 15-6 x 11-7.

No name, hull 25, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Dec./20, estimated; delivery Apr./21, estimated; dim., etc., same as hull 24.

No name, hull 26, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Jan./21, estimated; delivery May/21, estimated; dim., etc., same as hull 24.

Mary Luckenbach, hull 19, transverse tanker for Luckenbach Co.; keel laid Feb. 24/20; launching Sept./20 delivery Oct./20; 410-5½ LBP; 54 beam; 23-11 loaded draft; 10¾ loaded speed; 8450 DWT; TE engines, 2800 IHP; three Scotch boilers, 14-9x11.

Montebello, hull 21, Isherwood tanker for Union Oil Co.; keel laid Apr. 20/20; launching Nov./20, estimated; delivery Dec./20, estimated; 440 LBP; 58 beam; 29-2 loaded draft; 11 loaded speed; 12,000 DWT; QE engines, 3300 IHP; three Schotch boilers, 15-6 x 12-1.

La Placentia, hull 22, Isherwood tanker for Union Oil Co.; keel laid May 20/20; launching Jan./21, estimated; delivery Feb./21, estimated; dim., etc., same as Montebello.

G. M. STANDIFER CONSTRUCTION CORPORATION, VANCOUVER, WASH.

John Worthington, hull 16, shelterdeck oil-tanker for Standard Oil Co. of N. J.; 11,740 DWT; VQM engines, 2800 IHP; three Scotch boilers, 14-4 diam.; Isherwood framing.

W. H. Libby, hull 17, shelterdeck oil-tanker for Standard Oil Co. of N. J.; dim., etc., same as John Worthington.

Livingston Roe, hull 18, shelterdeck oil-tanker for Standard Oil Co. of N. J.; dim., etc., same as John Worthington.

Calgarolite, hull 19, shelterdeck oil-tanker for Imperial Oil, Ltd.; dim., etc., same as John Worthington, except boilers, which are 14-9 diam.

Albertolite, hull 20, shelterdeck oil-tanker for Imperial Oil, Ltd.; dim., etc., same as Calgarolite.

W. F. STONE & SON, OAKLAND

Purchasing Officer: Lester F. Stone.

Sea Lion, tug for S. O. & M. Tug Boat Co.; delivery Dec. 1/20, estimated; 150 LBP; 30 beam; 16 loaded draft; 12 loaded speed.

Sea Monarch, tug for S. O. & M. Tug Boat Co.; delivery Jan. 1/21, estimated; dim., etc., same as Sea Lion.

Sea Ranger, tug for S. O. & M. Tug Boat Co.; delivery Feb. 1/21, estimated; dim., etc., same as Sea Lion.

Sea Scout, tug for S. O. & M. Tug Boat Co.; delivery Mar. 1/21, estimated; dim., etc., same as Sea Lion.

Doris Crane, aux. schr. for Fanning Island Trading Co.; keel laid June 28/20; launching Oct. 30/20, estimated; delivery Nov. 15/20, estimated; 136 LBP; 32 beam; 12½ loaded draft; 6 loaded speed; 500 DWT; gas engine, 150 IHP.

TODD DRYDOCK & CONSTRUCTION CORPORATION, TACOMA

No name, Isherwood steel motorship for Alaska S. S. Co.; 360 OA; 29-6 beam; 22 loaded draft; 6500 DWT; McIntosh & Seymour four-cycle Diesel engines; 1200 IHP, 140 RPM.

Three scout cruisers for U. S. Navy.

UNION CONSTRUCTION COMPANY, OAKLAND

Heber, hull 10, cargo for USSB; 402 LBP; 53 beam; 27-4¾ loaded draft; 11 loaded speed; 9400 DWT; geared turbine engines, 2900 SHP; three watertube boilers; delivered Oct. 1/20.

Charlie Watson, hull 11, oil-tanker for Standard Oil Co. of Calif.; 250 LBP; 37 beam; 15-6 loaded draft; 11 loaded speed; 2000 DWT; two 500-BHP Diesel engines.

Liebre, hull 12, oil-tanker for General Pet. Co.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 2700 IHP; three Scotch marine boilers, 15-3x11-9.

R. J. Hanna, hull 14, oil-tanker for Standard Oil Co. of Calif.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 2700 IHP; three Scotch marine boilers, 15-2 x 11-6.

No name, hull 15, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; 412 LBP; 53-5 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2800 IHP; three Scotch marine boilers, 15-6 x 11-7.

No name, hull 16, cutter for USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engines, 2600 IHP; two watertube boilers.

No name, hull 17, cutter for USCG; dim., etc., same as hull 16.

No name, hull 18, cutter for USCG; dim., etc., same as hull 16.

No name, hull 19, cutter for USCG; dim., etc., same as hull 16.

No name, hull 20, cutter for USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec. engines, 1000 IHP; two watertube boilers.

No name, hull 21, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2800 IHP; three Scotch marine boilers, 15-6 x 11-7.

No name, hull 22, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as hull 21.

No name, hull 23, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as hull 21.

Note: Heber was last ship on original contract for ten with USSB.

WALLACE SHIPYARDS, NORTH VANCOUVER, BRITISH COLUMBIA

Canadian Highlander, cargo for Canadian government; launching Oct. 13/20; 8400 DWT; 413 long; 52 beam; 31 deep; 11 loaded speed.

Canadian Skirmisher, cargo for Canadian government; keel laying Oct. 2[illegible]; sister to Canadian Highlander.

Passenger vessel for Canadian Pacific.

J. G. WILLIAMS CONSTRUCTION COMPANY, SAN FRANCISCO

Two steel barges for Standard Coal Co., 138 ft. in length; 35 ft. in width; 12 ft. molded depth; coal capacity of 900 tons.

Miscellaneous Construction

BABCOCK & WILCOX COMPANY, CHARLES C. MOORE, SAN FRANCISCO, PACIFIC COAST MANAGER

Steamer Quinault, Hart-Wood Lumber Co., installation of two Babcock & Wilcox marine boilers.

Steamer Pacific, Pacific Marine Iron Works, installation of two Babcock & Wilcox marine boilers.

COLUMBIA STEEL COMPANY, PITTSBURG, CALIFORNIA

Steel castings for many steel vessels now under construction in the Pacific Coast yards, including dreadnought Montana and sister ships 49, [illegible], 52; also for Coast Guard cutters under construction in the Union Const. Co. yard.

ALLAN CUNNINGHAM COMPANY, SEATTLE

On order and under construction: fourteen large steam steering gears of the geared quadrant type; twelve large steam anchor windlasses, and several smaller ones; a number of steam cargo and warping winches. For two large motorships: electric anchor windlasses, steering gears, capstans and cargo winches.

DOW PUMP AND DIESEL ENGINE COMPANY, ALAMEDA

Charlie Watson, motorship for Standard Oil Co.; two Diesel auxiliary electric drive engines, 200 IHP.

F. H. Hillman, motorship for Standard Oil Co.; one 200 IHP, two 267 IHP Diesel auxiliary electric drive engines.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

McNab direction indicator, mfd. by the McNab Co., for hulls 11, 12, 14 at Union Const. Co., hull 163 at Moore's; Willett-Bruce whistle control, mfd. by the McNab Co., for hull 14 at Union Const. Co., hull 5305 at Bethlehem; Todd-White fuel-oil system, Todd Drydocks, Inc., hull 19 at Southwestern; Brown steam tiller, Hyde Windlass Co., for hull 5308 at Bethlehem; National stockless anchors, Upson Walton Co., for hull 165 at Moore's; Dean feed pumps, Dean Bros. Steam Pump Works, for 16[illegible] at Moore's; Reliance forced draft equipment, John Reid & Co., for hulls 165, 166, at Moore's.

MAIN IRON WORKS, SAN FRANCISCO

Purchasing Officer: Austin Sper[illegible]

Outfitting four tugs for Shipowners' & Merchants' Tug Boat Co.; 1[illegible] overall; 3[illegible] beam; 16 loaded draft; TE engines, 100[illegible] IHP; two Scotch marine boilers, 11-6.

MARINE IRON WORKS, CHICAGO

For Atlantic fishing companies, boats building at East Booth Bay, Maine: four 200 HP triple expansion condensing engines.

For oil company, Barranquilla, Rep. de Colombia, S. A.; 60 ft. light draft steel stern wheel steamer with machinery, for shipment in K. D. shape.

For transportation company, Barranquilla, Rep. de Colombia, S. A.: 300 HP stern wheel engines.

For transportation company, C[illegible]: 1[illegible] HP propeller engine.

For towing company, Michigan: 195 HP fore and aft compound engine.

SKANDIA PACIFIC OIL ENGINE COMPANY, OAKLAND

Purchasing Agent: A. Bolander.

Two 850 BHP Werkspoor Diesel engines building for Standard Oil Co.'s MS H[illegible], [illegible] cyl., 1[illegible] RPM, delivery Oct., 192[illegible].

Ten 850 BHP Werkspoor Diesel engines building for USSB, 6 cyl., 13[illegible] RPM, delivery Nov. 1 to April 1/21.

STEWARD DAVIT & EQUIPMENT CORPORATION, NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Alameda works, Beth. S. B. Corp.: Algonquin, hull 5304, for Standard Trans. Co. of Del.; W. S. Miller, hull 5305, for Standard Oil of Calif.; Yerba Linda, hull 5307, for Gen. Pet. Co. At Union Const. Co.: Charlie Watson, hull 11, for Standard Oil Co. of Calif.; Coast Guard cutters, hulls 17, 18, 19, for U. S.; Liebre, hull 12, for Gen. Pet. Co.

At Todd's: SS. [illegible].

At Southwestern: SS. Hollywood.

At Long Beach: SS. M[illegible].

At Moore's: Vacuum, hull 157, for Vacuum Oil Co.; hull 164, for Vacuum Oil Co.; S. C. T. Dodd, hull 160, for Standard Oil Co. of N. J.; M. F. Elliott, hull 161, for Standard Oil Co. of N. J.; Thos. H. Wheeler, hull 162, for Standard Oil Co. of N. J.

For Pacific SS. Co.: Admiral Schley.

UNION GAS ENGINE COMPANY, OAKLAND

Purchasing Agent: J. H. C[illegible]

Doris Crane, hull [illegible], aux. schr. for Fanning Island Trading Co., [illegible] as follows: [illegible] type 1[illegible] HHP [illegible] HP [illegible] 8 HP [illegible] light and pump outfit; [illegible] HP [illegible] refrigerating [illegible].

Drydocking and Repairs

BETHLEHEM SHIPBUILDING CORPORATION,

Alameda Works

Miscellaneous repairs, drydocking and painting: stm. sch. Arctic, yacht Trident, launch Dispatch No. 3, stm. sch. Saginaw, stern wheeler Petaluma, stm. sch. Everett, M.S. La Merced, stm. sch. Florence Olsen, stern wheeler Colusa, barkentine Echo, stm. sch. Brunswick. Miscellaneous repairs, electric welding, drydocking and painting: stm. sch. Bee. New propeller: stm. sch. Florence Olsen. Miscellaneous repairs, drydocking and painting, new wheel shaft: stern wheeler Sacramento. Miscellaneous repairs, docking, cleaning, painting: sch. Irene.

Potrero Works

Miscellaneous repairs, drydocking and painting: stm. sch. Johan Paulson, tug Standard No. 1, tug Wyadda, M.S. Piru, SS. Ardmore, SS. Acme, sch. Edward R. West. Engine, boiler and hull repairs: SS. Frederick Luckenbach, SS. Maui, SS. Bondowoso, SS Ullsted. Miscellaneous repairs, Lloyd's survey: SS. D. G. Scofield. Engine and boiler repairs, hull repairs, drydocking and painting: West Sequana, SS. Colusa, SS. Tofua. Work in connection with changing propeller: tug Priscilla. Renew globe valve: SS. J. A. Moffett. Repairs to rudder, engine and boiler repairs, hull repairs, drydocking and painting: SS. Frank H. Buck. Painting topsides, calking on boilers: SS. West Harts. Miscellaneous repairs, drydocking and painting, work in connection with survey: SS. Tamaha. Making stanchions for gangway: SS. Wairuna. Making new tailshaft: SS. Newport. Overhauling crankshaft: SS. Ventura. Electric welding on stern: SS. West Cadron. Overhaul tailshafts: SS. Oleum. Miscellaneous repairs, drydocking: barge No. 3, Pac. Coast Dr. Co. Furnishing boiler scalers: SS. Shortsville. Engine and hull repairs: M.S. Piru. Repairing section of main feed pipe: SS. El Lobo. Machining propeller blade: SS. Topa Topa. Engine and boiler repairs, hull repairs, drydocking and painting, drawing tailshaft: SS. Ventura. Miscellaneous repairs: SS. Maui.

LONG BEACH SHIPBUILDING COMPANY, LONG BEACH

General overhauling: motor yacht Maude F., E. D. Burge, Santa Ana, owner.

Dry dock and general overhauling: SS. Santiam, Hammond Lbr. Co., San Francisco, owner; elec. 20-inch dredge Windham, Western Dredging & Marine Const. Co., Long Beach, owner.

General overhauling, installation of fuel oil-burning equipment, and overhauling Seabury boiler: stm. yacht Louise, E. D. Burge, Santa Ana, Owner.

MOORE SHIPBUILDING COMPANY, OAKLAND

Drydocking, cleaning, painting and miscellaneous repairs: barge Melrose, King Coal; tug Crolona, Cal. Hawaiian; motorboat Oregon, Crowley; ferry str. San Pedro, Santa Fe; West Holbrook, USSB; schr. Anne Hanify, yacht Martha, launch Scout, Hanify; City of Sydney, L. A. Peterson; str. Arakan, Spreckels & Bro.; str. West Katan, USSB; str. West Niger, USSB; Santa Fe No. 2, Santa Fe; str. South Coast, Hobbs-Wall; ferry str. San Francisco, S. F. Oak. T. Ry.; Fort Laramie, Scammel; str. Lyman Stewart, Union Oil; Jalapa, USSB; str. Iris, Swayne & Hoyt; schr. Lahaina, Hind-Rolph; str. Westport, Hobbs-Wall; str. West Henshaw, USSB; tug A. H. Payson, Santa Fe. Drydocking, cleaning, painting, and extensive hull repairs: schr. Samar, H. Kirchman; schr. Forester, Sanders & Kirchman; West Cayote, USSB; str. Venezuela, Pac. Mail; str. Santa Alicia, Grace Co. Drydocked: str. Heber, Lavada, West Eldaro, USSB; str. Siskiyou, E. K. Wood; str. Asuncion, Hanlon. Drydocking and miscellaneous repairs: South Coast, Hobbs-Well; barge King No. 1, King Coal.

PACIFIC COAST ENGINEERING COMPANY, SEATTLE

General repairs: Eastern Sword, Iris, City of Spokane, Eemdyk.

NAVY YARD, MARE ISLAND

Repairs to a large number of naval vessels.

NAVY YARD, PUGET SOUND

Miscellaneous repairs: baftleships Idaho, Mississippi, New Mexico, Texas; cargo vessel Houston; Coast Guard Bothwell, Snohomish; colliers Bath, Brutus, Saturn; cruisers Charleston, Charlotte, Missoula, Seattle; destroyers Dent, Dorsey, Doyen, Edwards, Henshaw, McCawley, Meyer, Moody, Rathburne, Roper, Sinclair, Talbot, Waters; destroyer tender Prairie; Eagle boat 57; mine sweeper Ortolan; naval auxiliaries Cuyama, Helori; submarine chasers Nos. 295, 301, 309; tugs Challenge, Iroquois, Mahopac, Pawtucket, Tatnuck.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

General repairs: Shabonee, tanker for Stand. Oil Co.; West Cayote. Copper painting: U.S.S. Minneapolis. Gas engine repairs: sch. John M. Winthrop. Winches: SS. Frederick Luckenbach, Luckenbach SS. Co. Pumps: SS. Trinidad. Electrical repairs: SS. Matona. Repairs to piping: SS. Haynie.

W. F. STONE & SON, OAKLAND

Miscellaneous alterations and repairs necessary for cattle trade in Hawaiian Islands: Hawaii Meat Co.'s steamer Bee. General overhauling: submarine chaser No. 297. Miscellaneous repairs: F. E. Booth & Co.'s Junta; E. K. Wood Co.'s San Jacinto.

TODD DRYDOCKS, SEATTLE

Drydocking for new shafts: tugs Daniel Kern and Hero, Washington Tug & Barge Co., owner. Engine repairs: tanker Pearl Shell, Shell Oil Co., owner. Deck and engine repairs, drydock, cleaning, painting: SS. Maquan, Frank Waterhouse & Co., operators. Engine, deck and hull repairs: SS. Westward Ho, W. C. Dawson & Co., operators; West Ivan, Frank Waterhouse & Co., operators. Miscellaneous repairs: Wheatland Montana, Elkton, Pacific S. S. Co., operators. Dock, clean and paint: Santa Inez, W. R. Grace & Co.; Pico, USSB. Dock, clean, paint, and rebuild afterhouse: bark Belfast, W. R. Grace & Co. New cargo booms: Santa Alicia, W. R. Grace & Co. New masts, top masts, cargo booms, etc.: Mandasan Maru, Mitsui & Co.

UNION GAS ENGINE COMPANY, OAKLAND

Installation of 85 HP, 4 cyl. Union kerosene engine in Tagua, Atkins, Kroll & Co.

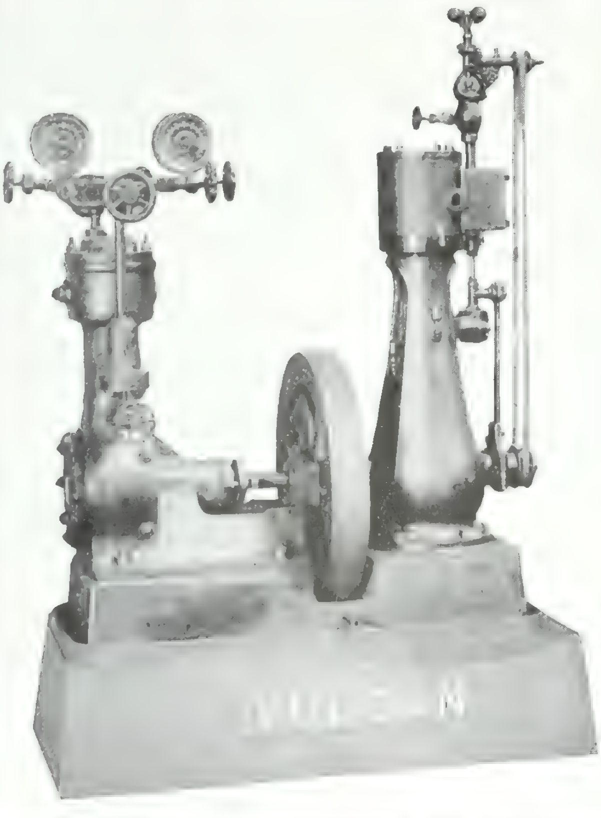
Overhauling gas engines in ex-subchaser No. 29, E. S. Hough.

Repairs to hull and machinery: SS. Bee, Hawaii Meat Co.

Installation of kerosene-burning equipment on Union gas engine, Golden State, Union Fish Co.

YARROWS, LTD., VICTORIA

Docked for cleaning and painting and minor repairs: str. Canadian Exporter. Docked for cleaning and painting, installation of new stern tube, repairs to propeller, machinery and deck: str. Mattawa. Docked for repairs to propeller and cleaning and painting: str. Princess Charlotte. Docked for repairs to propeller: str. Princess Adelaide. Docked for cleaning and painting and repairs to propeller: str. Princess Maquinna. Docked for cleaning and painting, general overhaul and new main mast installation: str. Princess Victoria. Docked for cleaning and painting: str. Mount Etna. Machinery repairs: str. Tahiti. New main mast, foremast, yardarms for aprons and rigging renewed: bktn. Puako. Docked for extensive repairs to forward end of vessel: bktn, Alta. Docked for extensive repairs to bow and bottom, damage due to stranding: str. Pacific. Docked for cleaning and painting and extensive overhaul, and No. 3 survey: str. El Lobo.



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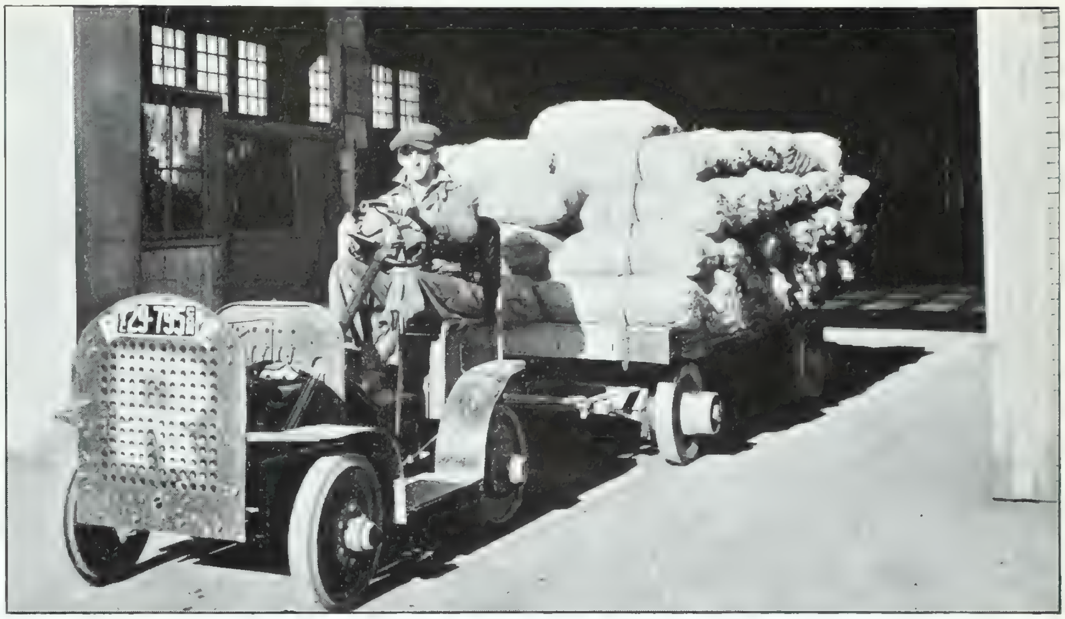
RELIANCE INDUSTRIAL TRACTORS

H. H. JENNESS of the Dunbar-Hansen Company is daily demonstrating the efficiency of gasoline-driven tractors in handling freight from the San Francisco waterfront to their uptown warehouses.

In regular service a Reliance gasoline industrial tractor hauls a "flat" containing about eighty sacks of onions for the Dunbar-Hansen Company. Approximately 130 tons of this class of freight is transported daily, the distance covered between points of loading and discharge is from one-quarter to a half mile. This sturdy little tractor with one operator keeps three men busy loading freight at the ship's side and two men unloading at the warehouse. By the use of three "flats," loading and unloading proceeds without interruption. The movement of over 100 tons of this class of freight daily is a very good showing for the tractor when it is considered that the "flats" are the heavy, slow-moving wagon type with dead axle and rather clumsy in operation.

With the use of the Reliance tractor, Dunbar-Hansen Company have found that with five men and one driver they are handling the same tonnage over the same route which formerly was handled with four teams and seven men. An increasing number of Reliance tractors are in operation in Pacific Coast terminals, warehouses, industrial plants, etc.

These tractors are manufactured by the Reliance Trailer & Truck Company in San Francisco, and before placing this equipment on the market the manufacturers have been careful to design a tractor which develops tremendous power, and with minimum of wear and tear. Some of the outstanding features of the Reliance tractor are the heavy construction of the running gear and reinforced axles, the heavy buffer plates which protect the tractor from rough handling. An exclusive feature of the Reliance tractor is the internal gear drive which gives maximum power without the use of the chain drive. That the manufacturers have expended considerable expense and time developing these machines is indicated by such parts as the automatic spring draw bars, extra heavy honeycomb radiators, auxiliary cooling water pump, etc.



A Reliance Tractor on the San Francisco Water Front

PLANT 85 PER CENT MAGNESIA

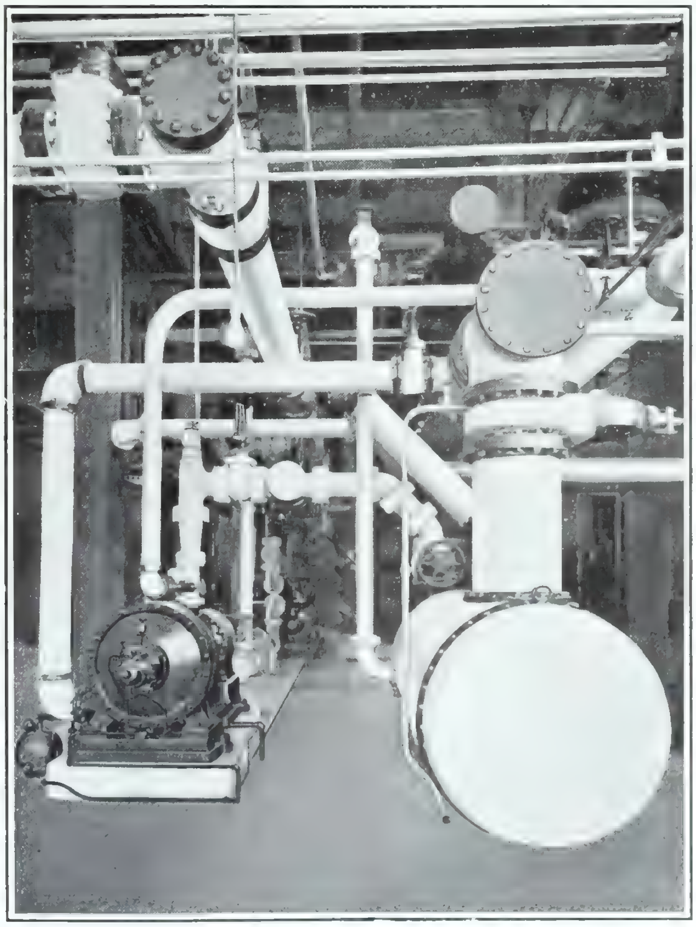
ON September 1 the Plant Rubber & Asbestos Works took over the entire factory and equipment of the Merle Magnesia Company, situated at Redwood City, California.

This factory is devoted to the manufacture of 85 per cent magnesia pipe and boiler covering, with a capacity of 100 carloads per annum.

The carbonate of magnesia which forms the basis of the pipe covering is produced chemically, under a patented process owned by this company, from magnesia extracted from seawater in combination with trona, of which there is an unlimited supply in California. The precipitate thus secured is slightly saline, and is then thoroughly washed, and put through a vacuum filtering process that removes every vestige of salt, leaving a carbonate of magnesia that complies in every respect with the exacting requirements of United States pharmaceutical specifications.

Asbestos of the finest quality and longest fiber is then added in proportion of 15 per cent, by weight, to the 85 per cent of magnesia carbonate, for the same reason that hair is mixed in mortar, and the mass is then ready for molding into the requisite diameters for steam pipe insulation, or blocks for boiler lagging.

No modern steam plant today operates without having its pipes and boilers carefully insulated against heat radiation, and no other article has ever been found or manufactured that combines the qualities of efficiency, durability and ease of application of 85 per cent magnesia coverings.



The above shows a view of a power plant well insulated with 85 per cent magnesia

A NEW BOLTING UP MACHINE

AFTER extensive experiments covering over two years, the Construction Appliance Company, 322 Cherry Street, Seattle, are now placing on the market a pneumatically operated machine for bolting-up in ship construction, boiler works and other structural iron work.

They are using in connection with compressed air the well-known mechanical principle of the "toggle joint." The machine is known as Hallett's Invincible Plate Tightener, and is manufactured in three sizes of seven, eight and nine-inch cylinders, which exert a pull of from ten to twenty-five tons on the plates. The plate tightener, as illustrated in the figure, consists of a small cylindrical shaped machine 16 inches long by 8 inches in diameter, with an enclosed clutch projecting about five inches at right angles from the center. Each end of the machine is a pneumatic cylinder acting by a piston head on a double toggle joint, drawing on the clutch and at the same time forcing against the plates, the outstanding feature being the enormous multiplication of power obtained from the toggle leverage as the machine closes to 85 degrees, where the draw obtained is approximately eleven times greater than at the commencement of the pull. The center bar is readily adjustable so as to allow the maximum pressure to be used on varying thicknesses of plates.

This machine uses either one or the other of two special bolts, which are practically indestructible and can be used time and time again, one of which is a bolt with a slot 3/16 inch wide with a taper key which is readily driven with a hammer when the pull is made. The other bolt is a patented self-locking bolt which requires absolutely no mechanical operation to hold the plates together when the pulling is done.

In operation the machine is very rapid, for when the bolt is inserted through the hole, there is a clutch on the machine which grabs the bolt automatically. The pull is made almost instantaneously, regardless of whether working on thin or thick plates. After the key is driven and the plates held in place, the machine is instantly detached by a small lever on the top.

Some remarkable records have been made for speed with the machine during the last year. In shipyards where the reaming is done after the plates are hung and before the bolter-up commences, a speed of 200 bolts per hour is easily attained. The saving effected by re-use of the special bolts is considerable, as the bolts have no threads and are practically indestructible.

Two men constitute a gang for the operation, one to insert the bolt and one to operate the machine and drive the key-wedge. The machine weighs from 33 to 38 pounds, according to the size. This machine appeals especially to riveters, on account of the ease with which the bolts are taken out, one tap of the gun on the key removing both key and bolt.

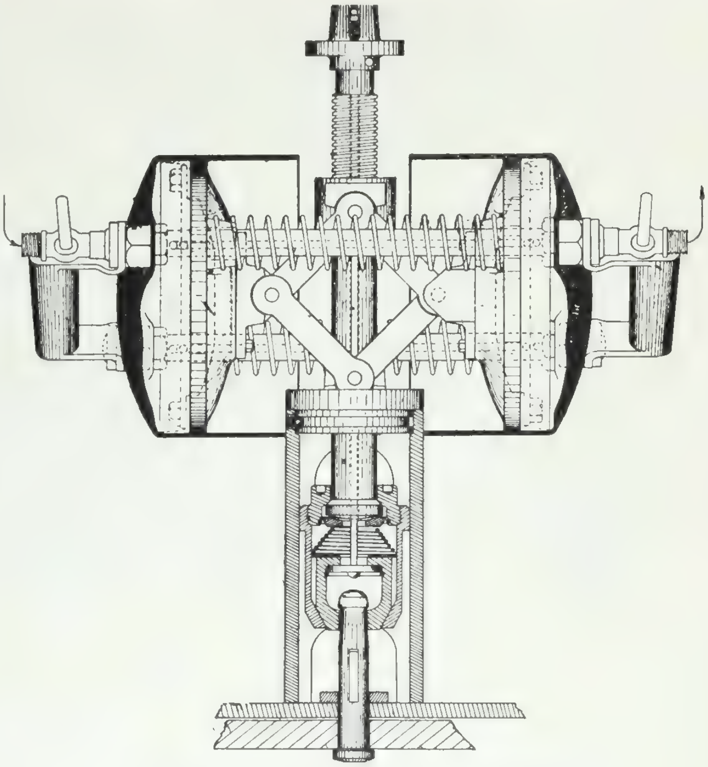


Diagram of Hallett's Invincible Plate Tightener

The Invincible plate tightener has been subjected to severe tests in various yards during the past year with most satisfactory results, and they are now in practical operation in the largest yards in Canada.

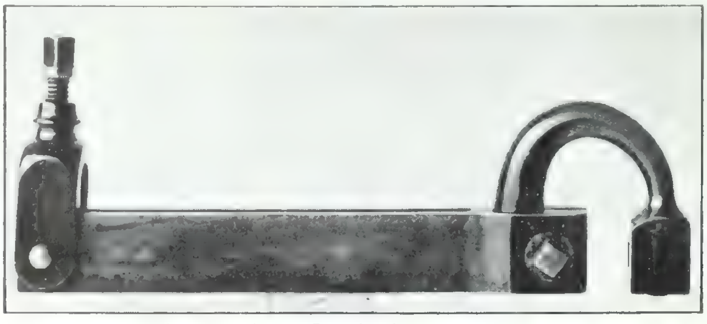
DERRINGER COMBINATION TOOL HOLDER

A COMBINATION tool holder for medium size work has recently been perfected by Maurice H. Derringer, Philadelphia, Pennsylvania, that can be used alternately for square and round stock. It is made of high-grade steel, with all parts hardened and drawn, to prevent breakage.

One side of the holder will take square stock up to 5/16 inch, and can be used for turning, boring and internal threading. By turning yoke to opposite side of holder it presents 45 degree slot, which will take round stock from 1/8 inch to 9/16 inch in diameter. This side of the holder will also be found useful for boring or internal threading of small and large holes. It will also be found useful in many other ways, such as holding "indicator" or scriber for setting work dead true. The yoke that is attached to the body of the tool holder is fastened with a taper pin and can be removed in a few seconds. This yoke has a 5/16 inch screw in it, and when the holder is placed in tool post of lathe it has a double grip on the tool, the screws in yoke and tool post gripping the tool. This gives a firm grip on the tool and will absolutely prevent it from springing.

Another feature of the Derringer combination tool holder is a spring tool in the form of a goose-neck, which is brought into use by taking out taper pin that holds yoke in place and removing yoke. Goose-neck is then attached with taper screw and nut, which, after tightened up, will positively prevent goose-neck from moving. This spring tool is broached to suit 5/16 inch tool bit and will be found ideal for cutting threads. Spring tool will also be found useful in planer and shaper as well as the lathe. Goose-neck can be used on right and left hand angles.

The tool holder can be assembled and taken apart in less than one minute and will be found desirable for more uses than space permits at this time to enumerate. It can be used in lathes that will swing from 12 inches up to 20 inches.



The Derringer Combination Tool Holder

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912,

Of Pacific Marine Review, published monthly at San Francisco, California, for October 1, 1920.

State of California,
County of San Francisco ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared B. N. De Rochie, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Pacific Marine Review, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—J. S. Hines, No. 9 Scenic Way, San Francisco.

Editor—A. J. Dickie, 1706 Mariposa Ave., Berkeley.

Managing Editor—None.

Business Manager—B. N. De Rochie, 943 Fresno St., Berkeley.

2. That the owners are: (Give name and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)

J. S. Hines.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

B. N. DE ROCHIE.
(Signature of Business Manager.)

Sworn to and subscribed before me this 25th day of September, 1920.

(Seal) E. M. CLARK,
Notary Public in and for the City and County of San Francisco, State of California.
My commission expires April 22, 1924.

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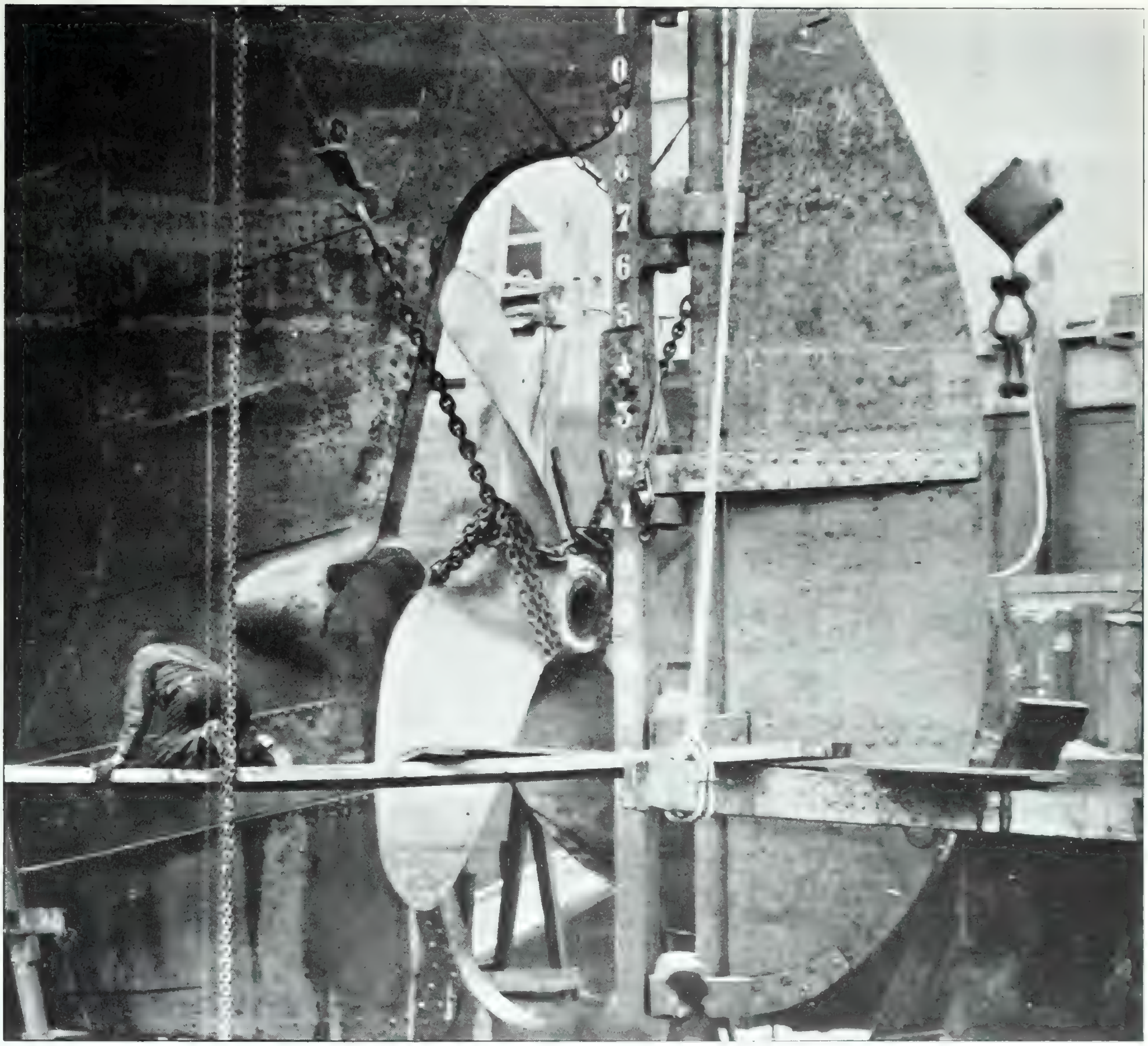

This casting was removed while still in perfect condition and a wheel designed and made by CHAS. S. LINCH, INC., was installed. The owners were prompted to take this action by the exceedingly good performance of the sister ship, Cabo Cruex, whose original propeller was scrapped to make room for a CHAS. S. LINCH installation.

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THE BARNES SCARPHING MACHINE

THIS machine has been designed to fill a want that we believe exists in all shipbuilding, engineering and railway works for a tool that can be fixed or portable, and capable of doing heavy milling operations expeditiously, with a minimum power consumption.

This machine is applicable in many directions. For instance, in shipyards for machining scarphs on ship plates, stern and stem post scarphs, keyways in rudder posts, engine beds in position, and also roller paths. In engine shops for machining keyways of large diameter in shafts of all descriptions, such as propeller shaft keyways up to 3 feet 6 inches in length, and also for water-tight door facings. In boiler shops for machining scarphs on the end plates of marine boilers, machining bridges, and also by using a former, machining the strap joints. In forges as a portable tool for re-machining anvil blocks in position and cutting keyways. In railway shops as a portable tool for machining the guides for axle boxes on locomotive and steel truck frames.

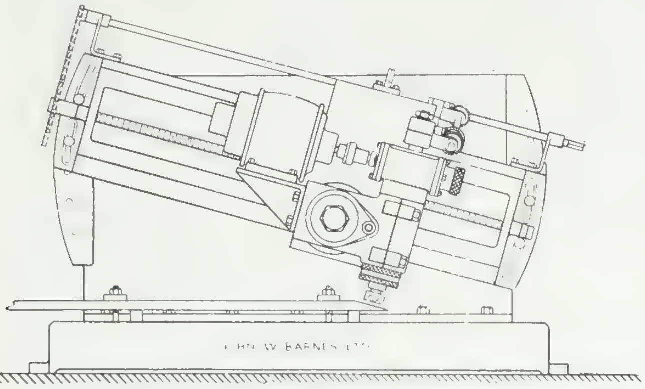


Diagram showing front view of Barnes Scarphing Machine

The base of this machine is arranged to form a bed 64 inches long and 47 inches wide and has T-slots for securing work. On this is mounted a back 31 inches high, this back having two faces, both machined and arranged with a center pivot on which the slide revolves, provision being made for bolting the main slide rest carrying the milling head. This slide rest can be bolted either to the back or front, so that if the work is too large to go underneath the milling head when in normal position, by putting the milling head and slide rest on the back, much larger work can be machined. This slide rest is swivable from the center 14 degrees up or down and graduated so that it can be swiveled to any angle that may be required or worked at zero.

On the main slide is fitted a heavy cross slide which has a longitudinal movement of 42 inches and fitted so that the milling head can be bolted in a low or high position. Vertical movement is 12 inches. When in a low position the job can be machined right down on the bed and when in a high position shafts up to 23 inches' diameter can be put underneath the cutter. If, however, it is required to have higher movement than this, then packing slips can be put under the back.

On this compound slide rest is fitted one of the Barnes No. 5 milling attachments, which has a column 6 inches diameter and 20 inches long, giving 12-inch movement. On this is mounted a slide bracket moved up and down by central screw which carries on one side a milling quill with worm drive, on the other side a bracket for 2-horsepower motor. This motor is preferably arranged to run at 1700 revolutions a minute, the reduction of the worm being 16 to 1.

The worm is hardened steel fitted on one side with Skefko radial bearings, on the other side with double thrust Skefko bearings. The worm wheel is of bronze and both worm and worm wheel are running in grease. The whole of the worm box and quill carrying milling cutter can be reversed, and so instead of working on the right hand side can be used on the left and the motor arranged accordingly, the plan shown of the quill and worm being fully descriptive.

On the main shaft of the milling spindle is arranged a worm box which gives a drive through a nest of bevels to shaft, and back to automatic feed on the slide rest. By a clutch arrangement this can be made to travel either way.

As previously stated, the line blocks show the latest machine, from which it will be seen that the automatic feed is arranged to come between the top of the slide rest and the back, and can be swung to full angle without catching the slide or bracket, and can be used independently of either the base or back, if required, thus enabling the milling head and slide to be used as a portable machine.

The makers will utilize for starting the motor a Brook-Hirst Midget type starter with no volt and overload release, having quick break switch and fuses of the handle type and to utilize on the motor itself a separate iron-clad press button to stop.

It has been arranged so that the standard traverse of the slide rest will be three-eighths inch per minute. Cutters of various sizes up to four inches can be used. The machine is sent out as a standard article complete with arbor for taking 1¼-inch hole cutters. Cutters can be used having a No. 4 Morse taper shanks with flats for driving from the jaws. The base, back and slide rest are of cast iron, well machined and fitted; the rest of the machine is of malleable steel. The quill is fitted with Timkin roller bearings of ample proportion for any stress that may be required.

In scarphing ship plates the machine is arranged as shown in illustration, having the slide rest swiveled to angle required and cutter having the necessary bevel fixed. The cutter is brought down so as to just touch the plate. The bevel required will be obtained at a single cut. For this purpose we advise a cutter of 3½-inch diameter to be used. A scarph of 8 inches by 6 inches can be cut in sixteen minutes on ⅞-inch plate. For cutting a scarph of the opposite angle, all that is necessary is to swing the slide to the opposite degree required and so instead of cutting right hand, cut left hand, the same cutter of course being used.

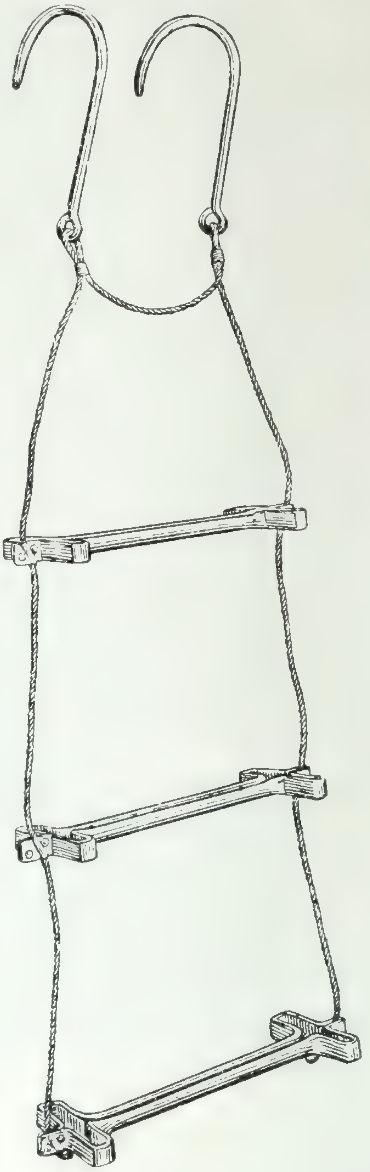
The approximate net weight of this machine is 2800 pounds. It is manufactured by Alfred Herbert of Coventry, England.

B-D FLEXIBLE LADDERS

THIS double rung type flexible ladder is the only one on the market and is gaining great popularity owing to its substantial construction, double spacers to hold the ladder away from the surface, affording safe hand and foot hold, the flexible cable not kinking in unrolling, compactness for stowage, and durability.

All metal is hot galvanized and copper or brass rivets used. The rungs are separate units, which makes repairing easy without taking the whole ladder apart. Upper loops of cable pass through eyes of hooks over thimbles and are securely fastened with cable clips (not shown in cut).

This ladder has stood the rigid test of the United States Navy and been recommended for sea service. It has been highly endorsed by representative men in Eastern marine circles and the United States Shipping Board has adopted it for use, having equipped such vessels as the Martha Washington, Huron, Porto Rico and Aeolus with one ladder at each lifeboat station. All the ex-German passenger ships that are being reconditioned will have these ladders as standard equipment.

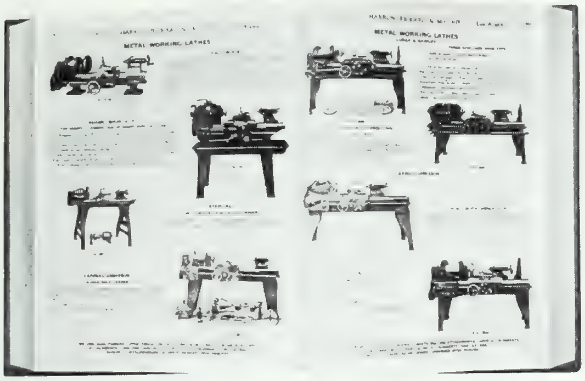


A B-D Flexible Ladder

Bethlehem Hydraulic Telemotors—Bulletin No. 14 of the Bethlehem Shipbuilding Corporation, Ltd., Bethlehem, Pa.

A 10-page brochure describing the duplex ram type of hydraulic telemotor as manufactured by the Bethlehem Shipbuilding Corporation. In the design of this type of telemotor all leathers and leather packing have been entirely eliminated, all glands are externally packed and can be adjusted while the apparatus is in operation. A mechanically operated bypass is provided, and all valves are of gun metal with gun metal seats. All of the cylinders are cast in one piece. Pressure is applied from the hand steering wheel through gears onto the plain gun metal rams.

TRADE LITERATURE



Reproduction of two pages of the New Catalog No. 2 of Harron, Rickard & McCone

Catalog No. 2, Harron Rickard & McCone, San Francisco and Los Angeles. Seventh edition, June, 1920; 930 pages, bound in light blue buckram with red stampings. Describes in detail and illustrates profusely supplies, small tools, and machinery of every kind for mines and mills, machine shops, planing and saw mills, box factories, power plants, contractors, shipbuilders, foundries and all manufacturing plants.

This volume is without doubt the most important machine tool catalog yet issued in the West. It is very completely indexed, both as to illustrations and descriptive matter, the index covering not only the names of tools but also a great variety of allied subjects and departments, so that, for example, a man who had no exact knowledge of his requirements in machine tools but was figuring on a garage business could turn to the subject "automobile" and also the subject "garage" and be referred to pages in this catalog whereon he would find every possible requirement in the way of machine tool described with its uses and adaptations and its cost. One notable feature of this catalog is that the index is printed on a very fine quality of bond paper, in view of the fact that it will probably be the most used portion of the book.

Harron Rickard & McCone have been in the machine tool and supply business on the Pacific Coast since 1875 and have established a splendid record for straightforward and prompt methods in the handling of orders. They have had a very considerable experience in foreign trade in their various lines and are thereby enabled to understand the peculiar requirements of many foreign markets. The preface of the catalog contains sections addressed to foreign trade in Dutch, Spanish, Russian, and French which (considering the fact that industrial development in China and Japan is largely controlled by those who have at least a working knowledge of English), covers the entire coast of the Pacific Ocean.

The last thirty pages of the catalog are devoted to a compilation of information useful to the users of machine tools, and this section has its own special index and covers various tables of measurements, equivalents, standard dimensions, etc. Rules are given for calculation of power requirements in all ordinary problems, rules for calculation of air requirements in connection with pneumatic tools, much information on electrical power and wiring formulae, and a very complete table of weight units, and much data on specific weights of various materials.

Lidgerwood Steam Hoists for Contractors' Work — Bulletin No. 2 of the Lidgerwood Manufacturing Company. A very handsome, 52-page booklet describing the Lidgerwood type of contractors' steam winch equipment.

The Lidgerwood Manufacturing Company has been engaged exclusively in the manufacture of hoisting machinery since 1873. Their knowledge and experience enable them to design the proper hoist for each type of service. Practically every detail of all of their machinery is produced in their own plant. Both iron and brass castings are made in the Lidgerwood foundry. The boilers used on their steam hoists are manufactured by themselves in their own plant and especially designed for severe service as met with in contracting work. The catalog describes not only the ordinary type of contractors' hoist but especially designed hoists for such services as wheelbarrow elevators, piledriving derricks, bridge erection, special rotary engines for swinging derricks, coal-hoisting engines, dredge engines, quarry hoist engines, compound-geared hoists, and various combinations of multiple drum hoists.

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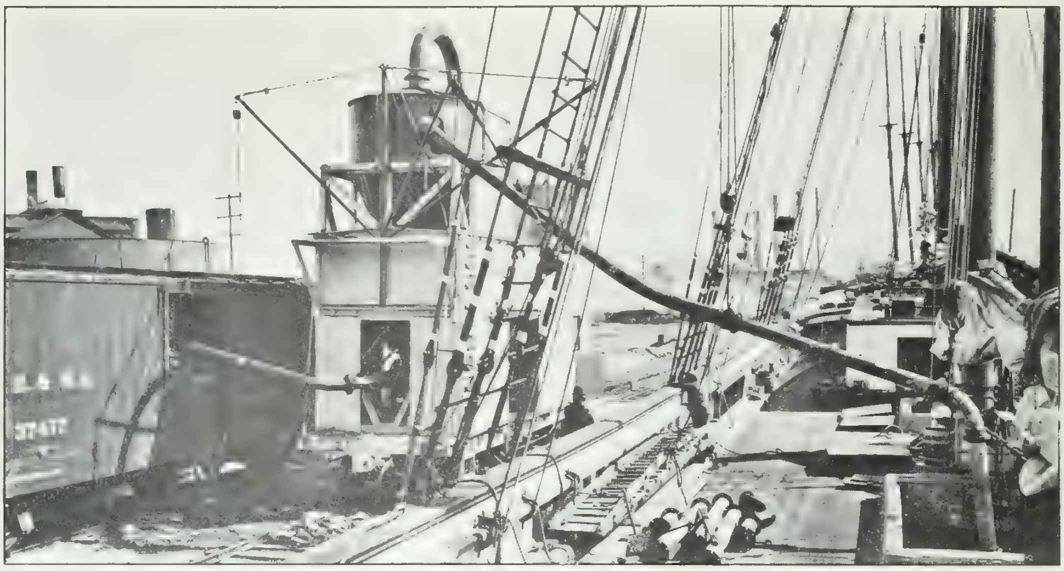
A PORTABLE PNEUMATIC COPRA UNLOADER



A Portable Pneumatic Copra Unloaded in operation at the Howard Terminals, Oakland, California
This equipment was the design of Leland S. Rosener

WE illustrate herewith a highly successful portable pneumatic unloading device designed by Leland S. Rosener of San Francisco and installed at the Howard Terminals, Oakland, California.

This machine consists of a special blower driven by a 100 horsepower motor, the suction from the blower operating on a large drum. An 8-inch pipe line is led from the hold of ship to the drum, entering the drum in a tangential direction. The bottom of the drum is tapered like a funnel, the lower end of the funnel entering into a special cast housing which contains a specially designed revolving gate valve, the spindle of this revolving gate being driven by an independent motor of three or four horsepower. This gate valve forms an air seal at the bottom of the drum and a discharge gate for the copra. The bottom of the cast housing in which the drum revolves ends in a T, one side of which takes the discharge from the main blower and the other takes the discharge pipe for loading the copra into the cars. The whole arrangement is mounted on a standard flat car and so becomes perfectly portable and can be moved to any part of the waterfront or from hatch to hatch without the necessity of warping the ship.

It will be noted from the above description that the copra is sucked up into the drum by a vacuum; in other words, it is under atmospheric pressure. Its entrance into the drum in a tangential direction at a high velocity produces centrifugal action on the copra which falls down at the outer circumference of the drum into the hopper, the carrying air going off through the suction pipe of the blower. This centrifugal action thoroughly separates the copra, and it is continuously drawn down through the funnel into the discharge gate valve and deposited in the way of the discharge air of the blower which picks it up and deposits it in the car or bin. The system is entirely self-contained, the discharge of the blower acting somewhat in the nature of a jet pump to assist the vacuum in the drum above.

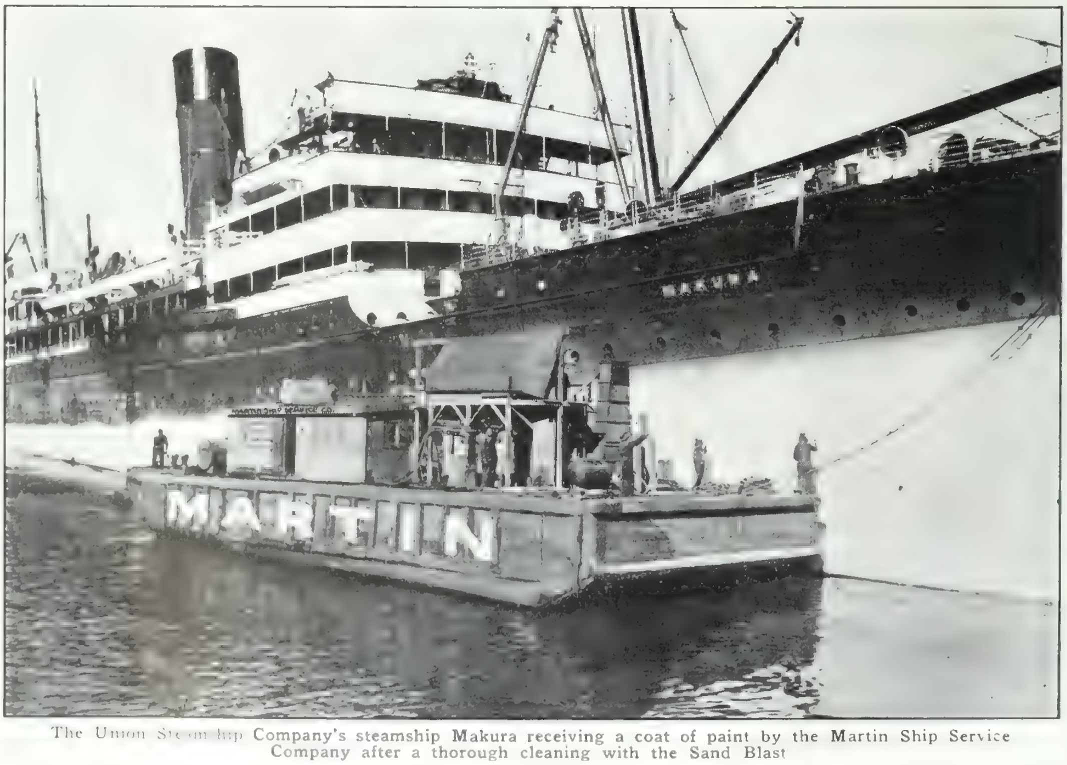
This apparatus in use unloading copra has been highly successful, handling about 75 tons per hour with much greater economy than this amount could be handled by any arrangement of ship's tackle or grab bucket cranes.

While this portable unloader was designed especially for handling copra, it can be used with equal success on any bulk cargo of low specific weight and would be particularly adaptable to the handling of grains of all sorts. Its great value for waterfront purposes lies in its easy portability to any portion of a waterfront.

Ship Painting and Cleaning With Pneumatic Equipment

THE Martin Ship Service Company of San Francisco has recently equipped a modern sand-blast and paint barge for ship work along the waterfront. Ship operators have been quick to take advantage of this method of applying paint after their ships have had a thorough cleaning with the sand-blast. It has been demonstrated that after sand-blasting a very excellent job of painting can be obtained with the pneumatic equipment, and it is also found to be time-saver, and therefore less expensive than painting by hand.

The ships which have been cleaned and painted by the Martin Ship Service Company include the Standard Oil Company's tank steamships Richmond, Acme and D. G. Scofield; also the Shipping Board's cargo carrier West Cape, the Union Oil Company's motorship Kern, the steam yacht Venetia owned by J. D. Spreckels, the Union Steamship Company's steamship Tahiti, the Oceanic Steamship Company steamship Sonoma. A number of destroyers building at the Bethlehem Shipbuilding Company's yard have also been painted by the Martin Ship Service Company.



The Union Steamship Company's steamship Makura receiving a coat of paint by the Martin Ship Service Company after a thorough cleaning with the Sand Blast

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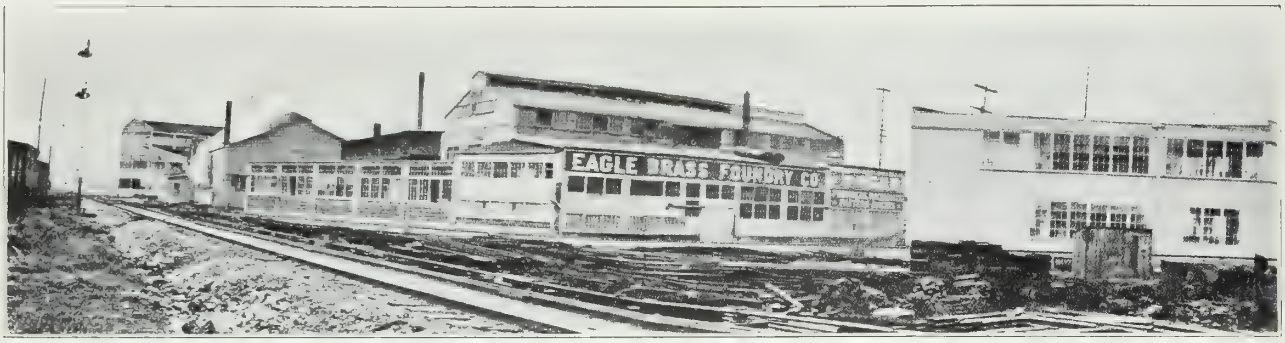
BRONEL VALVES



General plant view of Eagle Brass Foundry Company of Seattle where Bronel Valves are manufactured

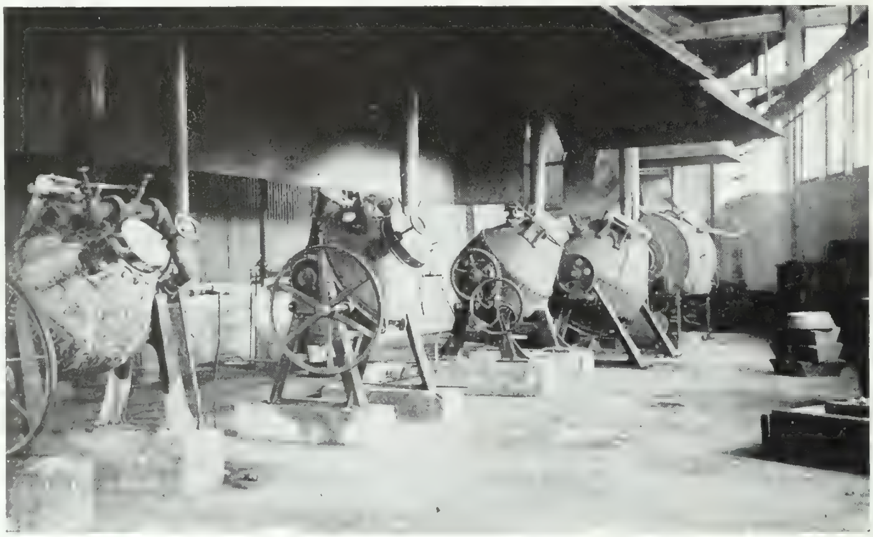
THE Eagle Brass Foundry Company of Seattle are making a specialty of valves made of Bronel bronze and especially adapted for use with high pressure superheated steam. During the emergency shipbuilding period quantities of these valves were supplied to the shipbuilding firms in Seattle for use in the engine rooms of ships built for the United States Shipping Board.

The valves are all subjected at the shop to a hydrostatic pressure of 1000 pounds per square inch in both the open and the closed position. On more than one occasion individual valves of this metal were subjected to pressures of 3500 pounds per square inch hydrostatic, which enormous pressure had the effect of blowing out the packing but was unable to show any indication of leakage or fracture in the valve itself.

The use of superheated steam and the prevailing high pressures in turbine work have made necessary the use in valves for this service of a metal having very high tensile strength over a wide range of temperatures and at the same time having sufficient toughness to resist the cutting effects of superheated steam, and also having high non-corrosive qualities. These qualifications have been met by Monel metal and its alloys, of which Bronel bronze is probably the most important. It has been shown by exhaustive tests that cast Monel metal at 600 degrees Fahrenheit, as compared with the same metal at 70 degrees Fahrenheit, retains 75 per cent of its tensile strength and 73 per cent of its elastic limit.

Monel metal is composed of 67 per cent nickel, 28 per cent copper, and 5 per cent of other materials. By reason of this high nickel content it possesses great resistance to the eroding and corroding effects of hot steam.

The Eagle Brass Foundry Company are agents for the Monel Metal Products Corporation for the states of Washington and Oregon, and this, together with their splendid equipment for the production and finishing of brass and bronze castings, qualifies them to supply the engineering trade of the Pacific Coast with a line of standard valves guaranteed to meet all the ordinary conditions of superheated steam practice, and also to make specification valves to meet any special requirements. They cordially invite correspondence from engineers submitting valve problems.



Furnace Room at Eagle Brass Foundry showing battery of five Brass Melting Furnaces

THE INTERNATIONAL SILVER COMPANY

WHEN the United States entered the war and began to train an army and build a great merchant marine fleet, the government's demand for supplies extended into some industries that few would have expected to be greatly concerned. Among these was table silver, because the armies in barracks and camp and the crews of the hundreds of new vessels had to be supplied with knives, forks and spoons.

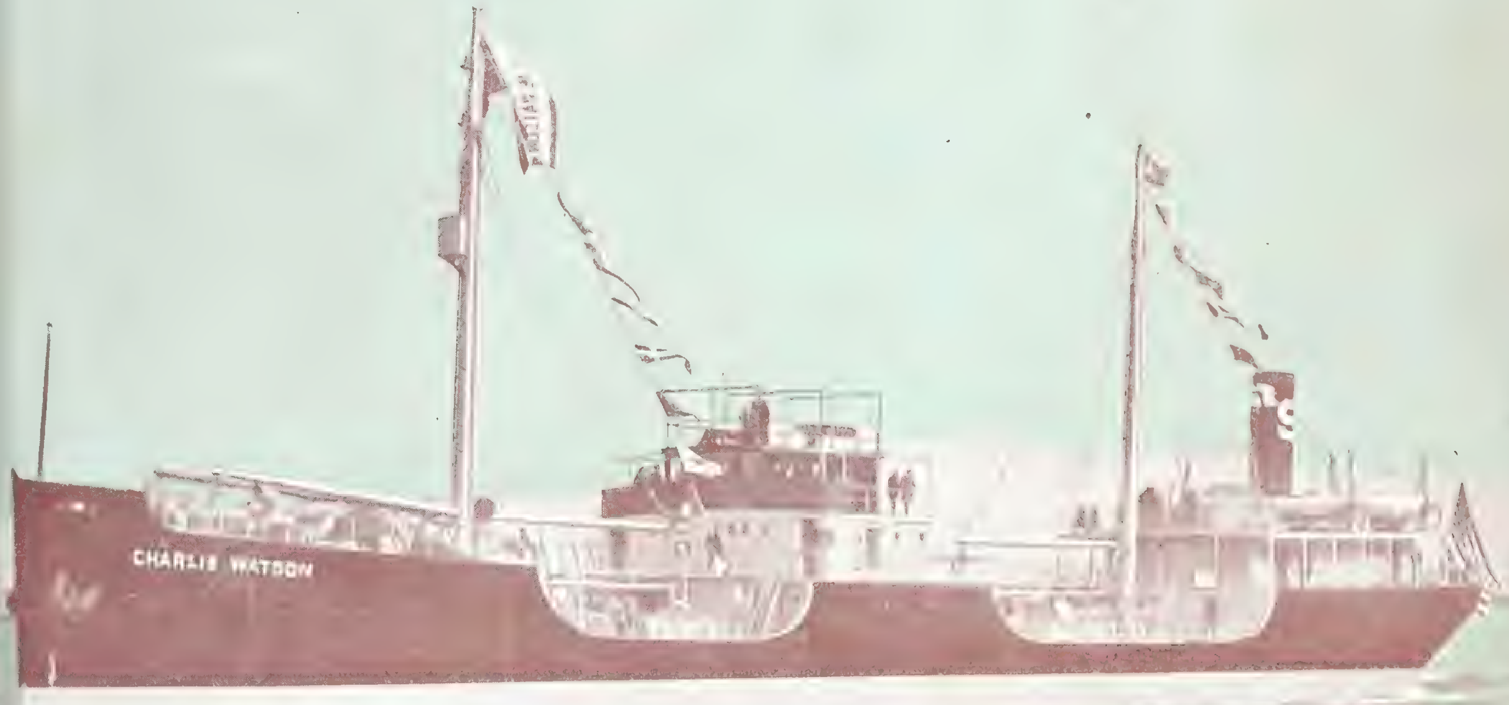
Up to the limit of its capacity, the International Silver Company, Meriden, Connecticut, supplied army posts, the navy and the vessels of the United States Shipping Board. Ship-owners will be interested in learning that its products were adopted as the Shipping Board standard, and were placed on hundreds of vessels, among which were many built at Hog Island, by the American Shipbuilding Company at Detroit, the Chester yard, Merchants, Federal, Atlantic Corporation, Bethlehem, Todd, Hanlon, Union Construction, Schaw-Batcher, and, in short, practically all the yards that built for the government.

Among privately-owned vessels that have been supplied by the International Silver Company are those of the Pacific Steamship Company and the United Fruit Company; and the number of railroads and hotels is indeed large, the list of railroads including the Union Pacific, Southern Pacific, Oregon Short Line, Northern Pacific, Great Northern, Pennsylvania, L. & N., Arizona & Eastern, Boston & Maine, Atlantic Coast Line, New York, New Haven & Hartford; and among the hotels are the Palace, San Francisco; Winton, Cleveland; William Penn, Pittsburgh; McAlpin, New York; Severin, Indianapolis; Cafe de l'Opera, New York, in addition to a large number of clubs.

At the time the armistice was signed more than 75 per cent of the output of the International Silver Company was for the government, but not all of this was silver, as the company's factories had engaged in the manufacture of essential military supplies, such as parts for gas masks and for airplanes.

The warerooms of the Pacific Coast division, International Silver Company, are at 150 Post Street, San Francisco.

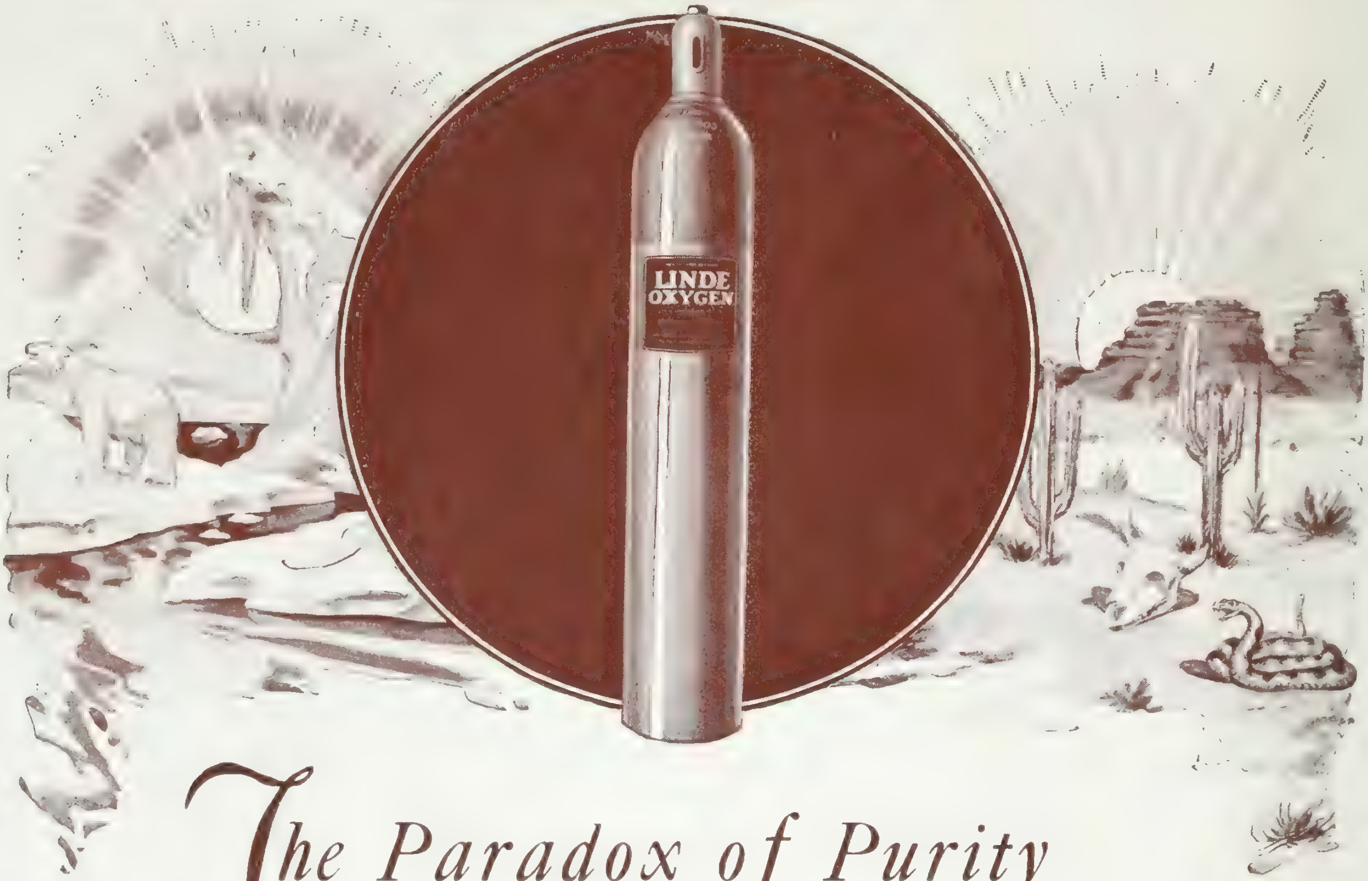
Pacific Marine Review



Standard Oil Co's Tank Motor Ship,
Built By The Union Construction Co.

December
1920

Pacific Marine Review, Vol. 17, No. 12. Published monthly at San Francisco. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. $3.00 a year.



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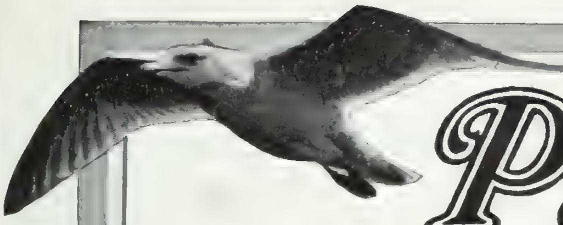

Pacific Marine Review

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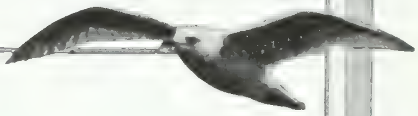

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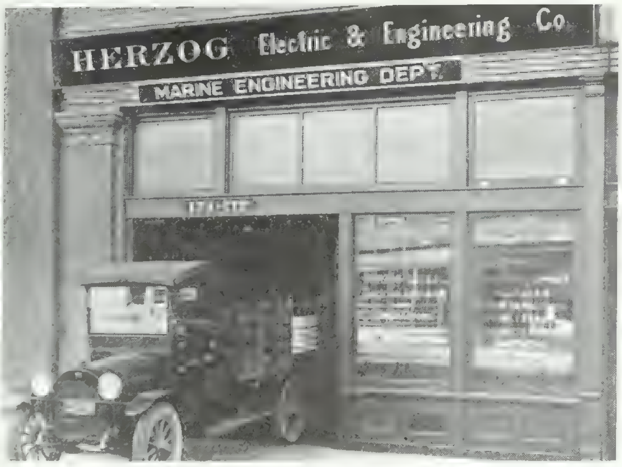

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174 STEUART ST.
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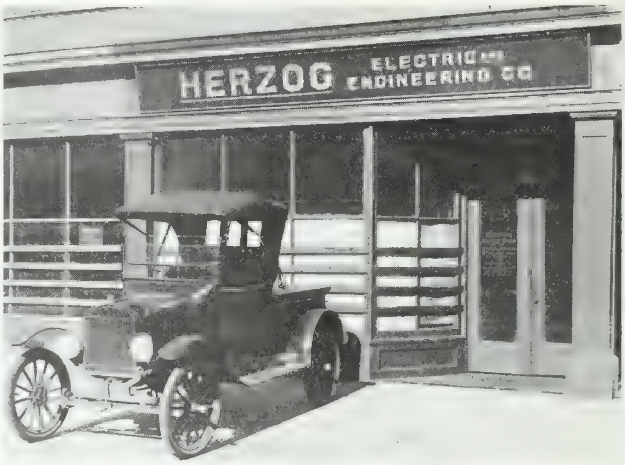
Foremen: Herman Haubold—M. McKenna



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V. Aharonian, Foreman

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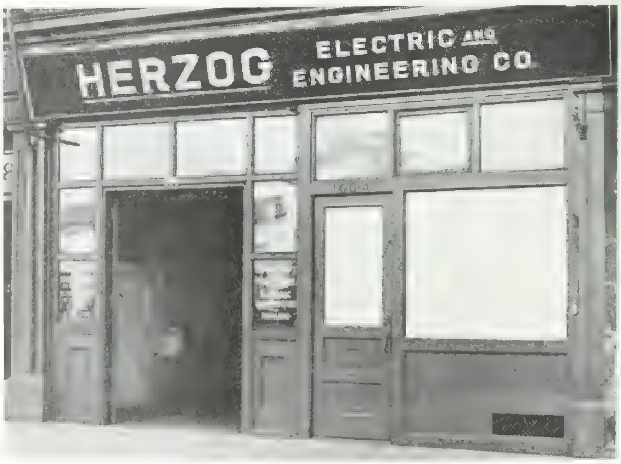
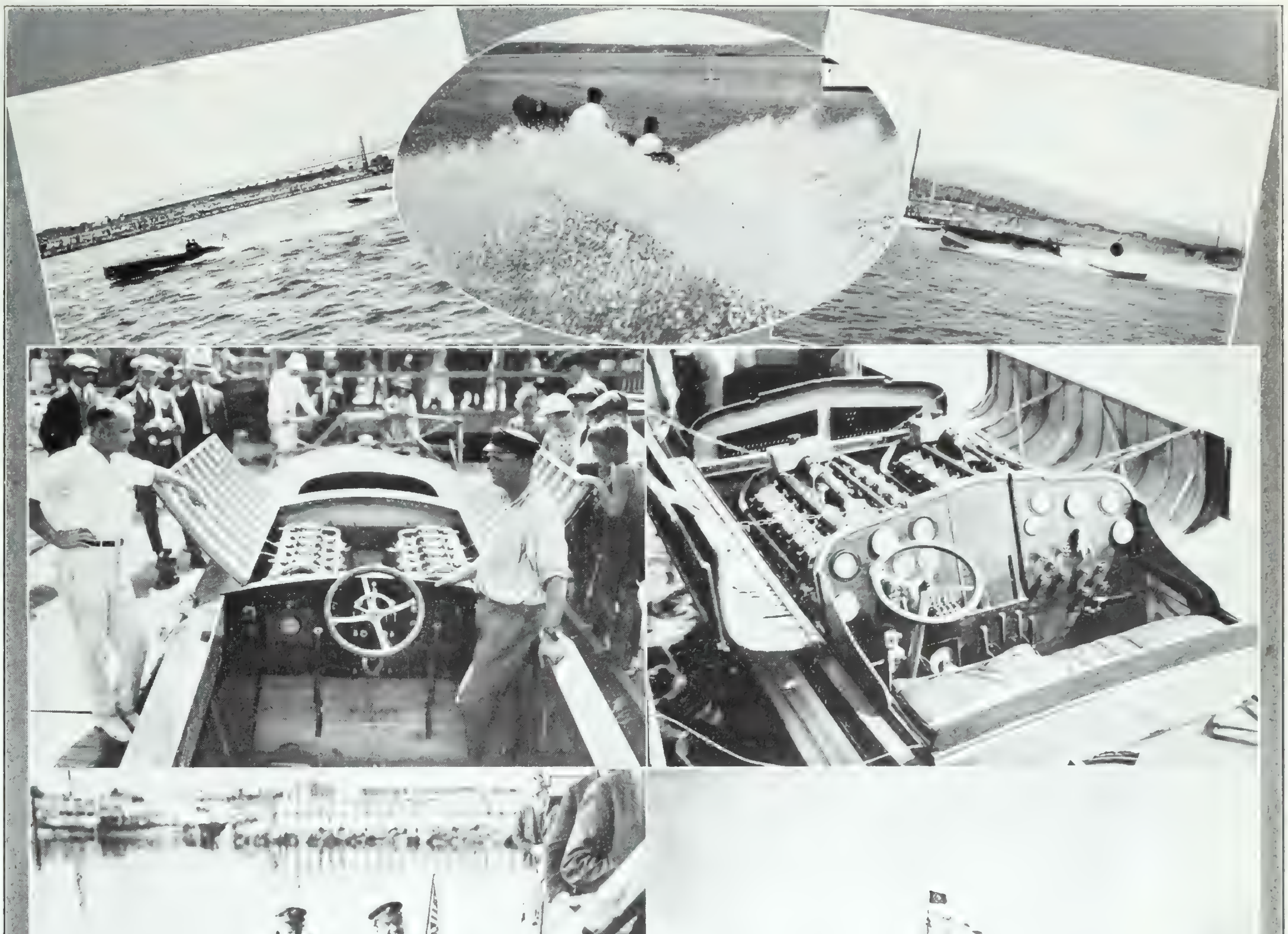
169 STEUART ST.
A. M. Hanson, In Charge
Roy Condrott, Assistant



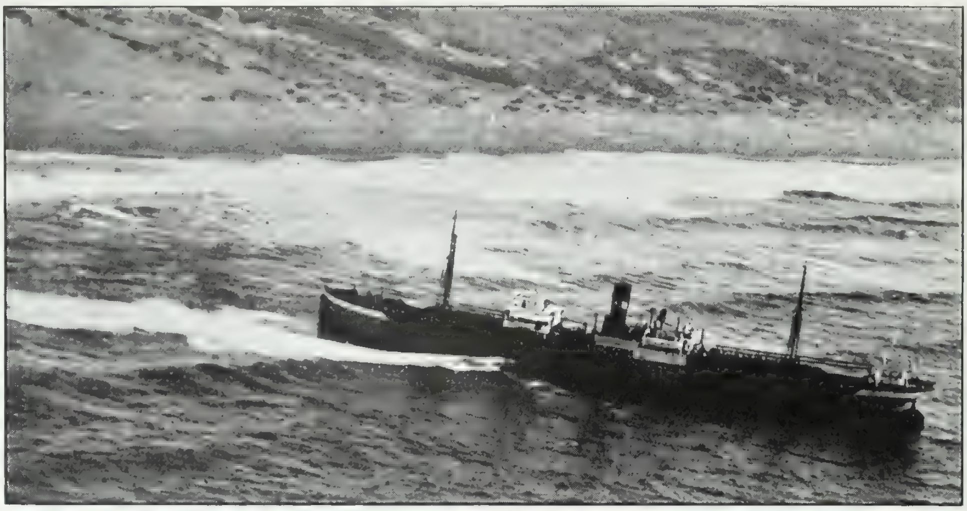
EAST STREET ENTRANCE TO SUPPLY DEPARTMENT
166 EAST ST.
This entrance was provided to facilitate delivery of supplies

MOTORBOATING AROUND LOS ANGELES



Upper Row, Left to Right—Eleda leading Fellows III; the wake of a fast express cruiser; Mystery V going some. Second Row—Wilson Brothers and power plant of the Hurrican; power plant of the Mystery V. Third Row—Dustin Farnum and Harry Vorhaner in the Eleda; the Ranger, pet cruiser of Commodore J. W. Jump of the Los Angeles Motorboat Club. Lower Row—Rainbow III on the jump; the Eleda shrouded in spray; Tai-kun towing surf board.

Mr. Shipyard Manager—
Is this possible in your plant?



Aeroplane View of Dutch Steamer Arakan Ashore North of Point Reyes, California Coast

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MOTOR BOAT BOOM

Great Impetus Given to Popular Sport in Southern California

By W. C. SAWYER

THE awakening of interest in yachting about Los Angeles during the past season has given her a leading place among Pacific Coast cities. All of the yacht clubs have been progressing. The Newport Harbor Yacht Club was the result of the foresight of Dr. Albert Soiland. Few people would have guessed the remarkable growth that the past two seasons have brought the young organizations. Last winter a new clubhouse was formally opened after being beautifully furnished. Now the membership roll has reached the limit of three hundred and there are several on the waiting list. During the past season the fleet has been enlarged by the addition of John Bowers' schooner Uncas from New York, Dr. Soiland's schooner Viking IV, formerly the Clarinda of San Francisco and now jointly owned by the doctor and Shirley Meserve. Ed Burge brought from the Thousand Islands the 110-foot steam yacht Louise and from Seattle the 76-foot cabin cruiser Maud F. He has also acquired two launches. Two or more other cruisers, twelve sloops and a large ketch have been or are soon to be added to the fleet from San Diego and the north. We show a picture of the Tai Kun, C. W. Leffingwell's new runabout. With her sister, the Sho Gun, both designed and built by H. W. Worcester, a Los Angeles broker, we have unusually good examples of amateur craftsmanship. They are 21 feet by 5, powered with Port Huron motors. The club has just held an opening of its winter season.

The Los Angeles Motor Boat Club, which has staged perhaps the most important motor boat event in Southern California waters, is greatly in debt for the valuable services of Commodore J. W. Jump, who has held the office for no one knows how long. We are showing a picture of his pet cruiser Ranger, upon which he lives during the game fishing season. From this boat he has broken three world's records for taking tuna and marlin sword fish on light tackle. Keith Spaulding, son of Albert, the famous sporting goods manufacturer, brought out by rail from the Great Lakes a 53-foot cabin cruiser, especially fitted for fishing. He and his wife have made remarkable catches of tuna and marlins on standard tackle, his wife making the season's record and the world's record for a woman. Their fishing was also noted for the large number of catches in a single day. E. A. Featherstone had built for him, by Cookson & Gallahan, a fine 74-foot cabin cruiser. A. M. Andrews has recently brought from New York a fine large ketch. Some smaller cruisers and two speed boats, winning second and first place, which were built especially for the Nordlinger race, are proudly welcomed as a part of the Motor Boat Club fleet.

The Hurricane at Balboa September 20

The old South Coast Yacht Club, first organized in Southern California and now known as the Los Angeles Yacht Club, has also been thriving under the able direction of Commodore Hubert T. Morrow. This fleet has been growing as well as the others. Vice-Commodore Walter M. Brown early in the season put into commission his large and finely appointed cabin cruiser Lady Luck. Commodore Morrow rebuilt his yawl Winsome. Churchill purchased John Barneson's popular sloop Genevieve, rerigged her and named her Galliano, and captured the Lipton Cup at San Diego as well as a cartload of other trophies. The little Wasp was also fortunate under the guidance of Paul Jeffers, her owner, and Warren Wood. Ex-Commander Ben Weston and Milton Hesselberger acquired the old Honolulu racer Molli Lou, a yawl. Captain Wilbert Melville brought from Honolulu the famous schooner Hawaii and overhauled and refitted her at great expense. The schooner Henrietta has been brought down from San Francisco. Next summer a big schooner and yawl race to Honolulu is planned.

One event of especial interest this season is the trip of Harry Pidgeon to Honolulu and return in his V-bottomed yawl (his own make). She is a little over 27 feet on the water line.

He made the trip over alone, leaving Los Angeles on June 4 and arriving at his destination on the 13th. He went by a direct route, being to sail the course at all times. For the return trip he found a mate, Earl Brooks. The return trip started September 23 and no wind aft of the beam was encountered. They sailed twelve degrees north of his former course to get out of the trades. After a somewhat tedious trip they reached Los Angeles on the evening of November 6.

We should not fail to mention here that two years' cruise about to be undertaken by Dr. E. A. Salisbury in the Wisdom II, formerly the ketch Anemone. He will sail around the world. It is unfortunate he will not be here for the Honolulu race.

We must now hasten to take up the real subject about which we started out to write—the big motor boat races held about Los Angeles this fall. One has followed another so rapidly that a record was no sooner made than broken. Since several boats competed in all the four events, it will simplify matters to mention some of their details together.

Miss Los Angeles is a 28-foot by 6-foot, Hacker-built, V-bottom displacement boat, powered with a 6-cylinder Hall Scott marine motor, the cylinders being 5 inches in diameter and having a 7-inch stroke. She won last year's Nordlinger race in a close fight with Kenupshau, a Boeing Airplane Company's sea-sled from Seattle. Her average time was about 36 miles per hour in last year's classic. Her power is rated at 200 at 1800 r. p. m. Dustin Farnum is her owner.

Cad-Hill was also a last year's boat, but reversed her luck this time. Last season she dropped out early and this year won third prize. She was designed and built by Joe Fellows of Los Angeles. Her power is an A5A Hall-Scott aviation motor (marine job). She is a 25-foot, V-bottomed displacement boat and owned by Captain George Hill and C. J. Cadwell.

Vogler Boy III, previous Pacific Coast champion, is owned by F. D. and F. W. Vogler of Portland, Oregon. She is a one-step Hacker model hydroplane, 25 feet in length, and is powered with a 250-horsepower Sterling racing engine. There are eight cylinders, 5¾-inch diameter and 6¾-inch stroke.

Hurricane was built this season for W. W. Paden by Wilson Brothers Commercial Company of Balboa, California. She is a 35-foot, Hacker model, V-bottom displacement boat, powered with twin Hall-Scott L. M. 6-cylinder motors 5 by 7. She is one of the finest boats of her type yet built in Los Angeles.

Rainbow III is another locally built and designed boat, owned by Arthur

Powel. Her length is 20 feet and her beams 7. The power is a Hall-Scott aviation motor type A5A, 190 horsepower. There are six cylinders, 5¼ by 7 inches.

Mystery V was built last season by Frank Garbutt, but was not ready to enter the Nordinger race. Her power was then two Hall-Scott motors. This season she was refitted with two Liberty motors. She is 26 feet over-all and is of modified V-bottom displacement type, having round bilge. She had two Hyde propellers, 17 by 28 inches.

Fellows 4 was designed and built this season by Joe Fellows. She is 26 feet by 6 feet 4 inches, driven by a 6-cylinder G. R. Sterling motor, developing 225 horsepower at 1600 r. p. m.

Eleda was built this season for Dustin Farnum, the moving picture star, especially to win the Nordlinger trophy. He now has two legs on it and will doubtless go strong to get it for keeps next year. The boat is a Hacker-built, V-bottomned displacement type, 30 feet in length. She is powered with a Smith Liberty motor of the same type used in Miss America and Miss Detroit. The engine has eight cylinders and is rated at 400 horsepower.

Miss Los Angeles II is a Smith model hydroplane 18 feet 9 inches in length, powered with the 6-cylinder 100-horsepower Sterling.

Among the prominent figures in the motor boat racing game, Joe Fellows stands out prominently. He is always ready to help and boost, always willing to enter, whether he has a chance or not, often succeeding on consistency, endurance and skillful handling against faster competitors. The game had been his one hobby until the mountains have of late begun calling him. His boy Richard, called "Rusty" by his intimate friends, began to act as his father's mechanician or assistant in big races at the tender age of ten, probably the youngest motor boat racer in the world. His father states that he is the best helper he ever had.

Frank A. Garbutt has been another enthusiast. He originated the sixty-mile around Catalina Island and back race and donated the trophy. He has been very successful in arranging mysteries to defend his title to the prize.

The arrival of Dustin Farnum added new pep to the game and his popularity knows no bounds.

E. R. Abbott, secretary of the Los Angeles Motor Boat Club, has doubtless done more hard, efficient work than any other interested party.

Labor Day Race

The Labor Day race at Balboa for the E. J. Louis perpetual trophy was run in three twelve-mile heats back and forth over a two-mile straight course in the broad ocean along the beach from Balboa pier to the Newport pier. There were three laps to a heat. Three boats entered, but the little Rainbow III was not quite strong enough for the seas encountered and retired after the first lap with a leak in her bottom, thus leaving the race to Hurricane and Miss Los Angeles. Hurricane took three straight heats from last year's champion at an average speed of 36.85 miles per hour, but Miss Los Angeles made the fastest heat at a speed of forty miles per hour, four miles faster than her last year's average in the Nordinger. The Newport Harbor Yacht Club is responsible for this race.

The next event was the Hal Roach mile trial race, in which Frank A. Garbutt broke the world's displacement boat record set by Miss Nassau some time before.

The boats ran one at a time over a measured mile in still water and were allowed three trials if they so desired, the fastest counting. Hal Roach, a popular young moving picture producer, originated the race and donated a very beautiful trophy. The timers were in the middle of the course and signal flags were lowered at each end of the course. The time is as follows:

Vogler Boy III—First heat, 1 minute 17-2/5 seconds; second heat, 2 minutes 25 seconds, broken rocker pin.

Hurricane—First heat, 1 minute 24-4/5 seconds; second heat, 1 minute 25-2/5 seconds.

Rainbow III—First heat, 1 minute 24 seconds; second heat, 1 minute 24-2/5 seconds; third heat, one minute 19-2/5 seconds, different propeller.

Miss Los Angeles II—Second heat, 1 minute 57 seconds.

Fellows 4—First heat, 1 minute 34 seconds; second heat, 1 minute 32-1/5 seconds.

Cad-Hill—First heat, one minute 31 seconds.

Mystery V—Second heat, 1 minute 9 seconds, four people in boat.

Fastest speed—Mystery V, 52.3 miles per hour.

On October 9 three speed boats went after the Garbutt trophy. The destroyer Parrot had been ordered by the United States government to make all speed possible around the course with the boats. The water was very smooth. No boat missed a shot in the sixty-mile endurance test, starting from the breakwater light at San Pedro, to and around Catalina Island and return. The time is as follows and Garbutt keeps his bronze another year:

Mystery V (five people)—1 hour 48 minutes.

Hurricane — 1 hour 48 minutes 6 seconds.

Fellows 4—1 hour 58 minutes 5 seconds.

Parrot—2 hours 19 minutes.

This race is under the auspices of the Los Angeles Yacht Club and is considered one of the big races of the world. It is free for all. The distance is in nautical miles.

The Nordlinger race, the final event of the season, occurred on October 23 and 24.

The weather was favorable, but the harbor seemed never so full of driftwood. All but three of the eight entries were destined to drop out, thanks in most cases to the wood. The winner ran amuck soon after the finish and bent her propeller. The race would have proved intensely exciting had all the boats stayed in. This would have been especially the case had Mystery V been able to fight it through with Eleda.

Rainbow III made a wonderful and most spectacular fight. Every little while a wave sent her on a leap entirely out of the water except her wheel. Her proper name should be Flying Fish. It was a shame that after enduring such punishment almost to the finish, a miserable direlect should break her strut and so badly bend her propeller that she turned a complete circle. This occurred in the third lap of the third heat. The race between Fellows 4 and Cad-Hill was exceptionally close, the latter being ahead much of the time. It will be noticed that Cad-Hill beat or tied ten of the twenty-four laps.

In the first heat Farnum was 48 seconds behind the gun and Garbutt 3. Farnum's elapsed time was 31 minutes 27 seconds.

Farnum's boat was late at the start each heat and his average speed, based on elapsed time, was 42.55 miles per hour. The popularity of the winner was attested by the tooting of whistles and general commotion whenever he gained an advantage and at the finish.

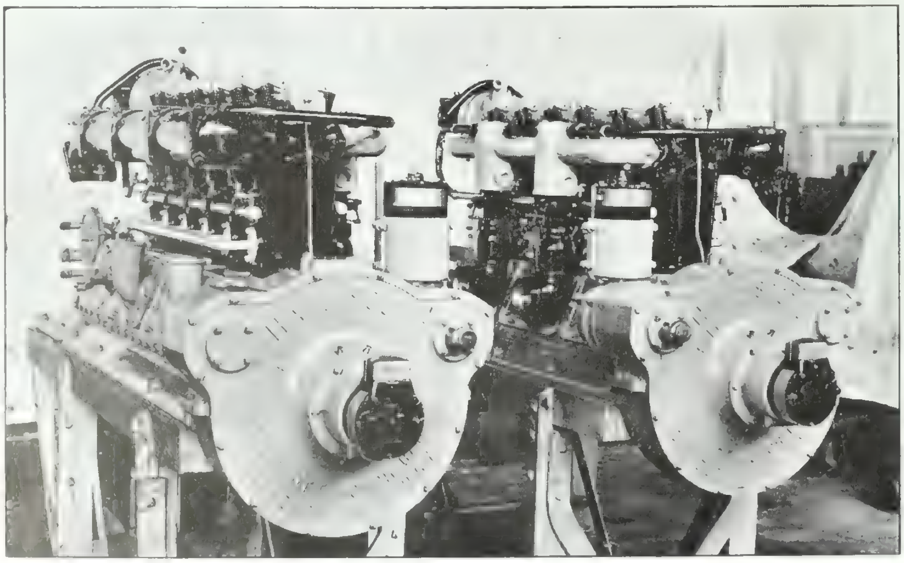
The officials were as follows: Commodore J. W. Jump, Vice-Commodore Dustin Farnum, Rear-Commodore R. R. Thomas.

Regatta committee: Harry P. Hubbard, chairman; Ray Thomas, E. R. Abbott.

Timers, first heat: R. R. Thomas, Davis E. Bradly, J. T. Dickson. Checkers: E. R. Abbott, Charles F. Turner.

Timers, second and third heat: R. R. Thomas, R. C. Davis, J. T. Dickson. Checkers: E. R. Abbott, L. Barclay.

The race is held under the aucpices of the Los Angeles Motor Boat Club. Never had there been so many boats present with spectators and the shore was black with people.



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ISLAND WRECKS VIII

By ANDREW FARRELL

THAT mythical archipelago which lured the Hornet's boat to the west, after it had failed to make Clarion Island, reappears in the narrative of the American ship William A. Campbell, lost at sea in 1892. Evidently the archipelagoes were the same, although the charts of the Hornet gave the position as longitude 133:30 west and latitude 17 north, whereas those of the Campbell showed the longitude as 127 to 129 west and the latitude as 17 north. There is precise agreement as to the latitude; only the longitude differs four to six degrees; but what are four or six degrees on the map? Even on a large-scale Mercator's projection, less than an inch.

On August 5, 1892, the William A. Campbell sailed from Port Townsend for Queenstown. From Puget Sound to the latitude of the northeast trades she had good weather; but no trades were met; on the contrary, light north and northwest winds alternated with calms. This state continued for several days, until, at 7 o'clock in the evening of August 25, a good breeze sprang up in the northeast. Both Captain Havener and the mate thought that the trades finally had begun to blow, and when they left the deck at midnight all was well.

Struck by Hurricane

Whether this wind was a breath of trade or no, all was not well with the William A. Campbell. At 3:30 o'clock in the morning of August 26, the crew was awakened by the flapping of the sails. The vessel, then standing south-southeast, was taken aback by the lee. With great violence she was struck by a hurricane out of the west, in longitude 120 west, latitude 14 north, or approximately the same position as the Shelehoff had been overwhelmed twenty-one years before. Scarcely less sudden and complete was the disaster to the William A. Campbell.

An effort to shorten sail was useless, because the canvas was blown away as the sheets were started; and even the masts began to go. By 5 o'clock in the morning the ship was beaten upon by the full force of the tempest, at that time blowing from the southwest. The crew tried to cut away the foremast, so as to get the ship before the wind, but failed because of the floods of water that swept the deck. Within the next three hours the ship was battered to an amazing degree. First the mizzenmast, and then the maintopmast, went by the board. The crew attempted to cut away the mainmast, and failed; the forward house was torn off; great seas, sweeping the vessel, burst open the doors of the cabin and wheel-house; five tanks of fresh water on deck were carried overboard; all tanks in the hold were split and the contents lost; the ship filled; and the decks began to split open.

Captain's Boat Lost

At noon the storm abated and the sea began to subside. Two boats were lowered and well provisioned with food but with no water except what had remained in the donkey engine. In one boat went Captain Havener, his wife and child and eleven seamen; and in the other boat the first mate and ten men. After setting fire to the wreck to prevent its becoming a derelict, the two boats, on August 27, sailed for Hawaii.

On the second day out the boat of the first mate left that of the captain because "we couldn't help him and our boat was faster." That was the last ever seen of Captain Havener, Mrs. Havener, the infant and eleven sailors.

At the beginning of the voyage each man of the mate's crew had one-half tin of water and three biscuits a day; in the morning some canned meat, and sometimes in the evening one tin of fruit to be divided among all. On the eighth or tenth day (as usual, accounts differ in particulars), the water was exhausted, and each man was given a half-can of beer or wine. On the twentieth day all liquids were exhausted, and the thirst of the crew became well-nigh intolerable. On September 20, 1892, twenty-four days out, the boat arrived at Kauhane, Puna, Hawaii, with two men suffering from severe scurvy, two from mild scurvy, most from boils and blisters and all from badly swollen feet.

Perhaps a Mirage

Of the mythical group of islands in longitude 127 to 129 west and latitude 17 north, the mate had this to report: After sailing away from Captain Havener's boat, he headed for the archipelago, which was much closer than Hawaii, and was helped on his way by fine weather and fair winds. In longitude 127 there were "indications of land"—just what is not told in the narrative; at that time, however, no land was sighted. One evening about sunset land did appear, "but it was so doubtful that we kept on our course."

It is difficult to give much credence to these statements: at first, there are "indications," but no land; then some island (probably altogether imaginary) breaks the horizon, and land is reported as "sighted," yet so "doubtful" that the boat, though in mid-ocean, does not even attempt to go near. All this is worth little or no serious consideration; and yet one may reason too hastily from insufficient evidence; perhaps the story as we have it is incomplete. A vessel is lost, let us say, in a given longitude and latitude on a reef or rock; when the wreck is reported a survey vessel searches the position carefully, and utterly fails to find any trace of land. One is forced to conclude that the position as ascertained by the lost vessel was in error; but that is no reason for casting out the indubitable fact of the disaster itself. Certainly, until the South Seas have been surveyed and charted, as eventually they must be, it is the part of wisdom to reserve an open mind for stories such as these. In them may be a grain of truth.

Stupidity at Sea

On January 16, 1893, the Hawaiian bark Lady Lampson, bound from Sydney to Honolulu with coal, while under all sail, in heavy weather and rough seas, with two men as lookouts in the fore-royal-yard, struck an outlying reef of Palmyra Island. Her keel was torn off completely by the teeth of the coral and she filled within a few minutes.

Two boats were manned, the first in charge of Captain J. Peterson, with whom were his wife and five members of the crew; and the second in charge of the first mate, who had with him four men. They departed from the wreck at 7 o'clock in the evening, an hour and one-half after the vessel had struck, the mate's boat in tow of the captain's. Expecting to arrive at Palmyra, about forty miles distant, within a few hours, the crews took only six gallons of water, twenty pounds of ship's bread and six tins of meats. But something protects the stupid against their own stupidity.

A Mate Gets Hungry

Once in the open sea, the boats met a stiff gale, which bore them away from Palmyra; and both craft constantly shipped water, spoiling the bread. For several days this blow lasted; during three or four days there was nothing to eat, and the water supply, at length, gave out. By this time, however, the storm had subsided. But no man in the boats knew where they were. The twelve drifted and starved and thirsted. Though driven half-mad, the men showed no signs of dangerous discontent, except the second mate, who was in the captain's boat. He might have been insane. First he attacked the fourteen-year-old cabin-boy, probably because the lad was the youngest and tenderest, and followed this with the statement, somewhat disquieting to the youngster, that food of some sort must be found. His dull shipmates not immediately seizing this suggestion, he proposed that lots be drawn to determine who should be killed and eaten. A prompt and firm veto met this advance. The mate then turned upon Mrs. Peterson and with great gusto related to her some of his adventures on the high seas, among which was the murder of the captain of the brig G. L. Bowen off the coast of South America.

For more than a week the boat drifted aimlessly. On the morning of the ninth day a large object hove in view; it was the wreck of the Lady Lampson, to which they had returned in their blind wanderings. To pass over the heavily-breaking reef threatened destruction, but death certainly sat in the boats; and at length, after several attempts had been made, a great roller carried the craft into calm water.

Display Better Judgment

On the ship the crew obtained plenty of food and drink and busied themselves in repairing the boats and making new sails. And now each boat was supplied with nautical instruments (apparently this had not been done before); and large supplies of water and provisions were taken. There was little enough time to spare, for the Lady Lampson was going to pieces rapidly.

Again in the open sea, the boats headed for Honolulu. For two days they remained together; then the first mate's boat disappeared, to be picked up by a vessel bound for San Francisco. For fourteen days the crew of the captain's boat, sleepless, benumbed by cold and lack of exercise, soaked by rains, held their course to Hawaii. During the entire voyage Captain Peterson quit the tiller only for an hour or two at a time, and then only when he was falling to sleep. On the morning of the fourteenth day Hawaii was sighted, but could not be made because of contrary winds; on the next day Maui hove in view; and at noon of the seventeenth day the boat picked up Diamond Head.

Drifts 82 Days

Eighty-two days from Tahiti, the schooner Tetautua drifted into Hookena, Hawaii, May 21, 1898. She had sailed from Tahiti for Penrhyn Island, but, a short time after her departure, a terrific storm broke, before which she was driven for several hours. In this gale the compass was lost, and the crew, unable to navigate the small vessel, insufficiently supplied for a voyage of any length, decided merely to go with wind and tide. The amazing fact is that the schooner is not drifting yet.

For forty-two days the crew had no water except what could be caught in sails, and at times suffered severely from thirst. Three days before the schooner made land, however, there had been a rain, and three gallons of water remained from what was caught then. Of food, including rice, there remained an abundance, but the firewood for cooking had been exhausted. There were eight Tahitians aboard the Tetautua when she arrived at Honolulu, and one Frenchman had quit her at Hookena and preceded her to Honolulu; the whole number of the crew is uncertain, however, and details are unsatisfactory and incomplete.

To attempt to compare this drifting with that of the Shelehoff is rather absurd, because the tale of the Tetauta is too vague, and in some noteworthy instances her case was far different: she was not waterlogged; there was food in plenty and (although this is mere speculation) she may have caught much more rain-water than did the Shelehoff. But in one large particular the two voyages lie at opposite poles: the crew and passengers of the Shelehoff were Caucasian; a majority, at least, of those on the Tetauta were Polynesian. A trifling difference, one might think, but it is by no means trifling, for the Polynesian can endure the physical and mental strain of privations such as these when the Caucasian gives way to madness.

How the Polynesians Spread

This long drifting of the Tetautua naturally enough suggests the means by which the islands of the Pacific were populated centuries ago by the different racial stocks, by straight-haired Polynesians of Malay blood, by woolly negroids who founded the Melanesian race, and by other more obscure families that have blended with the larger breeds in variety well-nigh endless. To nothing other than the mere chance of wind and wave, which bore his outrigger canoes hither and thither across strange waters, can the native owe his wide-spread lands.

We can conceive of the parent stocks of Polynesian and Melanesian creeping from island to island of the Malay archipelago and on to New Guinea; but here, or hereabouts, there is a pause; New Zealand lies across a wide stretch of sea; the Marquesas and Paumotus are more remote; and in the far Pacific Easter Island sits alone. The voyages of exploration and colonization, therefore, were accidental and involuntary. Most of the unwilling crews of the outrigger canoes doubtless perished at sea; from the few survivors, we may assume, have sprung the inhabitants of the countless islands.

Savaii or Hawaii

Precisely by what routes the Polynesian and Melanesian and their Micronesian grandchildren journeyed must remain pure speculation, despite the existence of Maori and Hawaiian and other Polynesian myths that assign definite localities as the birthplaces of their peoples; even today no one knows surely whether the original word-form be Savaii or Hawaii; we are uncertain, Stevenson to the contrary notwithstanding, whether the change from T to K be the "disease" of Polynesian languages, whether, that is, the Hawaiian K or the Southern Polynesian T be the healthier consonant; even today practical-minded men are unable to explain to their own satisfaction how the outrigger canoes of those ancient sailors, designed primarily for running with a free sheet, ill adapted for sailing closely into the wind, could have made headway against the northeast and southeast trades. The "brave west winds," often of hurricane violence, aided by currents setting to the east, might have carried those early travelers a long way toward America, whence they spread again to the west before the equatorial current and the trades of the tropics.

The Good Feel of Land

However all this may be, few of us would be disposed to credit the Polynesian with any extensive wanderings after chance had cast him upon his ultimate archipelagoes. The good feel of land under his feet, we believe, would have kept him close to his coral reefs and cloud-wreathed mountains. Yet a curious document exists to indicate that the native did sail to and fro in the Pacific; that he made long voyages, across the equator, and, what is more to the point, that he returned from these wanderings to tell his fellows what was the appearance of the heavens in those remote waters; to describe the final setting of the Pole Star and the rising of new constellations in the South. This document in question is of relatively recent date, having been published by the Nupepa Kuokoa of Honolulu, August 5, 1865, and translated byW. D. Alexander from that Hawaiian version; but it is credited to a far earlier time, as witness the title: "Instructions in Ancient Hawaiian Astronomy, as Taught by Kaneakahoowaha, One of the Counsellors of Kamehameha I, According to S. M. Kamakau." Kamehameha I reigned in the closing years of the eighteenth century and the opening of the nineteenth; quite a time, it is true, after the appearance of the white men beginning with Captain Cook in 1778, so that perhaps the "Instructions" reflect knowledge gained through the Caucasian. Besides, much may have been added, innocently enough, before the Kuokoa set down the "Instructions" in black and white. At any rate, as a human document, the translation of Mr. Alexander is a curious thing, regardless of whether it correctly portrays the astronomical and navigational knowledge of the primitive Hawaiian.

Instructions in Ancient Hawaiian Astronomy, as Taught by Kaneakahoowaha, One of the Counsellors of Kamehameha I, According to S. M. Kamakau.

(Translated from the Nupepa Kuokoa of August 5, 1865, by W. D. Alexander.)

Take the lower part of a gourd or hula drum (hokeo), rounded as a wheel, on which several lines are to be marked (burned in), as described hereafter. These lines are to be called Na alanui o na hoku hookela (the highways of the navigation stars), which stars are also called Na hoku ai-aina (the stars which rule the land). Stars lying outside of these three lines are called Na hoku o ka lewa; i. e., foreign, strange or outside stars.

The first line is drawn from the Hoku paa (North Star), to the most southerly of Newe (Southern Cross?). The portion to the right or east of this line is called Ke alaula a Kane (the dawning, or the bright road of Kane); and that to the left or west is called Ke alanui maaweula a Kanaloa (the much-traveled highway of Kanaloa).

Lines for the Solstice

Then three lines are drawn east and west (latitudinally); one across the northern section, indicates the northern limit of the sun, about the fifteenth and sixteenth days of the month Kaulua, and is called Ke alanui polohiwa a Kane (the black shining road of Kane). The line across the southern section indicates the southern limit of the sun, about the fifteenth and sixteenth days of the month Hilinama, and is called Ke alanui polohiwa a Kanaloa (the black shining road of Kanaloa). The line exactly in the middle of the sphere (the drum, the Lolo), is called Ke alanui a ke Kuukuu (the road of the Spider), and also Ke alanui i ka Piko o Wakea (the road to the navel of Wakea).

Between these lines are the fixed stars Na hoku-paa o ka aina. On the sides are the stars by which one navigates. The teacher will mark the position of all these stars on the gourd. Then he will point out to his scholars the situation of Humu (Altair), Keoe (Vega?), Nuuanu, Kapea, Kokoiki, Puwepa, Na Kao (Orion), Na Lalani o Pililua, Mananalo, Peloahilani, Huihui (the Pleiades), Makalii (the Twins), Ka Hoku Hookelewaa (Sirius) Na Hiku (the Dipper), and the planets, hoku hele, Kaawela (Jupiter), Hokuloa (Venus), Hokuula (Mars), Holoholopinaau (Saturn), Ukali (Mercury), etc.

The Dark-bright Sections

During the nights from Kaloa to Mauli (the dark nights of the moon), are the best times for observation. Spread out a mat, lie down with your face upward, and contemplate the dark-bright sections of Kane and Kanaloa, and the navigating stars contained within them.

If you sail for the Kahiki groups, you will discover new constellations and strange stars over the deep ocean, hoku i ka lewa a me ka lepo.

When you arrive at the Piko o Wakea (equator), you will lose sight of the Hoku-paa (North Star); and then Newe will be the southern guiding star, and the constellation of Humu will stand as a guide above you,Koa alakai maluna.

You will also study the regulations of the ocean, the movements of the tides, floods, ebbs and eddies, the art of righting upset canoes, ke kamaihulipu, and learn to swim from one island to another. All this knowledge contemplate frequently, and remember it by heart, so that it may be useful to you on the rough, the dark and unfriendly ocean.

LIMITATION OF LIABILITY

In Its Relation to Marine Insurance

By HAROLD M. SAWYER

FOR the purpose of encouraging investment in ships and fostering the growth of a merchant marine, nearly every maritime country has adopted legislation to limit the liability of ship owners for damage to property and persons. Such statutes are, however, usually operative only in cases where the damage occurs without the privity or knowledge of the owner. In practical effect this means that the owner may limit his liability only when he has used due diligence to make his ship seaworthy and has exercised reasonable care in the selection of competent officers and crew. Once these requirements have been met the owner's liability for subsequent damage may be limited in accordance with the provisions of the pertinent statute.

In England (1) the liability is limited to eight pounds per net registered ton in case of property, and to fifteen pounds in case of loss of life. In the United States (2) liability can never exceed in any case the value of the owner's interest in the vessel and pending freight, to be determined upon the completion or prior breaking up of the voyage.

A recent case (3) arising out of the sinking of a steamer in the Mississippi River presents an interesting question relating to the determination of the value of the owner's interest. The sinking was the result of negligent navigation and led to loss of life. Anticipating that an attempt would be made to hold them liable for the damage, the owners, pursuant to the statutes, instituted a proceeding in admiralty to limit their liability to the value of their interest in the steamer and her pending freight. In accordance with the statutory procedure they surrendered the wreck and all pending freight to a trustee for the purpose of creating a fund and relieving themselves of all liability in excess of the amount thereof. It was apparent that the value of the wreck and of the pending freight would be merely nominal as compared with the total amount of the damage claims, and that the pro rata distribution of the fund would leave the claimants with heavy losses for which no compensation could be recovered. At the same time it appeared that the owners had been paid a considerable amount of insurance by the underwriters, and it was contended that the liability should not be limited to the fund unless the insurance payments were also surrendered to the trustee.

This contention was rejected by the District Court, but Judge Haris remarked that his decision was based entirely upon the authority of an old case in the United States Supreme Court which he felt it his duty to follow, although "taking leave to doubt both its logic and conclusion." The rule followed so reluctantly by Judge Faris limits the recovery of damage, however great, to the value of a wreck which may be merely nominal, notwithstanding the owner has been paid approximately the full value of the ship by the underwriters.

Bearing in mind that the purpose of the limitation statutes is to relieve the owner of liability in excess of his investment in the vessel plus pending freight, it would seem to follow that the owner should at least be answerable to the full extent of such investment; or, in case it is impaired or even entirely destroyed, insurance, if any, should stand in its place. It is not strange, therefore, that Judge Faris should be reluctant to follow the contrary rule laid down by the Supreme Court, nor that he should question the logic and conclusion of the case by which he felt bound.

While we do not entirely agree with all of the conclusions reached by Harold M. Saywer in this article, we feel that here is a disputed point in American Admiralty practice to which it is well to direct the attention of ship operators and owners. We invite a thorough discussion of this point and hope that many of our shipowning friends will see fit to state fully their side of the case.

The original case in the Supreme Court was one of three argued at October term in 1885 and decided May 10, 1886. In each case the problem involved was the determination of the extent to which the owners might limit their liability, the gross amount of which had already been judicially ascertained.

In **The City of Norwich** (4) the gross liability of the owners was fixed at approximately $150,000 and, although the ship itself was a wreck valued at $2500, the owners had been paid nearly $50,000 by the underwriters. In **The Scotland** (5) the total damages were assessed at upwards of $250,000. The ship itself sank and the value of the strippings was less than $5000, but the underwriters paid the owners nearly $300,000. In **The Great Western** (6) the damage was about $7000, but the ship became a total wreck worth less than $2000, although insurance was paid amounting to $170,000.

In all these cases the damage claimants contended that "the amount or value of the interest of the owner in the vessel" included not only the value of the wreck but also the insurance, but in each case the contention was rejected. The result was that the owner's liability was limited to the value of the wreck, and upon payment of the amount thereof into court all claims for damage were extinguished. These decisions not only relieved the owners from all but nominal liability but put the full value of their ships into their hands in the form of insurance and beyond the reach of injured parties. Thus a statute which was presumably intended to subject the whole investment to the satisfaction of damage claims, was construed to accomplish precisely the opposite result.

It is worthy of note that these decisions were the result of pure construction. The statute said nothing at all about insurance in so many words. It was left for the court to determine whether or not Congress, in fixing the value of the owner's interest in the vessel as the maximum limit of his liability, intended to include insurance as a part of such interest.

Yet even though the intent was not clearly expressed, the circumstances surrounding the enactment of the statute and connected with these three cases were all such as to justify the adoption of a broad rather than a narrow construction. To begin with the statute was remedial and, like all such statutes, should have been liberally construed. The word "interest" was one of the most comprehensive terms known to the law, and could easily have been held to include not only the physical vessel, but also anything, such as insurance, which represented the value of the vessel in another form. The claimants were the innocent victims of negligence, and the ship owners who had caused the damage had received from the underwriters more than would have been required to pay all claims in full. Yet, in complete disregard of the natural meaning of the words and the broad equities of the case, the court decided that the owners could keep the insurance.

There was a vigorous dissent in each case and in fact each decision depended upon a bare majority of one vote.

The majority opinion proceeded upon the ground that the insurance was collateral to the owner's interest in the vessel and no part thereof, because it was not produced by the vessel, but arose from the payment of a premium. It was also pointed out that the owner was under no duty to insure and hence the insurance was for his own private benefit. Having rested their decision upon the technical character of an insurance contract, the majority then asserted that their view was in harmony with the general maritime law of continental Europe. This law, while recognizing that the damage claimants had a lien upon the ship as long as any plank was left, denied that the lien could be transferred to any substitute for the ship, such as insurance.

The minority opinion expressed the view that the word interest was broad and comprehensive, and not only was a liberal construction necessary to accomplish the purpose of Congress, but that any other construction resulted in granting to the ship owners an exemption from liability far greater than was originally intended.

Since the decision of these cases the question has been regarded as settled. The cases have several times been cited by the Supreme Court with approval, although without any discussion or re-examination of the principles involved. Judge Faris, however, by his criticism, has perhaps re-opened the question, and it is possible that the matter will again be presented to the Supreme Court in the hope that the harsh and unjust rule of the old cases may be ameliorated. There is some reason to believe that the Supreme Court as now constituted may conceivably be induced to reconsider the question upon its merits and independently of the precedent set by the decisions of 1886. Some of the subsequent cases seem to disclose a tendency toward a broader construction of the statute.

For example, an analogous question came before the court in 1897 in the case of O'Brien vs. Miller (7). In that case the owner had received a payment of damages for the loss of his ship by collision, and in a suit by a lien claimant, the owner was not permitted to limit his liability to the value of his sunken ship, but was held liable to the extent of the payment which had been made to him. The court restated the ground upon which the insurance cases of 1886 were decided, and said that there was a difference between insurance and money paid the owner as satisfaction for damage done the ship; the former is the result of a collateral contract which the owner may or may not make as he pleases, but the latter does in fact become a substitute for the ship, and, as such, is liable for anything for which the ship itself would have been liable.

Except upon very narrow and technical grounds it is difficult to distinguish between insurance and the recovery of damage. Both result in indemnifying the owner for loss and neither is collected by the ship as a person but can be recovered only by the owner. The strict construction which resulted in the elimination of insurance as an element of value in 1886 would seem to have justified similar elimination of a claim for damages in 1897. If it be true that the owner might or might not insure his ship at his pleasure, is it not equally true that he might exercise a similar election between enforcing or ignoring a claim for damages? It is intimated in the O'Brien case that the claim for damages is a part of the value of the ship, and that if the owner did not enforce it the damage claimants might. But on the other hand, the claim for damages is just as personal to the owner as his insurance, and if the former is one of the elements involved in a determination of the value of the ship it is difficult to see why the latter should be excluded.

It is perhaps significant that in the nine years which elapsed between the insurance cases of 1886 and the O'Brien case, the personnel of the court had materially changed. Only three of the nine judges who participated in the insurance cases were on the bench when the O'Brien case was decided. One of these three, Judge Field, had concurred in the majority opinion in the insurance cases, and the other two, Judges Harlan and Grey, had dissented with the minority. Even though it may perhaps be going too far to say that the two cases are clearly in conflict with each other, yet the exceedingly narrow construction adopted in 1886 has obviously been broadened by the decision of 1897. The change in personnel may have had something to do with it. At any rate, the O'Brien case is a step on the road to a more liberal construction.

But even though the rule of the insurance cases be too firmly fixed in the decisions to permit of any judicial amelioration, it is not beyond the power of Congress to declare specifically that insurance upon either vessel or freight, or both, shall be deemed a constituent part of the maximum amount to which the owner's liability is limited. The present rule as declared by the Supreme Court is unquestionably severe and inequitable. It is also anomalous, for the more an insured vessel is damaged, the less the owner's liability becomes, and this, too, even though the vessel is herself at fault. Nor can the rule be defended as necessary for the protection of American shipping, for if the suggested changes were to be made the American shipowner would still be under less financial obligation than his English competitor.

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(1) Merchant Shipping Act of 1894, Sec. 503.
(2) R. S. U. S., Secs. 4283-4287 (Comp. St., Secs. 8021-8025).
(3) In re St. Louis & Tennessee River Packet Co., 266 Fed. 919 (Sept. 9, 1920).
(4) The City of Norwich, 118 U. S. 468; 30 L. Ed. 134.
(5) The Scotland, 118 U. S. 507; 30 L. Ed. 153.
(6) The Great Western, 118 U. S. 520; 30 L. Ed. 156.
(7) O'Brien vs. Miller, 168 U. S. 287; 42 L. Ed. 469.

A WHALER DE LUXE

If Conan Doyle and Oliver Lodge have any sure means of communicating with the dead, they might interview some of the old-time New England whalermen on the subject of the Carolyn Frances. Those hardy and venturesome down-Easterners, who lighted the hearthstones of the United States before "earth-oil" drove them from the seas, would have some interesting observations to make regarding this new whaling vessel. They doubtless would gaze with wonder, and then with contempt, as the crews of Columbus would regard the Olympic and Aquitania. "Who couldn't cross the Atlantic in that!" exclaim the fifteenth-century Spaniards; and the New England whalermen echo: "Who couldn't catch whales with that new-fangled tub!"

Under command of Captain L. L. Lane, who, with Rudolph Spreckels and D. C. Jackling, is financially interested in the Western Whaling & Trading Company of San Francisco, the Carolyn Frances departed from San Francisco October 28 for a whaling cruise along the West Coast of Mexico and into the South Seas, and perhaps also to the Arctic. When she sailed she was, if not the "last word" of whalers, at least the last spoken word. Among her new contraptions that would arouse surprise and then contempt in the mind of the whaler of seventy years ago is a device for filling the whale with compressed air, with the double object of killing him and of keeping him afloat until he can be towed alongside the Carolyn Frances. And the crew of this newest whaler, instead of cutting up the mountainous mass of blubber with sharp spades, will turn an electric-driven machine on the carcass. Truly, as some genius remarked last year, the world do move.

Built by Barnes & Tibbitts of Oakland, the Carolyn Frances formerly was used by the Northern Fisheries, Inc., in transporting the catch of the fishing-vessels. Upon being taken over by the Western Whaling & Trading Company the Carolyn Frances was left as a three-masted schooner, but other and striking changes were made. She was equipped with a McIntosh & Seymour Diesel engine, developing 300 shaft horsepower, 390 indicated, at 265 revolutions a minute. (The one thing that ever revolved at the rate of 265 turns a minute for the old whaler was the world, and that only after the first bottle or so of good West Indian rum.) This McIntosh & Seymour Diesel, driven by the same "earth-oil" that threatened to ruin the whaling business in the last century, drives a two-bladed, single-screw propeller, which is not without unusual features.

L. E. Geary of Seattle, impressed with the desirability of reducing the drag of propellers of auxiliary-powered sailing vessels, devised the two-bladed wheels, the first of which was fitted on the schooner Kamchatka. When the engine is not to be used, the shaft is stopped at a marked position that leaves the propeller exactly vertical in the water; in this position, just abaft the deadwood, the blades offer less resistance to the movement of the vessel than results from any other plan, such as throwing out the wheel, and thus leaving it to

Three-masted auxiliary whaling schooner Carolyn Frances

turn more or less freely as the vessel moves forward under sail. This new-fangled two-bladed propeller has a dimeter of 86 and a pitch of 40. Besides being devised with a view to efficiency, the propeller is of heavy construction, and several spare manganese-bronze blades are carried, so that, if the vessel is caught in thin ice, she will be able to batter her way out without disabling herself beyond repair. In this connection, it is interesting to note that the quick, sharp impulse of a motor vessel can break ice that would effectually resist the more elastic push of a steam engine. Should any blades be damaged in this maneuver, the vessel may be beached or tilted for replacement.

Always slung outboard from davits and supported underneath by brackets, are seven 32-foot whale boats, built by Kneass of San Francisco. These boats have beautifully fine lines, which make high speeds possible; all have sails and oars, and three are equipped with 24-horsepower Wisconsin motors, with which a speed of 18 knots can be made. These power-driven boats (to add another novelty) have mufflers so as not to disturb unduly the dreaming whale.

In charge of the boats will be the six mates, a rarely cosmopolitan assembly of whaling men, hand-picked from most of the seas of the world. Under the mates will be crews of young Americans, many of whom are college boys out for the "fun" of the cruise. Although the Carolyn Frances can carry a crew of fifty men, she sailed with thirty or so, to the disappointment of many volunteers, who would have crowded the vessel three or four times over. Those who were fortunate enough to be accepted are living as few whaling crews ever fared, what with metal bunks, electric lights, an excellent galley and other somewhat unusual fittings.

Heavy steel tackle has been fitted to the main and mizzen masts; this tackle, dropping as a bridle, will be connected with the steam donkey engine and used for pulling the whale alongside; this done, a strong platform will be lowered from the starboard side, and from the platform the crew will cut up the whale and load the blubber. On deck is a multiple-knife cutter, driven by a five-horsepower motor, for slicing the fat, which then goes to four bricked-up rendering kettles nearby. When the oil has been rendered it will go into the hold, practically all of which is given over to tanks, or to the additional receptacles on deck.

On her trial run about San Francisco Bay, the Carolyn Frances averaged 8½ knots, having all equipment aboard but no cargo. Her fuel-oil tanks have a capacity of about 400 barrels, sufficient for sixty days' cruising at a speed of 6½ knots on a consumption of about 6½ barrels a day. Her auxiliary machinery consists of two 9-horsepower, 6-kilowatt Skandia Diesel generating sets; a Rix auxiliary air-compressor; a storage battery for lights; motor-driven circulating pumps, and an auxiliary circulating pump on the tail-shaft. Throughout the vessel a naval order prevails: each knife has its rack, in which that knife and no other must go; scrupulous attention was given to details; the harpoons and whale lines, for example, are from New Bedford; all in all, the Carolyn Frances probably is the most completely equipped whaling vessel ever seen on the Pacific Coast, and, for that matter, in the world. She is 160 feet over-all, 140 on the waterline; has a beam of 38 feet; a draft of 13; and her deadweight capacity is about 1000 tons.

Captain Lane's compressed-air device, the most new-fangled of all the contraptions, must not be overlooked. The captain, knowing that Diesel-driven vessels had a superfluity of injection air, decided to make use of it in a curious way. One hundred and fifty cubic feet of air compressed to a pressure of 1000 pounds to the square inch will be run into two steel bottles, from which will lead an armored hose, paralleling the harpoon line. When the harpoon penetrates the whale, the immense pressure of the air, suddenly entering the heavy layers of blubber under the skin, will deal death probably more quickly than the old-style explosive bomb; and the whale, even if not killed instantly, will be transformed into a floating baloon, unable to sound because of his newly-acquired buoyancy. In this manner the death struggles of the wounded animal will be cut short, and the sounding, or diving, always a source of annoyance and possible danger, will be prevented. All this is what Captain Lane hopes to accomplish; details of his success will be awaited with interest.

And the down-East whalermen repeat in chorus: "Who couldn't catch whales with that new-fangled tub!"

A TWO YEARS' YACHTING CRUISE

DR. E. A. SALISBURY has been making long cruises for twenty-five years. He has pictured many hitherto unknown places and added much to scientific knowledge. His present undertaking, a two years' trip around the world, is a little more pretentious than his previous ones.

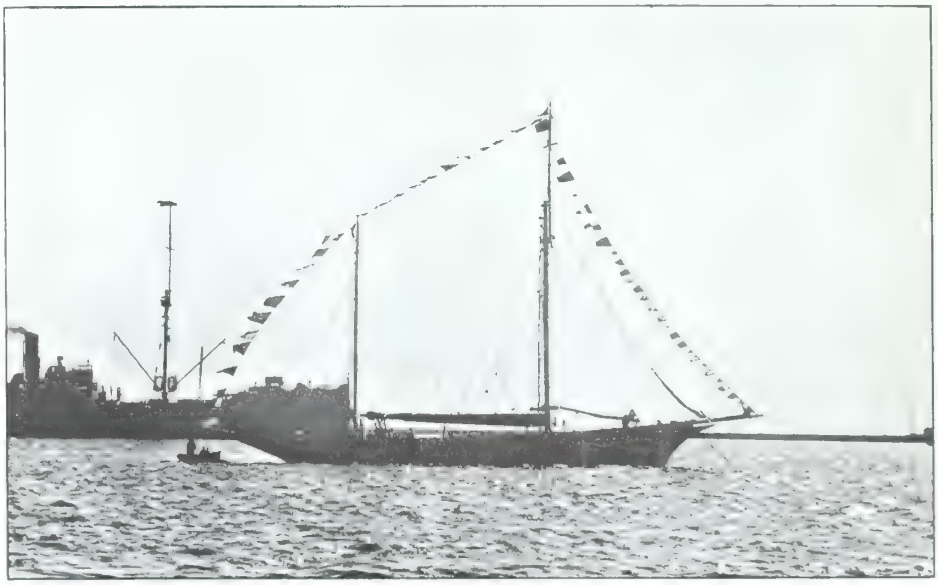
He purchased the famous 120-foot ketch Anemone on Puget Sound. She was built by Camper & Nicholson, designers of Shamrock IV, in Gasport, England. Her bent frames and rail are of English elm and her planking and deck trim of teak. The interior is finished in teak and quartered oak.

The boat has for auxiliary power a 135-horsepower Union engine, burning kerosene. The boat is fitted with wireless telephone and telegraph. A one-ton ice plant freezes meat to 22 degrees and keeps it for a month at a time. The 20 by 10 foot laboratory is thoroughly equipped for photographic and scientific work. He has renamed the ketch Wisdom II.

There are eighteen in the crew. The three foremast hands, the cook and two engineers, are hired men. The others are all college men interested in the trip for various scientific reasons. The owner is captain, Nels Taylor of Los Angeles first mate, and Snapper Brainerd second mate. Among the colleges represented are: Cornell, 2; Yale, 1; Princeton, 2; California, 1; Stanford, 1; California Academy of Science, 1.

Upon starting from Seattle the boat was saved from a bad fire by having a large CO2 tank piped into the engine room and laboratory. The same tank saved the Columbia when she took fire at the Nordlinger race at Los Angeles on October 24.

The trip of Dr. Salisbury should be of great interest to everyone engaged in overseas shipping. Not only is it probable that many of the results of the scientific researches made by the doctor and his friends will be of direct benefit in the opening up of new lines of American overseas trade, but it is certain that these results will lead to a closer knowledge of conditions in much of the insufficiently surveyed sections of the Seven Seas. This trip should bring America, and particularly the Pacific Coast of America, into closer relationship with the peoples, customs, needs, and products of many of the out of the way places off the regular beaten path of commerce.



Wisdom II, Cruising Yacht of Dr. E. L. Salisbury of Los Angeles

WITH THE NAVAL ARCHITECTS

THE twenty-eighth general meeting of the Society of Naval Architects and Marine Engineers held in New York City November 11 and 12, 1920, brought out a number of very interesting papers on timely subjects. Elsewhere in this issue we are printing in full two of these papers, namely, the paper on "Oil Tight Riveting Work" by Hugo Frear, and that on "Surface Condensers" by Luther D. Lovekin. We shall attempt, for the convenience of our readers, herewith to abstract some of the other papers.

UNIVERSITY EDUCATION IN SHIP CONSTRUCTION AND MARINE TRANSPORTATION, by Professor Lawrence B. Chapman.

This paper describes the course in naval architecture recently inaugurated at the Lehigh University. To quote: "The main feature which differentiates this course from others offered in this country and abroad is the introduction of a substantial amount of economics and business administration subjects. These subjects are built upon a solid basis of engineering education." The idea of this departure from the traditional university courses in naval architecture is that after a student is given a broad training in applied economics and business management in addition to the fundamentals of engineering, he will be less likely to hesitate in assuming the larger responsibility of executive work when the opportunity offers. In introducing this new subject matter the authorities of the university have dropped out much of the advance specialized work in design often included in naval architecture courses.

In marine engineering "the theory and practice of steam, Diesel, and marine engineering is given vigorous treatment," and little time is spent on details of engine and turbine design because it is felt that very much of this is of an empirical nature and subject to constant change, and it is felt that these details can be taught in a more thorough and satisfactory manner in practical work in the industry rather than in the university.

In ship design, however, the student is carried through the complete design of a cargo ship commercially in order to drive home the principles of naval architecture and ship construction in a practical manner. An attempt is made to carry out this work in the same way that it would be done in the drafting rooms and estimating departments of a big shipyard, several students working on one problem, and after the work is finished with, for example, two radically different ships assigned to a class of ten or twelve, the class would be assembled and the results on both ships fully discussed and explained to all the students.

The freshman year of this course is practically the same as that for all engineering courses. In the second year a study of ship construction is begun, and following this year the student is required to spend at least eight weeks of his vacation in a shipyard on hull construction. This work is required for the degree, and it is endeavored to distribute the students in as many different yards as possible so that when they return and compare notes, as many different types of ship's methods and practices will be represented as is practical. Following the third year a second summer's work of eight weeks is required, which, if possible, must be spent at sea. In case it is impossible to arrange for all men to go to sea, work in the machine shop is substituted. During the third year the student has begun practically all of the basic engineering studies, and these have been supplemented by laboratory exercises so that it is felt that he is in a position to appreciate and benefit greatly from eight weeks' engineering experience on the ship. Attention is especially directed to a course entitled, "Shipyard Plants and Terminal Facilities," which consists largely of lectures by practical men from the outside, conferences, inspection trips, and papers by the students.

The aim of the course is three-fold: "First, to turn out men who may in the future become specialists in naval architecture or marine engineering. Second, to create the type of man who, after devoting several years of work along marine lines, will be prepared when the opportunity arises to enter executive position in the shipbuilding and shipping fields. Third, to prepare men to enter the business end of shipping directly upon graduation."

LAUNCHING OF SHIPS IN RESTRICTED WATERS, by Lieutenant-Commander H. E. Saunders, Construction Corps, United States Navy.

This paper is in a sense a continuation of a paper on the same subject presented by the same writer at the Naval Architects' general meeting for 1919 and has particular reference to the results of the use of the friction launching brake developed and used at Mare Island Navy Yard for the launch of the battleship California, which apparatus was described in detail in the former paper, together with the tank model experiments which led to its adaptation.

The present paper describes the working out of this apparatus at the launch of the California and shows the valuable lessons learned in connection therewith and outlines the commencement of model tank experiments for the launching of the battleship Montana, which is now building on the same slip from which the California was launched. The Montana will be a much heavier vessel at the time of launching and therefore presents considerably more of a problem than did the California. This paper is illustrated with photographs of the apparatus used in the California's launching, the launching of the ship itself, and with diagrams obtained from the launching data.

ECONOMICAL CARGO SHIPS, by Alfred J. C. Robertson.

This paper also is a continuation from last year, when the same writer analyzed in a very masterly paper, which was printed in full in Pacific Marine Review, the effect of size and speed upon the economy of freight ships. The present paper presents the results and particulars of some model experiments which were undertaken with the object of arriving at the best form for propulsion of full cargo ships.

This is a subject which has received much attention during late years, and the paper claims only to cover ground very similar to that covered in the tests of G. S. Baker and J. L. Kent in London and to those made by Commander McEntee, by Admiral Taylor, and by Doctor Sadler and other investigators in America.

Experiments were conducted in two independent series and covered ground more fully for vessels of various prismatic coefficients exceeding .70. The first set of experiments consisted in the modification of both the area and the curvature of the afterbody for a successful cargo ship model of high prismatic coefficient. The second set of experiments consisted in the development of several entrances and runs of varying length but of identical form as to cross section and curve of areas, these being combined with various lengths of parallel middle body and being so arranged as to secure two or three models, each of identical dimensions, draft and prismatic coefficient but with varied positions of the parallel middle body.

The paper is highly technical, illustrated with many diagrams and curves and with two practical examples showing the use of these curves in calculations for E. H. P. and for best proportions for a given ship.

COMPARATIVE TESTS OF BILGE KEELS AND A GYRO STABILIZER ON A MODEL OF THE U. S. AIR CRAFT CARRIER LANGLEY, by Commander William McEntee, Construction Corps, United States Navy.

The Langley is being refitted to carry aeroplanes in such a way that these planes may both fly from and land on her deck, and it was therefore a matter of great importance to prevent excessive rolling in this vessel. This paper describes the experiments carried out at the United States Experimental Model Basin on a model of the Langley, using a small gyro stabilizer obtained from the Sperry Gyroscope Company for the purpose and using various forms of bilge keels. Incident to these tests for the prevention of rolling, the increase in the towing resistance when rolling was measured and the corresponding increase in E. H. P. required for the ship was estimated. The stabilizer used was a special machine on hand at the time and was larger than necessary for the purposes of the model. The designed speed of the twin gyro was at 7000 R. P. M., which gave a stabilizing moment of 57.4 pound feet. In the tests this speed was cut down to about 2300 R. P. M., reducing the stabilizing moment to about 20 pound feet. This was still considerably larger than necessary to quench heavy rolling rapidly.

The dimensions of the Langley are: length, 520 feet; beam, 65 feet; draft, 16 feet; and displacement, 11,000 tons. The model built to one-twenty-sixth scale was first fitted with bilge keels representing to scale keels 15 inches deep by 180 feet in length and was rolled in still water to obtain its declining angle curve. These bilge keels were found to be quite effective in quenching violent rolling.

The model was next rolled by waves produced and controlled in the still-water tank, the model being held broadside to the waves by head and stern lines. The same wave which produced a roll of 9.6 degrees with the bilge keels produced a wave of 26.4 degrees without bilge keels. The model was then tested with the gyro stabilizer, and it was found that with a wave-produced roll of 34 degrees cutting in the stabilizer reduced this roll with remarkable speed to a roll of three degrees. With waves approaching the half period of the model bilge keels were found to be very effective also, but not so effective nor so prompt in their action as the gyro stabilizer.

It was also proven that the stabilizer was capable of controlling the roll of the largest wave that the wave-maker could produce in the tank. As the gyro stabilizer was known to be more powerful than was necessary for the model, the model was arranged with a rolling weight actuated by an electric motor which increased the rolling moment, and it was found that this gyro stabilizer with a stabilizing moment of 20 pound feet was able to overcome a rolling moment of 31.33 pound feet and reduce the roll from 37.5 degrees to three degrees, but required several rolls before the angle was so reduced. As the rolling moment was increased, the gyro stabilizer was noted to require a greater number of rolls to overcome the degree of roll, but it was clearly proven that this gyro stabilizer was capable of controlling a harmonic rolling moment at least 50 per cent greater than the stabilizing moment exerted by itself.

The tests made of the increase of towing resistance through rolling showed that at a speed of 15 knots the necessary E. H. P. would be increased from 3000 to 3300, with the ship rolling through an arc of 25 degrees, and to 3600 when rolling through an arc of 45 degrees, these figures not taking into account the loss of power due to decrease in propeller efficiency for a twin-screw ship when the propellers under such rolls would approach the surface, if not actually come out of the water. Neither does the method of towing permit free yawning of the model so that the losses in propulsive efficiency which occur on a ship because of rudder resistance and in moving from side to side in an effort to steer a straight course are not taken into account. The author concludes that the power and weight devoted to means of stabilizing a ship are more than amply repaid in the saving effected in the power required to drive her.

PROBLEM OF THE HULL AND ITS SCREW PROPELLER, by Rear-Admiral C. W. Dyson, U. S. Navy.

The name of C. W. Dyson has among American naval architects become almost synonymous with the words "screw propeller." In this paper Rear-Admiral Dyson introduces his remarks by a statement made by Sir Archibald Denny in 1915, "In the future the rules for correct designing of propellers should be derived from data carefully taken from the trials of smooth bottom vessels carefully run over accurately measured deep water courses." He also quotes Admiral Taylor to practically the same effect. The difficulties encountered in obtaining reliable data on this subject are recited in the paper, and it is concluded that fully 95 per cent of the available data is absolutely worthless so far as the generation of reliable formulae and constants covering the combined problem of ships and their propellers is concerned. It is also pointed out that in making selection of data upon which to base formulae and constants consideration should be confined to hulls of fine lines with propellers located so as to give the best propulsive efficiency and having the same general forms of blade sections, true to pitch, fine edged and smooth.

The principal causes of the worthlessness of data, according to the author, are enumerated as follows: Lack of model tank trial curves for the ship; variation in conditions of ships' bottoms; deep-sea trials in place of measured mile; variation in displacement and trim from those of model; measured mile trials run in a tideway with insufficient number of runs; trials run in shallow water; model hull when tried not fitted with external appendages. The responsibility for the foregoing causes rests with the owner, the builder, and the naval architect, who are all "so short-sighted as to be able to see only the few dollars saved today by comparative petty economies, losing sight entirely of the thousands of dollars which would be realized in the future" were the trials of today made more complete.

Another set of reasons for worthless data relates to the propellers and are enumerated as blade forms varying; blade sections varying; pitch variations; blades abnormally thick and blunt; blades exceedingly rough; blades made with expanding radial or axial pitch; hub forms causing abnormal eddy losses; propellers so located with respect to the hull as to produce abnormal losses. The author places the guilt for this last set of reasons with the designer of the propeller and makes the naval architect "particeps criminis."

The bulk of the paper, which is quite lengthy and exceedingly technical, occupying forty-five pages of text, is given over to a mathematical analysis of these reasons in detail and to the recommendations of the author for the adoption of what he considers "orthodox" forms of hulls with "orthodox" propeller conditions. The author merely opens up material for the inspection of the student seeking to impress the fact that the hull and the propeller form two component parts of the whole problem of propulsion and that to treat them separately is simply to lose time. He closes with a prayer that the hearty and intelligent co-operation of shipowners, naval architects and marine engineers may in the future solve this problem more perfectly.

RECENT ADVANCE IN OIL-BURNING, by Ernest H. Peabody.

This paper reviews the experiments carried out for the increase of efficiency of apparatus for burning oil under marine boilers in connection with the United States Navy. The author estimates that 56 per cent of the present American self-propelled merchant fleet consists of oil-burning steamers and makes the statement that it is probable that in "not one of these ships is there a boiler containing more than 4500 square feet of heating surface in the individual unit and no single oil-burner capable of atomizing over 600 pounds of oil per hour, while the oil burned per hour per square foot of heating surface under forced draft conditions will not equal one-half pound." This, says Mr. Peabody, is following along very conservative lines and the full value of the use of oil fuel is not yet being approached. In the large majority of instances the vessels in the merchant marine are fitted with Scotch boilers, and the figures given above are practically the limit to which such boilers may be forced with safety. In marked contrast to the merchant marine, the Navy Department is making very rapid advances in this regard, using now in its fighting ships watertube boilers entirely with greatly improved condensers and evaporators, and within the last few weeks successful tests have been run at the fuel oil testing plant of the Philadelphia Navy Yard in which individual burners atomized more than one ton of oil in an hour. The fuel oil testing plant has demonstrated the remarkable economy of small-tube express type watertube boilers at high rates of forcing.

In the highest capacity test of these series with a White-Forster design boiler built by the Babcock & Wilcox Company, containing 7565 square feet of heating surface and 753 square feet of superheating surface with a furnace volume of 751 cubic feet, the evaporation of water per pound of oil at 212 degrees Fahrenheit was 15.14 pounds, which worked out for an evaporation of water per square foot of heating surface per hour of 22.73 pounds, with an efficiency of 76.15 per cent. The oil pressure in the closed fireroom was 9.5 inches and the rate of combustion 15.12 pounds of oil per hour per cubic foot of furnace volume. In this test there were eleven burners in operation, each atomizing 1032 pounds of 25.5 Baume oil per hour, or a consumption of 1.5 pounds of oil per heating surface per hour. In connection with these tests it is worthy of note that six months ago fifteen burners were being considered for each of the sixteen boilers of the battle-cruisers now being laid down. On the basis of the performance shown in the recent tests only five burners would be required and seven would be a safe estimate. It will thus be entirely possible to develop 180,000 horsepower from 112 oil-burners, and this is certainly a very notable performance.

One objection to these high-powered burners has been their lack of flexibility and decided limitation of economical range. Commander J. O. Fisher of the United States Navy has recently invented a new method of spraying which promises very satisfactory results and which consists of maintaining the whirling motion in the central chamber of the tip undiminished for any capacity desired of the burner. This is done by providing a bypass through which part of the oil spray is diverted from the central chamber and returned to the pump suction, the actual amount of oil which is sprayed into the furnace depending merely on the proportion of the oil that is bypassed to the total amount entering the burner. The amount of oil entering the central chamber through the tangential slots is always at the maximum and therefore the whirling of the oil and the atomizing effect remains at the maximum so that a perfect spray is secured at the lowest powers as well as at the highest rate. A good spray can be secured with this form of burner down to about 10 per cent of the maximum. The Navy Department has applied this burner with great success to small boilers of the launch type, the side range enabling them to operate these boilers with only one burner. Interesting experiments are now being carried on with a modified form of this burner, and it is believed that it can be developed to take care of almost any capacity.

(To be continued.)

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J. S. HINES . . . . Publisher
F. N. DE ROCHIE . . . . . . Business Manager
A. J. DICKIE . . . . Editor
ANDREW FARRELL . . . . . . Associate Editor
J. G. BRAY . . . . . Pacific Coast Adv. Mgr.

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INVESTIGATION ACTIVITIES

DURING the last six weeks a great deal of unfortunate notoriety has been given to American merchant marine affairs by the premature publication of reports emanating from the select committee on United States Shipping Board operations appointed by the United States House of Representatives. There was issued from Washington for release for publication on November 10 a report to this select committee on investigations conducted by A. M. Fisher, clerk and statistician to the committee, and J. F. Richardson, assistant clerk and statistician. The foreword to this report explains that the report is written by Mr. Richardson and that Mr. Richardson, a newspaper man of twenty years' experience, became connected with the Department of Investigation of the United States Shipping Board almost immediately after the organization of that department and that he continued in the employ of that department "in field and executive capacities until he was employed by the chairman of this committee. In his work he was called upon to deal with ship construction contracts, plant construction contracts, operating contracts, the guarding of ships and plants, evasion of the draft, sale of materials, and many other phases of Shipping Board operations."

The report as printed is very evidently a confidential report to the committee for their guidance in carrying out hearings to gather testimony from various sources as to the activities of the board. It is printed with a blank column on each two-column page so that the members of the committee may have an opportunity to make notes. It should never have been released for publication. Its method of makeup shows a very evident bias in favor of finding corruption in every phase of the Shipping Board's activities, and the single columns, divided into sections and paragraphs, are very cleverly arranged with italicized emphasis on words which have a psychological effect in proving that nothing but corruption and graft could be possible under the Shipping Board's system of management.

The general scheme of the book is an outline of the methods employed in contracting for repairs, ship supply, allocations, operations, and ship sales. All of these various activities are analyzed as to the methods employed in such a way as to show that there were tremendous opportunities for graft, and the conclusion is drawn that therefore graft must have been rampant. On page 15 of the report, for instance, under the general heading "Repair Yards and Practices," paragraph E, we find an italicized opening thus: "Corruption of United States Shipping Board Emergency Fleet Corporation employees." With this opening the paragraph goes on to state the various ways in which "attempts are made by contractors" to secure favor of the board construction and repair representative and shows how it is necessary to corrupt timekeepers and checkers, which results in "good men being heckled, insulted, or even frightened off the work—it is comparatively an easy matter to 'accidentally' drop a bar or wrench into the hold when a 'straight' timekeeper or inspector is standing under and thus it is not long before honest men are disgusted and discouraged and others are corrupted." This sort of argument is, of course, muckraking pure and simple. No one has ever denied that there were many opportunities for graft in the Shipping Board activities, or, for that matter, in the activities of any department of the government, especially under war-time conditions.

Treating the matter in a broad general way, the activities of the board relating to repairs and especially to repairs due to accident are largely up to the Department of Insurance, and undoubtedly if there is any such condition as is painted by Mr. J. F. Richardson in his report, the insurance on Shipping Board vessels should be immediately transferred to private American companies and the repairs under insurance be subject to the supervision and auditing of the competent marine departments in those private companies.

It is perhaps in that portion of the report which deals with the furnishing of supplies to ships in actual service that the report is most interesting to the majority of our readers. In this portion it is contended that the purchase of supplies under managers' and operators' agreements is left entirely in the hands of shipmasters, chief engineers, and stewards; that these worthies purchase supplies from ship chandlery firms who, without carrying any stock, take off a broker's profit of 25 to 40 per cent and add to this an additional percentage to cover fees on gifts to stewards or shipmasters, or both, and that the supplies purchased by the United States Shipping Board are purchased on the average at about 50 per cent above wholesale rates; also that supplies are overbought, improperly checked and inspected on delivery, and that these extra goods are sold over the side at various foreign ports, and the purchase price pocketed by these iniquitous ships' officers. A contrast is drawn between this sort of operation and private operation, and it is pointed out that in addition to these gratuities, which the author claims have now risen to about 10 per cent, the steward and the shipmaster are furnished by most ship chandlers with free liquor, free cigars, loans of money, gifts of jewelry and clothes, free automobile and launch rides, etc., etc. Who would not be an United States Shipping Board shipmaster? This board investigator goes on to say that these irregularities are so concealed and covered up that it is impossible for United States Shipping Board auditors to detect them.

The most amazing bit of this masterly exposition of Shipping Board operation to Pacific Coast operators and to Pacific Marine Review lies in the naive manner in which the investigator assumes that the United States Shipping Board pays these officers and seamen high salaries and wages to secure honest service and that lower salaries and wages are being paid in private operation, which winks at the irregularities in much the same way that some French restaurant keepers pay low wages to their waiters expecting them to work it out of the customers on tips.

On numerous occasions we have pointed out the fact that it is impossible to have an efficient business organization in the United States Shipping Board so long as shipping men are made ineligible to a seat on the board by the statute which creates that organization. We would like to suggest to Congress that special investigating committees be appointed to investigate Congress itself to see whether or no there can possibly be any common sense in the government of the United States refusing to place its trust in experts and handing its business over to politicians. We print elsewhere in this issue a suggested diagrammatic arrangement of the organization of the United States Shipping Board. This is not original, but is an effort by a prominent Pacific Coast shipping man to put into graphic form the prevailing sentiment of ship operators on both the Atlantic and the Pacific Coasts with regard to the necessity of eliminating red tape in Shipping Board methods.

If in conjunction with such a reorganization there could be appointed as the five commissioners of Shipping Board departments men who were absolutely experts in their line and had made a success of their own private business along that line, then we might have a Shipping Board favorably to compare with the British Board of Trade in carrying out policies for the extension and growth of America's maritime commerce, but if we are to continue a Shipping Board subject to kaleidoscopic political changes, it would be better to at once cut the price to bedrock on the whole American merchant marine fleet and sell to all comers, irrespective of nationality, and get out of the shipping business immediately so far as the national government is concerned. These continual interjections of political investigations by men who have absolutely no knowledge of the real conditions surrounding the building and operation of ships are making the American merchant marine a public laughing stock, both to the American citizen and to the nationals of all of our maritime competitors. Nothing will more quickly destroy the national sentiment for the ownership of a merchant marine among the American people, which has been brought to its present high enthusiasm by the expenditure of an immense amount of energy, time, and money, than will the ridiculous and misleading statements which are now constantly appearing in the daily press of the country concerning Shipping Board activities and ships in general.

Before leaving this subject we wish to say that personally we think that the activities of the United States Shipping Board, both during the war and since the armistice, were accompanied by very little graft and that they will show a greater proportion of marketable salvage than the war activities of any other department of the government. The Shipping Board in its first stages of the war program received much excellent advice from competent American shipbuilders, which advice was ignored, but we do not believe that this advice was ignored for the purpose of graft, but simply because in the great patriotic urge and stress of war preparation the men who were at the head of the Shipping Board at that time were obsessed with certain ideas and theories which they honestly thought would accomplish the purpose in hand more promptly and more economically than the old established methods which had been proven by shipbuilders for generations.

This rhyme by Berton Braley seems to us most apropos at this juncture:

I'm the block on which they stumble,
I'm the thing that makes a jumble
Out of all the airy visions they display.
Though the lights of hope may beckon,
I'm a thing that they must reckon
Or their science and their skill will not avail,
And their ships so proudly steaming to a port of which they're dreaming
Will be thrown in wreck upon me as they sail.

I am stubborn, heavy, leaden, and the thought of me may deaden
Many notions that are glorious and fair;
I'm a bore, I can't deny it, and I wouldn't even try it—
I am stolid, vulgar, tiresome, but I'm there!
You can sneer and you can flout me, but you can't get on without me,
Though you suffer with convictions most intense.
For your plan won't last a minute if you haven't got me in it—
I am nothing more or less than Common Sense!

Let us hope that the coming administration will use a little common sense in selecting Shipping Board commissioners.

THE SEA TRAINING SERVICE

AN activity of the United States Shipping Board which it seems to us has touched the American people in a more personal way than any other is that of the Sea Training Service, and it has been announced that this service is to be given up. We personally are very sorry to hear that this is the case, as we believe that this service has not only been very efficiently and economically carried out, but that it has done more to establish the love of the sea and a regard for an American merchant marine in the hearts of American citizens than any other activity of the government. Many American ship operators have the same idea. We quote here from one of these, Mr. A. F. Haines, vice - president and general manager of the Pacific Steamship Company:

"To make the American merchant marine a success, we must have the loyal interest of the American people back of it and to accomplish that we must have our ships manned by American boys. The sea training service has done much to bring that condition about. Before the war not more than 12 per cent of the men on American ships were American citizens. Today, notwithstanding the great increase in American shipping which makes it a large factor in the commerce of the world, the crews of our ships are from 50 to 60 per cent American citizens. This is due largely to the opportunity offered American boys through the sea training service. The service takes the American youth and gives him the education necessary to become a seaman with the opportunity to become an officer at the end of three years and in line for advancement to the berths of master or chief engineer. The opportunity to learn the essentials of seamanship and advance rapidly has induced many American boys to become seamen who would not otherwise have entered into competition with the foreigners who formerly manned our ships. This opportunity must be kept open to induce more and more American boys to follow the sea. They will not do so without it.

Notable among the articles deserving attention in this issue of Pacific Marine Review are the following: Limitation of Liability in Its Relation to Marine Insurance, by Harold M. Sawyer, on page 59; Marine Insurance Notes, by C. F. Howell, on page 95; the article on Mail Subvention, page 69, a masterly analysis of the problems involved in the development of a sea port, by P. H. Douglas, on page 77; an analysis of America's merchant marine problems, by Charles Piez, on page 67; the feature article on motorboating, page 55; and the summaries of the papers read before the Society of Naval Architects and Marine Engineers, which will be found on page 62. Two of these papers, that on Oil Tight Ship Work, by Hugo P. Frear, page 71, and Surface Condensers, by Luther D. Lovekin, on page 74, are printed in full.

"The Pacific Coast training ship Hollywood and her predecessors, the Brookdale and Iris, have been of great service in furnishing the personnel for the merchant marine of the Pacific Coast, and it would be a great mistake on the part of the Shipping Board to abolish the service. Unless we continue to induce our American boys to follow the sea, our merchant marine will prove a failure."

Another service which has endeared itself to the crews of our merchant marine and which is apparently about to be given up for lack of support and apparently is in the same boat with the sea training service is the merine service department of the American Library Association, which has been supplying the crews of our merchant steamers with boxes of excellent books and magazines, both for studious and recreative reading. Attempts are now being made in several ports to put this service on a self-supporting basis, and apparently what is necessary is that in each of these ports some shipowner with broad vision shall provide the funds to carry on the work for six months or a year until it can be put on a self-supporting basis through the nominal charges for the service.

It is sincerely to be hoped that interested shipowners will see that this fine service, which is certainly a great influence in keeping contented the crews of our ships, shall not fail for lack of support at this time.

AMERICAN BUREAU SURVEYORS AT FOREIGN PORTS

IN accordance with the announced policy of extending its surveying facilities to all the principal seaports of the world where American ships are now trading in the extension of our foreign commerce, the American Bureau of Shipping, now the officially recognized classification society of the United States government, is making careful analyses of port conditions and is assigning experienced surveyors as its representatives at such ports where the conditions warrant it. One of its vice-presidents is now engaged in visiting European countries and making recommendations, based on the actual conditions found at each seaport. Already an exclusive surveyor has been detailed at Hamburg, who will have general supervision of the bureau's interests at that and other important ports in the vicinity.

On November 6, Mr. Daniel Meyer will sail for Antwerp, where his headquarters will be located, and from that port he will have general supervision of American classification duties in all ports of Belgium and possibly Holland. Mr. George A. Browne will shortly sail for Havre and will be charged with looking after survey duties in Northern France. Each of these gentlemen has had many years' experience in shipbuilding and surveying, and speaks the language of the country to which he is assigned. Exclusive surveyors have also been appointed recently at Havana, Rio de Janeiro and San Juan to act as surveyors at those ports. An official of the bureau will shortly visit all ports in the West Indies and Central and South America to ascertain the conditions and necessities for surveyors at the principal ports where American ships will call.

The policy of the bureau is to have none but American citizens as its exclusive representatives abroad. Each surveyor will be charged with the duty of doing everything possible to facilitate the surveying of American ships classed in the bureau, and in a general way to aid in every legitimate way the extension of American commerce at the port where he is assigned. Wherever possible the surveyors will be taken from the experienced corps in this country, preference being given to the surveyor who can speak the language of the country under consideration.

The bureau now has the services of an experienced corps of non-exclusive surveyors in all of the leading ports throughout the world, by its alliances with the British Corporation, the Registro Navale Italiano and the Imperial Japanese Marine Corporation. It is contemplated that at the less important ports arrangements will be made whereby exclusive surveyors may be maintained to represent the four allied societies

MEXICAN MERCHANT MARINE

THERE has been a very great deal of interest expressed by American shipbuilders in the rumors coming from Mexico as to the development by the Mexican government of a Mexican merchant marine. We are glad, therefore, to secure through a report to the Department of Commerce by Trade Commissioner Charles H. Cunningham of Mexico City the plan recently proposed by the Secretary of Communications and Public Works for the facilitation of these improvements. It is the policy of the Mexican government to do everything possible to develop the merchant marine, to reduce prices of ship supplies and naval stores, and to remove all mercantile enterprises under the Mexican flag from imposts and unnecessary taxation. Therefore the following privileges have been proposed for the merchant marine of Mexico:

1. The right of fishing in territorial waters, which our laws reserve for Mexican boats, shall be made effective.
2. The exclusive right of coastwise trade, which is also conceded by law to the national flag.
3. Special duties on importation of materials which can be used in the construction of boats.
4. Establishment of premiums for national marine construction, machinery, and boilers for ships.
5. Reduction of the maritime and port charges for national boats.
6. Reduction of railroad freight rates on articles for exportation in national boats and those destined for coasting trade.
7. Facilities for the prompt clearance of boats in loading and unloading.
8. Establishment of premiums for development of commerce on the high seas or international commerce in national boats.
9. Free importation of fuel on the Pacific coast.
10. Facilities for the construction of storehouses for fuel on the coasts.
11. Facilities for the construction of docks and port works for public service.

This projected plan, after being passed upon by all the officials of the Department of Communications and Public Works, has to go through the hands of the secretaries of State, and from them to the president for his consideration and approval.

V. H. Pinckney

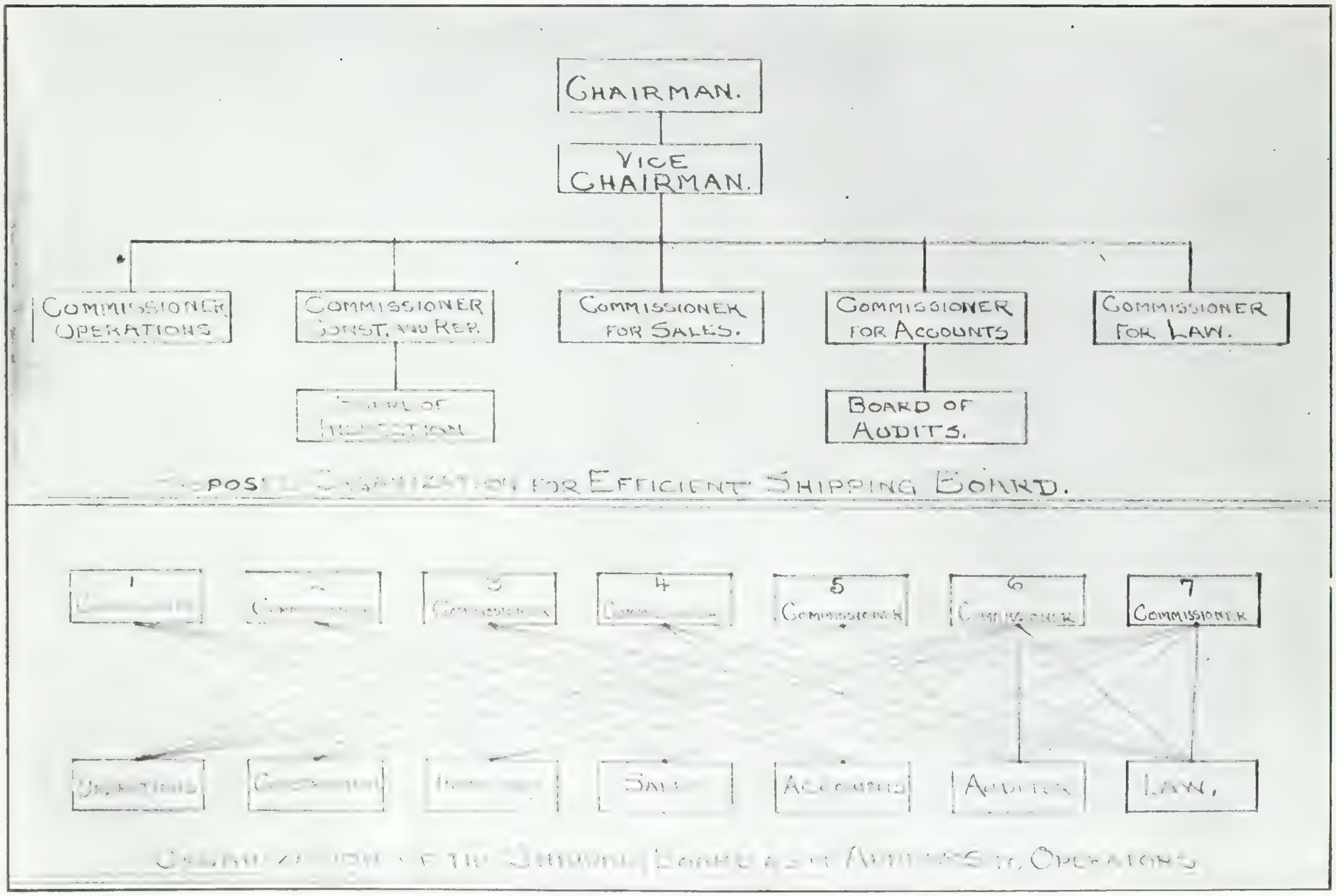
FOREIGN TRADE COUNSEL

THERE is probably no field of human endeavor at the present time where expert advice and counsel is needed more than in the expansion of American foreign trade and the operation of America's merchant marine. We are, therefore, glad to announce that a San Franciscan of very wide experience and great capability has entered the field as a commercial adviser.

V. H. Pinckney, formerly foreign manager of the California Packing Corporation, chairman of the Latin-American committee of the San Francisco Chamber of Commerce, vice-president of the Export Managers' Association and member of the Pan-American Financial Congress, has opened offices at 233 Pine street, San Francisco, for the practice of law and also for acting as adviser in connection with commercial and industrial problems, foreign and domestic.

"The fly-by-night exporter has gone, and should go," said Mr. Pinckney. "He has been a factor in bringing all American products into disrepute, since the individual act of an importer is regarded by the foreigner as an act of American commerce generally. It is necessary to send good goods, on time, then back them up in every particular.

"The time is ripe today to know whether a contract is a contract, in domestic or foreign markets. If it is a contract, how should it be carried out or how should it be enforced. The average business man knows more about contracts than the average lawyer, but oftentimes the third party comes in to interpret contracts."



Present confused organization of the Shipping Board (below) as contrasted with a simple and efficient plan (above), from a sketch by Commander Charles Belknap, president of the General Steamship Corporation, after he had discussed the situation with several Eastern shipping men. In the lower sketch each of seven commissioners is represented as having a finger in each of the five departments of operations, construction, sales, accounts and law and of the two bureaus of inspection and auditing. The proposed organization, in which each commissioner, preferably a man selected for his fitness, has direct and personal charge of one department, under the general authority of the chairman and vice-chairman, speaks for itself.

THE AMERICAN MERCHANT MARINE

By CHARLES PIEZ

President Link Belt Company

THE merchant tonnage owned by the United States and its citizens is upwards of twelve million dead weight tons—a fleet second only to that of England! and yet the problem of how to create an American Merchant Marine, how to convert this large, heterogeneous collection of ships into an effective system for the transportation of our exports and imports, for the development and maintenance of our export trade, is still largely before us.

Three billion dollars of facilities are in our hands, but need far-sighted and intelligent application for their successful and profitable employment.

The American Merchant Marine is still to be created. It awaits the touch that will organize out of the facilities created by the war, a dependable system of water transportation connecting American shippers with foreign customers, and foreign producers with American consumers.

The war brought us, almost without effort, a vast expansion of export trade and we are only beginning to realize, now that our export business shows evidence of heavy shrinkage, how essential its development and maintenance is to our national prosperity.

We recognize both in the interior and on the sea coast the vital influence of dependable transportation facilities on our export business.

We want our inland shippers put on a competitive basis with foreign shippers by granting favorable combined rail and ocean rates on products destined for foreign markets.

We do not want the delivery of American goods to foreign customers to rest in the hands of foreign commercial rivals.

We want an American Merchant Marine.

We want American ships to work for the development of American trade as our railroads work for the development of their own terminal points. These are our wants, the wants of our manufacturers, our farmers, our miners, our merchants, our people generally.

And what have we got to satisfy these wants? Twelve million tons of rather badly assorted vessels, a Shipping Board sadly crippled by changes and resignations, and the Merchant Marine act of 1920.

The twelve million tons of badly assorted vessels are the result of our national weakness of unpreparedness. President Roosevelt said fifteen years ago, "The condition of the American Merchant Marine is such as to call for immediate remedial action by Congress. It is discreditable to us as a nation that our Merchant Marine should be so utterly insignificant in comparison with that of other nations which we overtop in other forms of business. We should no longer submit to conditions under which only a trifling portion of our commerce is carried in our own ships." But not until September, 1916, did Congress take the first active step to remedy this condition.

The actual work of ship construction under the Shipping Act of 1916 was not begun until after we entered the war in 1917, and the stress was at that time so great that we had to build what our facilities permitted. There wasn't time for developing a program of a well balanced merchant fleet, and there were no facilities for its quick construction. We needed cargo tonnage, we needed anything that would float; and while we corrected this in part by our policy of cancellation after the armistice, yet we did get into our fleet, in addition to the wood ships which are negligible, a very much larger proportion of steel vessels of 5000 tons and under, than we can profitably employ in a competitive field.

As is usual in our national experience, a long continued policy of unreadiness and parsimony was followed necessarily in the crisis, by feverish haste and prodigality.

But the result is that the merchant fleet we have today is far from the kind of a fleet which we would have built after a careful study of our needs.

The Shipping Board in both its early and recent life has been subject to many changes in membership. In a little over three and one-half years there have been ten resignations and four chairmen. Continuity of policy can, under such circumstances, hardly be looked for.

The Merchant Marine Act of 1920 became a law in June, and while it provides for a board of seven commissioners, the board has a membership of but two, including the chairman. While this condition is probably due to the continued disability of the President of the United States, it does to my mind prevent the effective and prompt application of the new law.

It is fortunate for the future of the American Merchant Marine that this much-depleted board should, under existing circumstances have so capable a chairman as the present incumbent, for the operations of the Emergency Fleet Corporation and the cancellations after the armistice have left a heritage of claims, adjustments and problems that would prove a severe tax on any organization, and if to these problems be added the task of developing a successful Merchant Marine out of a hastily built fleet, we can appreciate how stupendous a burden we have placed on the chairman and his colleague.

The Merchant Marine Act of 1920 is a real national asset. So far as wise legislation can go in the development of our merchant fleet, Senator Jones and the Senate Committee of Commerce have gone in this excellent piece of legislation.

It encourages the further development of the American Bureau of Shipping for classifying American built vessels, it aids the development of American marine insurance companies, allows through preferential rates on merchandise and passengers when transported in vessels documented under the laws of the United States, extends the application of the coastwise laws to American ships, exempts vessels from the application of the War and Excess Profits Tax, encourages American shipbuilding, and places into the hands of the Board, broad retaliatory, or defensive powers to meet discrimination by foreign competitors.

The declaration of the act so aptly expresses what should be our national policy in respect of the American Merchant Marine, that I am prompted to quote it:

"It is necessary for the national defense and for the proper growth of its foreign and domestic commerce, that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce, and serve as a naval, or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States; and it is hereby declared to be the policy of the United States to do whatever may be necessary to develop and encourage the maintenance of such a merchant marine, and, insofar as it may not be inconsistent with the express provisions of this act, the United States Shipping Board shall, in the disposition of vessels and shipping property as hereinafter provided, in the making of rules and regulations, and in the administration of the shipping laws keep always in view this purpose and object as the primary end to be obtained."

This definition of policy points out one fact which, in the determination of what shall constitute the most suitable type of vessels for an American Merchant Marine, we are apt to forget viz.: that the merchant marine shall be an instrument of national defense as well as an instrument for the extension of commerce.

We need only recall our experience in the Spanish-American war, and in the world war, to realize the importance of this fact.

For the transportation of the Santiago expedition in 1898 the Quartermaster's Department chartered every American vessel that could be obtained in Atlantic ports during the twenty days following the declaration of war, and succeeded in obtaining a fleet of thirty-six vessels, averaging twenty-five hundred gross tons, or a total of 90,000 gross tons, hardly sufficient to carry a single division of less than 20,000 men, as divisions were then constituted and equipped.

It was a fortunate circumstance for us that, at the beginning of the war with Germany, there were some 600,000 gross tons of German ships interned in our harbors, and that a substantial portion of these ships were passenger vessels of great capacity and speed.

With their aid, and the aid of our own and chartered ships, we carried almost one-half of the two and a quarter million troops of the American Expeditionary Force in ships flying the American flag.

But as late as March, 1918, in spite of this aid, the War Department asked the Emergency Fleet Corporation to construct an additional one million tons of troop ships.

Does not this experience indicate that the first step, in determining which vessels to keep and which to sell, should be to call on the Navy and the General Staff of the Army to submit to the Shipping Board the character, number and size of vessels necessary to keep our Navy in foreign waters and to transport quickly and then maintain on foreign shores an army of, say, one and one-half million men.

The specifications thus arrived at should then be submitted to our leading shipping men, to determine what changes they would suggest, so that the fleet, thus determined upon, would prove a useful and profitable instrument for American needs.

The report thus submitted should include the vessels that will be necessary to carry to our shores nitrates, sugar, and other essential raw materials during time of war, as well as those which will take care of our essential coastwise and foreign trade.

Such a fleet would, I am certain, be a well balanced one, judged from the needs of our shipping, and from the standpoint of economic operation.

It is this ideal fleet by which the fitness of the vessels in our existing fleet should be gauged.

All those vessels which do not approximately conform to the general requirements thus determined, should be disposed of promptly, with the right to transfer the flag, and should not, if sold to citizens of the United States, be permitted to participate in any exemptions, preferences, or other special privileges which the Merchant Marine Act of 1920 provides.

Our merchant marine, if it is to succeed, can succeed only during its infancy by the fostering care and concessions given by the Government, and it is essential, therefore, that this care and these concessions be not extended to vessels which would not be useful to us in a national emergency, and which would be unable to maintain themselves in a competitive field, even under favorable conditions.

On the other hand, we must be prepared to construct such additional tonnage as may be essential either to our defensive needs, or to the requirements of our established or potential commerce.

We face no easy task in establishing ourselves on the high seas in the face of the experienced, aggressive, and unified policy of our chief competitor.

Our rivalry is not confined to the ownership and operation of ships, but to the development of our export trade as well. I assume that we have no desire to enter the shipping field as a competitor for world carriage, but that our policy will be American Ships for American Trade.

It behooves us, therefore, to develop our foreign trade in step with the growth of our merchant marine, and this requires agencies for financing transactions, and cable connections under American control. It requires also a better preparation for producing, shipping, and selling goods to foreign customers than is usual among our producers.

But underlying our foreign trade must be a regular and dependable water transportation system, with the addition of such new lines as are necessary to the opening up of promising territory.

Regular, dependable water transportation can only be secured through businesslike and experienced management on the part of ship operators, and the success of our merchant marine will therefore depend on the care and wisdom with which the Shipping Board selects those to whom it sells or charters ships.

Our coastwise commerce will take care of itself, for there it is a question of competition among American ship operators only; but in our foreign shipping, our ship owners and operators meet as competitors, not individual ship owners, but powerful foreign combinations of national, perhaps international scope.

It is essential therefore, until our ship operators gain in experience, establish proper foreign connection, and learn to co-operate with each other, that the direction of our foreign shipping policy shall remain under the control of the Shipping Board.

We are not going to establish our merchant marine merely by selling our ships to American buyers on favorable terms, and then permitting them to work out their own destiny. In the establishment of its merchant marine the United States is in competition with England, France, Norway, Holland and Japan. Our policy at least for a time must be laid down by the Shipping Board. There is no thought in this of continuing Government direction or control longer than necessary, but there is recognition of the fact that to be successful in the extension of our foreign shipping, we must work under centralized direction.

Many of our ship operators will take advantage of the generous terms of payment which the Government is offering on the sale of ships, and it is advisable that the Shipping Board, not only for the above reason, but to protect the Government's investment, follow the practice of other large investors ,and secure minority representation on the Board of Directors of the Shipping Companies, until at least 50 per cent of the price of the ships, purchased from the Government, has been paid.

This step can be taken without impairing either the initiative, or the enterprise of individual owners, and it will, I am sure, result in presenting a national front to meet the attack of foreign competitors.

GERMANY RENEWED

By W. C. BRISTOL

IN the great variety of things that have been said, written and printed about the Hamburg-American Line contracts with the Harriman corporations, nowhere has it appeared that a very interesting question arises about the right under present conditions to make a contract at all; indeed, whether a legal and binding contract can be entered into or written between the nationals of two nations at war with each other.

Quite aside from the rules of international law that forbid such a contract, there is in this country a specific statutory enactment that thus far has not been set aside to accommodate any such contract with an enemy or an ally of an enemy. There has not appeared anywhere mention of an act or resolution of Congress becoming law with executive approval permitting the dealings that the alleged preliminary contracts are designed to carry out. There does not appear among presidential proclamations that have been given publicity any executive license or permission to put into force or render capable of accomplishment any contract with an enemy or ally of an enemy looking to joint operation of transatlantic lines of steamships by the subjects of two nations engaged in, or yet in, a state of war.

The resolution of Congress declaring peace was vetoed by the President, and it was not passed over his veto; and the mandamus proceedings before the Supreme Court of the United States directed against Secretary Colby to act on this resolution have been dismissed for want of original jurisdiction in that Court. There is in process "a solemn referendum" on the much vaunted league of nations and Versailles treaty; so, the state of war declared by Congress in April, 1916 (9 Fed. St. Ann. p. 924), and against Austria December, 1917 (id. at p. 925), still exists between the Imperial German and Austrian Governments and their nationals, citizens and subjects and the United States, its nationals, citizens and subjects. How then, can any one or more persons, individual or corporate, in this country or that, legally enter into binding contracts with each other? No consideration of expediency, either national or private, or of convenience or of commercial advantage can support such a contract, unless and until peace formally declared restores the status of the two nations whose nationals, subjects and citizens are thus involved. The same situation frequently arose between the South and North during our Civil war, and courts did not hesitate to condemn and penalize parties thus contracting in defiance of the conditions induced by war. Instances arose where the contracting party ordinarily bound slipped out of his obligation ordinarily valid if not for the war, and left the other party remediless. Some comment in the present situation has been harsh enough to point out that there was evidence of a Teutonic trick, or "scrap of paper" shade, in the entire present transaction; but when the Shipping Board pronounced this proposed arrangement as "heaven-sent" and a great boon to American shipping, the possibility of the foundation for such comment was put aside.

Mr. Harriman's publication of the situation as it exists from his standpoint lends the public an interest in the matter. No doubt Mr. Harriman is quite ably advised by his friends, associates and eminent counsel not only identified with his own immediate concerns but with his allied companies; but it is not with Mr. Harriman's private business that such public concerns arise so much as it is that he being the individual through whom negotiations worked to fruition, now comes a national instrumentality, the United States Shipping Board and solemnly pronounces, what is criticised, to be "heaven-sent."

The grave question is up for solution, can such a contract be lawfully made and enforced?

Congress was advised and prevailed upon to enact the "Trading with the Enemy Act" which stands upon our own statute books unamended and unrepealed as to this present transaction (Fed. St. 1918 Supp. p. 866). And, the President has issued thereunder two proclamations, the first on June 28, 1918 (1464), wherein he asserted his taking and possession of and declaring necessary to national defense the property, compensation therefor to be thereafter fixed, of two New Jersey corporations, by virtue of their charters then citizens of the United States; and the second on December 3, 1918 (unnumbered), several days after the armistice and cessation of hostilities, fixing the compensation for and payable to these corporations for the property thus taken in an amount somewhat over seven millions of dollars.

Under neither of these can permission be said to have been granted to deal with the enemy. Indeed the confiscation and appraisal damages of enemy property therein contained stamps with evident concern just how far there is likelihood of governmental interference on both sides of the water in respect to the very subject matter of the proposed deal. It has not appeared among the vast amount of matter presented to the public that the terms of this act of Congress which expressly prohibits any dealings whatever with an enemy or an ally of an enemy has in anywise permitted some persons to lawfully deal with the enemy while not exacting from the enemy under the counter proposals of the Versailles treaty not approved in this country like permission on the part of its nationals to do the same thing, while a state of war exists; indeed, it would seem by the reported dismemberment of the Imperial German Government so far as its reigning dynasty was concerned that even more care would be exercised in dealing with any national under a defacto government. The question cuts both ways. There are those who express the opinion that under the Versailles treaty Germany cannot lawfully contract until she reinstates hereself as a nation by performance of its exact terms; but whether such an extreme view is right or wrong does not favor the solution of the main question for the nationals of this country. As long as war exists as a state of things or until peace is formally declared, a contract to make a contract is just as much open to doubt as the final fixed and determined instrument may be, with the added difficulty that specific performance thereof cannot be compelled in this country, if the foreign contracting party sees fit to repudiate, or treat the arrangement as a "scrap of paper."

If the President of the United States, or any departmental officer authorized by him, issued a license permitting this contract for the Hamburg-American arrangement, then the American public should be clearly and definitely informed about it. If no such license was issued, then what of the "heaven-sent" contract against the plain terms of an act of Congress?

MAIL SUBVENTION

Operators and Postal Department Face Some Real Problems

ALL individuals and corporations having interests of any sort abroad will find food for thought in the failure of the American Line of the International Mercantile Marine to renew its mail contract with the Post Office Department. For many years the American Line had operated under the mail subvention act of 1891; but upon the expiration of the contract October 12 no effort was made by the company to renew, to explain which P. A. S. Franklin, president of the I. M. M., said: "Its requirements under present circumstances and conditions of operation are very onerous, whereas the remuneration granted for carriage of mails under contract is practically no greater than the regular commercial rates, although the cost of operating steamers is from three to four times greater than before the war. The American Line is ready at any time to negotiate a mail contract for its Southampton service, based upon present costs of operation."

A Short-Sighted Policy.

Within a year or so another important contract under the act of 1891 will expire, that held by the Oceanic Steamship Company for the transportation of mails between San Francisco and Sydney via Honolulu and Pago Pago. No statement has been made by the Oceanic Line as to its intentions, but the officials of the company scarcely could fail to be moved by the same considerations as decided Mr. Franklin not to renew the American Line's contract; and American business men may discover that another important service has been discontinued because of the short-sighted policy of Washington.

In order to make the situation clear, an explanation of the mail subvention act is necessary. That law authorized the Postmaster General to enter into contracts with the lowest bidder, for periods ranging from five to ten years, for the transportation of American mails overseas. Vessels eligible under the act were divided into four classes:

1. Iron or steel steamships capable of making 20 knots an hour or more in ordinary weather and of not less than 8000 tons gross. Only vessels of this class were to ply between the United States and Great Britain. Their remuneration was not to exceed $4 a mile, regardless of the amount of mail carried.

2. Iron or steel steamships capable of making 16 knots an hour in ordinary weather and of not less than 5000 tons gross. Their remuneration was not to exceed $2 a mile.

3. Iron or steel steamships capable of making 14 knots an hour in ordinary weather and of not less than 2500 tons gross. Their remuneration was not to exceed $1 a mile.

4. Iron or steel or wooden steamships capable of making 12 knots an hour in ordinary weather and of not less than 1500 tons gross. Their remuneration was not to exceed 66 2-3 cents a mile.

Several Conditions Imposed.

Several conditions were imposed. For the first two years at least one-fourth of the crew were to be American citizens; for the next three, at least one-third; and for the remainder of the life of the contract, one-half. All vessels were to be fitted for conversion into naval auxiliary cruisers, in accordance with plans approved by the Secretary of the Navy; the steamships were required to carry cadets; fines might be imposed for delays and irregularities; and the vessels might be taken over by the Government upon the payment of their "fair actual" value.

The most casual reading of this summary of the act of 1891 brings the belief that the remuneration was regarded as liberal; so liberal that the Government felt justified in imposing conditions, in demanding more of the subvention lines than of others. The contract may have been liberal at one time; at least, transportation of mails by subvention vessels cost more than would have been charged by other steamships, although precisely what sort of service would have been by these latter does not appear. Nevertheless, one is justified in the conclusion that the Government formerly regarded the subvention service as important enough to justify an extraordinary expenditure.

"Through Intelligent Management."

Formerly—that word is pat. At one time the subvention service was relatively expensive, as was to be expected; but no longer is that true. Witness the report of the Postmaster General for the fiscal year ending June 30, 1919, page 12: "The cost, from 1892 to June 30, 1912, of carrying the mails by contract ships, authorized under the ocean mail act of 1891, was $8,000,000 more than if carried at the pound rate of non-contract ships. Through intelligent management the cost of the contract service for the six fiscal years ending June 30, 1919, was reduced to $2,566,694.35 less than it would have cost if the mails had been carried by non-contract vessels."

Private citizens may be excused if they disagree with Mr. Burleson's interpretation of the phrase "intelligent management." That management is not intelligent which takes advantage of the existence of a binding contract to alienate its servants. No more would an employer be intelligent who paid to casual labor a far higher rate than to his regular employes; who consistently followed that practice, for sooner or later he would be without an organization. In precisely that situation is the Post Office Department finding itself. Mr. Burleson's boast of a saving at the expense of the mail subvention lines scarcely is convincing; it savors too strongly of the penny-wise, pound-foolish policy against which our primers warn us. Mr. Burleson could not have been ignorant of the conditions imposed upon the vessels of the American and Oceanic and other lines, to which non-contract vessels were not subjected. Nevertheless, the contract lines were penalized for their stupidity in entering into an agreement with the Government. Is this "intelligent management?"

Some Specific Figures.

But Mr. Burleson is more specific than he was in the paragraph quoted above. On page 14 he says: "The cost of the contract service on route No. 80, San Francisco-Sydney, was $177,058.84 less than the conveyance of the mails concerned would have cost if the steamers had been paid at the rates applicable to non-contract steamers; and for the first time the cost of the contract service on route No. 36, New York to La Guaira, Venezuela, and on route No. 37, New York to Maracaibo, Venezuela, was less than the service would have cost by non-contract steamers—on the former route $25,086.51 and on the latter $28,739.12 less."

How was the Post Office Department enabled to make such a saving by the use of mail subvention steamships? Because R. S. 4009 provides: "For transporting the mail between the United States and any foreign port, or between ports of the United States touching at a foreign port, the Postmaster General may allow as compensation, if by a United States steamship, any sum not exceeding the sea and United States inland postage; and if by a foreign steamship or by a sailing vessel, any sum not exceeding the sea postage, on mail so transported."

The Aggregate Increases.

In spite of the fact that no additional remuneration has been granted to the subvention lines, the aggregate paid for the transportation of foreign mails increased during the period 1913-1919 by $3,180,278.77, or 14.10 per cent, as compared with the seven years preceding. (Page 4, Mr. Burleson's report for 1919). Evidently other steamship lines were paid more; salaries and other items showed marked increases; money paid railroads, for example, having climbed 16.53 per cent, and the salaries of clerks as much as 69.93 per cent. Page 85 contains this paragraph, which is fairly typical: "Under the act of July 2, 1918, which authorized the Postmaster General to investigate conditions arising from contracts in the star route service entered into prior to June 30, 1917, with a view to determining whether readjustment should be made in the compensation rendered, allowances amounting to $393,257.12 were made during the fiscal year on 2317 star routes." And we have this summing up on page 4: "Each branch of the service participated substantially in the increased expenditures for this period" (fiscal years 1913-1919 inclusive).

Time Lost in Port

There are various other phases that will bear examination. Vessels of the Oceanic Line, for example, are in port at San Francisco for no less than fifteen days, although the average period of detention of a transpacific liner is seven or eight days. Some explanation is required here; well, the explanation is not wanting; so important is the Australasian mail service of the Oceanic Line that the Government requires the vessels to wait at San Francisco until inbound mail may be delivered to the most remote corner of the United States, forty-eight hours be allowed for a reply, and that reply received in San Francisco in time to be dispatched to Sydney by the same vessel.

Regardless of the amount of mail carried—that phrase appears in the summary given above of the mail subvention act. Such a thing as an international parcel post was unheard of in 1891; Wells, Fargo & Co. dispatched most of the parcels destined overseas, and paid the Pacific steamship lines for transportation. As a natural result of the parcel post, the volume of mail has increased greatly, so greatly, indeed, that the Australian liners have been compelled to discharge cargo in order to make space for the mails. Special rooms designed for mail storage, and adequate when the Oceanic steamships Sonoma and Ventura were built, are absurdly small today, so that cargo space continually is occupied by goods that now go by virtue of the parcel post but which a few years ago would have paid freight. This is no argument against the parcel post; it is intended to be, however, a plea for justice.

Growth of Parcel Post.

To quote again from Mr. Burleson's report for 1919, page 12, which illumines the parcel post business: "From 1913 to 1919 the international parcel post service was extended from 47 to 85 countries or colonies. Agreements were effected during this period with 13 countries or colonies increasing the weight limit on parcels from 11 pounds to 20 or 22 pounds. The dispatch of parcel post matter to foreign countries increased from 2,831,512 pounds in 1913 to 17,102,131 pounds in 1919."

For the transportation of this increasing parcel post business the subvention lines are receiving no more than they got in 1891 for the carrying of ordinary mails.

There are other somewhat curious sides to the situation. In the summary of the act of 1891, given above, appears the statement that the Government was to be permitted to take over the contract steamships (fitted, it will be recalled, for use as naval auxiliary cruisers) at their "fair actual" values. When the administration commandeered American shipping in 1917 did it pay the "fair actual" values of the subvention vessels? The administration did nothing of the sort; it acted precisely as the United States Government has done many times, as it has done with regard to the coastwise laws: It violated its own statute, ignored its own contract, and seized the steamships. "Sign on the dotted line!" said the Government; and on the dotted line the companies signed.

Proud of Shabby Dealing.

Perhaps the most serious aspect of the situation is this: a mail subvention contract, once executed, must be carried out by the steamship company, regardless of conditions, regardless of profit and loss, of opportunities to dispose of vessels, of more advantageous openings elsewhere; the contract cannot be violated without not only incurring forfeiture of a large bond but also risking a prison sentence. In such circumstances as these, especially when a contract cannot be made for less than five years, one would expect to find subvention lines treated far more liberally than the others. Yet we discover Mr. Burleson taking pride in dealing with them shabbily.

In view of the quotations from Mr. Burleson's report, we may be permitted to take with a grain of salt the statement on page 12 that "every encouragement has been given to fast steamship lines carrying mails, and the service to Central and South American ports, and to Europe, has been expedited." Mr. Burleson has bizarre ideas as to what constitutes "every encouragement" no less than what constitutes "intelligent management." One more quotation from his report comes in handy: "The service belongs to the people and should be conducted for their use and benefit, but those who use the mails for particular purposes should pay for the service rendered them at rates approximating the cost of the service." Is Mr. Burleson aware that costs of steamship operation have increased enormously since 1891? What if we change his dictum to read: "Those who use steamships for particular purposes should pay for the service rendered them at rates approximating the cost of the service?"

Up to Business Men

If American business men do not desire the continuance of the subventions; if exporters are indifferent as to the promptness of the Australasian mails; if importers are willing to wait long for advices from their correspondents in Sydney; if, in brief, the Oceanic service is to be suspended as was the American, then the Post Office Department is pursuing the proper course. But not otherwise.

We hear much talk of living wages. The Shipping Board is working arduously to protect American shipping from cut-throat competition. Well, let us have a living wage for the mail subvention lines. We might interpret "living wage" as being not less than the same companies would receive if they were not under contract; certainly, in view of their obligations to the government, they should receive more.

Business men of the entire country might do well to express their opinion of the penny-wise, pound-foolish policy of the Post Office Department.

BUSINESS MANAGEMENT COURSE

THE Extension Division of the University of California has planned by correspondence a course aiming to give the small business man an insight into methods of business management and organization, which he may introduce into his own concern.

Oscar Eugene Mack, manager export division, George F. Eberhard Company, 360-370 Front Street, San Francisco, has prepared the course and conducts it for the purpose of giving to merchants, business men and their men and women clerks, insight into the important means of developing their trade and controlling their stores.

Practical problems that confront a man organizing a small business are presented, with emphasis on the principles that underlie success in business generally.

Among the subjects treated are:

Choosing a location; selecting stock; planning a store; arrangement of the stock; salesmanship; advertising; turning the stock; taking care of the customer; accounting; credits and collections; depreciation; employees; being a manager instead of a workman; planning ahead; relations to the community; relations to competitors; reading and study.

Fifteen assignments—fee $6.

Other business courses offered through University Extension Correspondence Study are: Accounting and bookkeeping; commercial law; economics; commercial arithmetic; business English.

OIL TIGHT SHIP WORK

Notes on Rivets and Spacing of Rivets[*]

By HUGO P. FREAR, ESQ.

IT IS improbable that the writer would have selected the above subject, which was assigned to him, had he volunteered to submit a paper at this session. The secretary usually sends out notices at an early date inviting members to recommend subjects and authors, and "Rivets and Spacing of Rivets for Oil-Tight Work" appears to be one of the topics which attracted the attention of the council. An exhaustive treatment would be largely a matter of compilation and beyond the scope of this paper and will not be attempted, it being the desire rather to invite discussion if there is a difference of opinion regarding general practice or on the few points raised, without which the paper will be of comparatively little value.

The present high state of efficiency of the modern tanker leaves little to be said on rivets and rivet spacing for oil-tight work that would be both new and conservative, and it may be safely said that radical departures from the practice arrived at as the result of years of experience would invite trouble.

Riveting is unquestionably one of the greatest, if not the greatest, item of expense entering into the cost of construction, and the unprecedented demand for tankers and oil-burning vessels at this time magnifies its importance.

Experience has become much more general in both the building and operating of tankers, and perhaps this was thought to be an opportune time to provoke discussion along other than traditional lines.

Rivets and spacing of rivets for oil-tight work, as covered by the classification rules, Navy Department, British Admiralty, etc., does not vary radically, although, on account of higher stresses used, a greater spacing is adopted in some parts of naval vessels. It must be borne in mind, however, that naval vessels are not subject to the great variations in load encountered in the merchant marine, and therefore the stresses can be anticipated with greater accuracy.

Rules for rivets and rivet spacing are the result of evolution arrived at by rule of thumb, experience, size of rivet found practicable to drive, spacing suitable for caulking, experiments, calculations, survey reports on damage cases, etc., and are in the opinion of the writer generally satisfactory with very few exceptions, which will be referred to later.

Oil tightness depends, perhaps, more on good workmanship than any other one thing, especially so far as riveting is concerned. If every rivet could be guaranteed 100 per cent perfect, slightly greater spacing would be practicable and might be allowed by classification societies except where a given efficiency of joint is essential. The same standard of workmanship does not exist throughout the yards of the world or in some cases throughout the same vessel. It is obvious that there must be a common rule for all and, therefore, the required rivet spacing is designed to guarantee good results for average standards of workmanship.

It was stated above that the rules for rivets and spacing of rivets for oil-tight work had been arrived at by a process of evolution, and it may not be out of place to refer briefly and in a very general way to some of the early bulk oil carriers and to some precedents in connection with conversion jobs on account of the large number of vessels which have been and will be converted to carry fuel oil.

While there were probably some barges in existence prior to 1872, it was in that year that the first bulk oil-carrying steamer was built at Palmer's, Newcastle on Tyne, England. Although this vessel was built especially for carrying oil in bulk, she had a double bottom, and the indications are that the rivet spacing was the same as in vogue at that time for water-tight work. Following this date, new bulk oil carriers were built from time to time, but perhaps for about three decades converted vessels contributed more or less to increasing the fleet.

During this period the spacing of rivets, even for water-tight work, was in some respects greater than at present, and vessels frequently leaked a little when new, but they were built of iron and the joints soon rusted up tight, thereby increasing the friction of the riveted joints and resulting in stronger and more durable vessels under existing conditions. This rusting-up process, however, would not take place in the case of new vessels built to carry crude or lubricating oils in bulk, and on that account some of the converted vessels were tighter than new tankers. It was during this period that the importance of the friction of the joint referred to above became more generally appreciated.

Oxidation, however, takes place in tanks carrying gasoline, and this rusting-up process, undoubtedly, penetrates into the seams. On this account it might be beneficial to carry a cargo of this character on the first voyage or two, as is sometimes done. Tests have demonstrated that, while the friction of the joint has no effect on the ultimate strength, it has a safe factor above working stresses where workmanship is good. If there is the slightest slip, defective rivets will come to light; therefore, in oil-tight work intimate metal-to-metal contact is of the greatest importance for permanent oil tightness, especially where subject to alternating stresses set up by the working of the ship.

Serious recurring damage, constant necessary repairs and resulting cost to underwriters during much of this part of the history of oil carrying in bulk were attributed to inadequate scantlings, improper distribution of material, insufficient riveting, poor workmanship, long tanks, overloading, and limited knowledge of manipulating large quantities of water ballast, especially in the case of exceptionally long tanks. Investigation by Dr. James Montgomerie over a period of thirteen years prior to 1909 conclusively showed that recurring damage was more frequent where the tanks were over thirty feet long.

The early tankers, both new and converted, had relatively less beam and were consequently easier in a seaway, yet the penertating character of the oil sought out weak spots and loosened rivets developed under new stresses created by carrying oil in bulk.

The first leaks frequently occurred at the ends of stiffeners and in rviets connecting frames to shell which were subject to stresses not common in ordinary vessels. After these started the vessel began to work more, and progressive damage followed, frequently resulting in almost entirely re-riveting the vessel.

There was a fad about this time for plug-headed rivets, but these were abandoned because they would not draw the work up sufficiently close and created greater difficulty in securing high quality of workmanship. The old reliable pan-head was found to produce the most intimate contact and to be more permanently oil-tight and was recommended except where some other types were absolutely necessary.

Up to 1894 there were built or building to Lloyd's Class sixty-four tankers, yet the society did not consider that it had sufficient experience to lay down definite rules for their construction. In this year, however, Mr. Benjamin Martell, chief surveyor to Lloyd's Register, read a paper before the Institution of Naval Architects wherein he outlined his views on the details of construction and of riveting for bulk oil carriers, recommending three diameters for oil-tight work. This paper in pamphlet form was distributed and for a number of years served as a guide to shipbuilders in the design and construction of tankers intended to be classed at Lloyds.

Within a comparatively short time after this, Bureau Veritas, apparently profiting by this paper, published rules for tankers, and the American Bureau of Shipping published their first rules in 1902, but the first rules of Lloyds did not appear for general use until 1909. Both Bureau Veritas and the American Bureau recommended three and one-half diameters at the start, while Lloyds specified one more rivet in a frame space than required for water-tight spacing, resulting approximately in three and one-half diameters.

According to the recollection of the writer there was a period when Lloyds practically decided not to class any more converted vessels, but both workmanship and details of construction must have improved, as many converted vessels have since been classed and have given good service.

Evolution was a slow process, and no doubt in numerous cases the true cause for failure was not recognized. Mr. Martell realized this when he wrote his paper and provided for tanks not over twenty-four feet in length, increased stiffeners and brackets, as well as closer spacing of rivets. Had the earlier tankers been better designed as regards tanks, stiffeners, brackets and compensation, where needed, the question of rivets and spacing of rivets for oil-tight work might possibly have received somewhat less attention during those troublous times. This appears to be a reasonable inference from the fact that so many converted tankers have since given long and satisfactory service.

Rivets in the shells of the early tankers were continually getting loose and leaky, while it is very rare that the shell rivets spaced for water-tight work of later converted vessels, where the interior details of construction were in accord with Mr. Martell's recommendations or classification rules, showed leaks. The comparatively slight variation in the spacing of shell rivets would not account for this great difference and must be attributed somewhat to improved details of construction and, in a measure, superior workmanship.

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[*] Read at the twenty-eighth general meeting of the Society of Naval Architects and Marine Engineers, held in New York, November 11 and 12, 1920.

That oil-tight work should be double riveted was an accepted rule. This is still the general requirement, but single riveting is now permitted in the seams of double bottoms intended for carrying fuel oil. This concession was not made until after many vessels in commission had been converted to carry fuel oil in their double bottoms with single-riveted seams and their class continued. The writer recalls a large vessel on the stocks with tank top required to be double riveted to carry fuel oil, while at the same time an old vessel lying in a wet slip alongside was being fitted to carry fuel oil in the double bottom where the tank top was single riveted.

Both new and old single-riveted tank tops, where fuel oil is carried in double bottoms, have proved a success. Why should there be any greater risk in single-riveting the seams for decks and trunks of tankers, which are subject to less test head and deflection, especially where the spacing is made closer for oil-tight work? This is a parallel case to double bottoms above noted, for both Lloyds and the American Bureau have vessels on their books which have been fitted with deep tanks for fuel oil, retaining the original single-riveted decking. This point has been discussed with representatives of both the above societies and one of the largest ship-owning oil companies who agreed that there would be no real objection with crude oil.

Just how far this argument could be carried for tankers intended or liable to carry bulk gasoline or other distillates is an open question. If single-riveted seams are tight for crude oil, would they be as tight or rust up tighter with gasoline? Lloyds do not permit gasoline to be carried in single-riveted double bottoms, but it is not known whether or not it would be permitted even with double-riveted seams with dry cargo above.

The writer was closely associated with the conversion of three passenger steamers to carry about 18,000 barrels of fuel oil in deep tanks forward of the fire room. The vessels had double bottoms, which were opened so far as to form part of the deep tanks, but the water-tight divisions in the double bottom did not coincide with the tank bulkheads and a portion of the double bottom under each tank formed a part of an adjoining deep tank. In other words, the transverse bulkheads extended, so to speak, under the next tank to the first double-bottom division and then down to the keel, the new part above double bottom being double riveted and the horizontal part, or what was the original double bottom, being single riveted. The after tank extended in this way under the forward fire room. These vessels have given excellent service, notwithstanding they were built during a strike where the best work could not be expected.

It is not concluded from this that it would be advisable to single-rivet transverse bulkheads in tankers, but, with a view to eliminating possible unnecessary expense, it might be well worth considering whether or not there would be serious objection to single-riveting the longitudinal seams of center-line bulkheads with the exception of the lower seam. A cargo is sometimes made up of more than one kind of oil, and it is therefore important that the transverse bulkheads be absolutely tight, but different kinds of oil have seldom been carried on opposite sides of the center-line, and it would appear that a single-riveted longitudinal bulkhead would fulfill every function the trade demands.

As noted above, Lloyds in their first announcement, more or less official, recommended three diameters for all oil-tight spacing. This was, in some cases, applied literally. Two vessels were converted in the vicinity of New York to carry oil in bulk, on which a spacing of three diameters was required in both rows of rivets in the flanges of single five-inch by five-inch bulkhead bounding bars, which both crowded the rivets and unnecessarily impaired the strength of the shell plating. Classification societies now allow a spacing of five diameters connecting bulkhead boundings bars to the shell.

Lloyds formerly recommended single double-riveted bulkhead bounding bars, but later gave the builder the option of using double single-riveted bars. The general practice now is to use double single-riveted bars with countersunk heads and points and bars caulked on both flanges on each side. The writer is inclined to favor single double-riveted bounding bars and pan-head rivets in standing flange with caulking on one side, because it is believed this lends itself to cheaper and better workmanship and would insure the parts being drawn up more closely. Countersunk heads are, of course, unavoidable in the shell flange.

On the Clyde, bulkhead bounding bars are frequently hydraulically riveted on the ground, using pan-head rivets and finishing with snap heads and points. Similar practice is universally followed in this country in the case of locomotive oil tenders and tank cars. Snap rivets driven by hand are also satisfactorily used in the construction of oil storage tanks.

There are two vessels now building for the same owner in different yards with double single-riveted bulkhead bounding bars with countersunk head rivets, where in one case every rivet is required to be caulked head and point before testing, while in the other case none of the rivets are being caulked before testing. A good pan-head rivet should never require caulking before testing. Pan-head rivets are used in the bulkhead stiffeners and are not required to be caulked before testing, which seems to indicate that it is considered the countersunk head rivet requires more doctoring.

In the case of another vessel now building, the inspectors are instructed that rivets are to be caulked before testing, in bulkhead bounding bars, heads and points, in all four flanges, also rivet points through bulkheads in clips connecting longitudinal brackets to bulkheads, while in the same instructions it is recommended that as few rivets as possible be caulked before the water test, as it is desired that the rivets be driven in such a manner as to be tight without caulking.

Where double bounding bars are fitted, careful workmanship is necessary to insure the two shell flanges lining up perfectly for intimate contact. To overcome this difficulty and with a view to better and more economical work, T-bars have in some cases been used, although the present available 6½-inch by 6½-inch T-section does not provide sufficient width of shell flange on that side on which the bulkhead plating connects to the standing flange for best spacing of the rivets. A more general use of this type of bounding bars has been recommended by some owners, and with this in view two of the large shipbuilding concerns have without success urged the steel companies to roll a larger section. Conditions, however, would be substantially the same as with single-bounding angles. Pan-head rivets could be used except in one flange, three-ply work would be eliminated, and only two edges would require caulking. A single angle as recommended above would have the same number of rivets, the same amount of caulking, and be more easily set.

In gunwale bars, Lloyds require four and one-half diameters for water-tight work and five diameters for oil-tight work, which does not seem consistent. In a recent case, one-inch rivets were spaced five diameters in a five-inch by five-inch gunwale bar for oil-tight work and appeared to be too crowded for the width of flange and size of rivets. Probably a larger bar or six diameters would have presented a better appearance.

The table herewith gives, for a number of selected parts, the rivet spacing recommended by Mr. Martell in 1894 for oil-tight work and present requirements for both oil and water-tight work of Lloyds, American Bureau, United States Navy, and British Admiralty.

Conditions briefly referred to above, no doubt, fully justify Mr. Martell in recommending a spacing of three diameters for satisfactory oil-tight work, but better design, construction and workmanship have demonstrated that strong, staunch ships can be built with wider spacing and be suitable for carrying oil in bulk. Scantlings and riveting must be sufficient to resist the stresses brought upon them, and there must be no slipping of the joints. When this condition is fulfilled, the work should be oil-tight whether the spacing is according to present oil or water-tight practice. It will be noted in connection with merchant vessels converted to carry cargo or fuel oil that the spacing is generally four and one-half diameters in the shell.

If oil-tight work depended less on the strength of the riveted joints and of the structure as a whole, and to a greater extent on spacing that would permit caulking without the edge raising, wider spacing could be used. Work that might be tight under static head would not necessarily be tight on parts subject to the working stresses of a vessel in a seaway, but might on certain parts where these stresses were in a measure absent. Any design, spacing or workmanship which will not permanently prevent the joints from slipping will not remain oil-tight.

The extensive use of fuel oil in naval vessels during the last few years has brought up for consideration and settlement many problems in design which did not exist in coal-burning vessels. In vessels of great length, such as scout-cruisers and battle-cruisers, longitudinal bulkheads are used as strength members. The riveting connections in these bulkheads must be designed to obtain maximum strength, and therefore the riveting should not be so closely spaced that more material is punched out of the plating than allowed in the calculations, without compensation. If, however, these bulkheads form boundaries of oil tanks, it becomes a matter of importance, when transverse bulkheads join the longitudinal strength bulkheads, to avoid too close spacing in the bounding bars. If the strength bulkhead is designed for a spacing of six diameters for rivets in stiffeners and oil tightness demands five diameters at a transverse bulkhead, it becomes necessary to introduce compensating liners which add to the weight and, on account of the extra thickness of plating, increase the difficulty of making the structure tight.

The hull division of the Philadelphia Navy Yard recently made a test on an experimental box to determine if a six-diameter spacing of rivets would be satisfactory under the conditions as stated above. It may naturally be expected that a wider spacing for oil-tight work can be used where the bulkheads are close together, where the stresses due to swash are not severe, and where alternating stresses are of secondary consideration. Six diameters might be quite suitable on a deck near the neutral axis, but unsuitable for the parts subject to stresses resulting from the vessel working in a seaway or from shocks of gunfire or explosion. In this test it was found that the caulking of bounding bars to heavy bulkheads was satisfactory under a sixty-foot head with a six-diameter spacing in the connection of transverse to longitudinal bulkhead and five-diameter spacing in bar connecting to the shell. No gunning was used and no special effort made to have the box absolutely tight on the first test.

A similar tank was also recently tested at the New York Navy Yard to demonstrate the efficiency of six-diameter spacing for T-bar stiffeners and for bounding bars to bulkheads. The tank was first subjected to a test head of sixty-five feet of water and found to be tight; then to a twenty-four hour endurance test with oil at the same pressure. Then the pressure head was increased to ninety-three feet, which pressure was maintained for fours hours without leaks.

The results of the tests appeared to indicate that in fairly heavy plating, where the members are not under the influence of other stresses than those due to head, six diameters are suitable. The thickness of angle bars, it was suggested, should preferably be not less than three-eighths of an inch.

It is understood that further tests were directed to be made on experimental tanks at navy yards, as the Navy contemplated revising its rules for oil-tight riveting due to the very considerable increase amount of oil-tight work involved by new construction. A description of these tests in greater detail would be interesting, but unfortunately full particulars are not at hand.

It has been the practice in naval work to use a spacing of three and one-half diameters for oil-tight work in seams and straps, four diameters in angles to plates including staples, and four and one-half diameters on bulkhead stiffeners if caulked oil-tight. This is a closer spacing than is required for water-tight work. Experience in the construction of oil tanks in double bottoms seems to indicate that, with ordinary good workmanship, water-tight spacing will be satisfactory for oil. While the naval authorities are not prepared to make the spacings the same, a compromise has been made allowing a somewhat greater spacing than called for by the navy rules for oil-tight work. For single riveting three and one-half diameters are retained, but four and four and one-half diameters, depending on the thickness of the plates, are now accepted; five diameters are used in bounding bars of oil-tight floors.

One of the larger builders, as a result of mathematical analysis, has suggested the following spacing as permissible, provided that considerations other than oil-tightness did not determine the spacing:

Diameter of Rivet	Thickness of Plating	Spacing in Diameters
3/4-inch	5/16-inch	3.6
3/4-inch	3/8-inch	4.2
7/8-inch	1/2-inch	4.9
1-inch	3/4-inch	5.6
1-1/8-inch	1-inch	6.3
1-1/4-inch	1-1/4-inch	7.0

The above spacings were based on the supposition that three and one-half inch diameters were satisfactory for a ten-pound plate using five-eighths inch rivets, and assuming that the deflection of the plate edge caused by caulking probably varies as the ratio of the fourth power of the distance between rivets to the fourth power of the thickness of the plating, and that the extension of the rivet varies as the ratio of the distance between rivets to the area of the rivet. In order to make practical use of the above it was suggested that water-tight spacing be used for rivets in oil-tight work on naval vessels.

A naval constructor stationed at the same yard carried the investigation further by considering the deflection that is caused by caulking and by the amount of general deflection of plating due to the water pressure, and suggested that, based on the assumptions made, the following spacing would be satisfactory: 15-pound plate, 4 diameters; 20-pound plate, 4.5 diameters; 25-pound plate, 5 diameters; 30-pound plate, 5.3 diameters; 35-pound plate, 5.6 diameters.

The above tables were deduced without reference to strength of joint and it was pointed out that this consideration might be more important than questions of tightness. For five-eighths inch rivets in ten-pound plating it was shown that approximately .006 inch is the deflection or amount of seam that can be caulked off without exceeding the elastic limit of the material. The stress on the rivet for such caulking was found to be very moderate.

The analysis used in arriving at the above tables of rivet spacing for oil-tight work was made to confirm a theory that every unnecessary rivet is a possible source of leakage, and that for heavy plating a wider spacing would be permissible, but considered only the stresses on the plating and rivets due to caulking to the exclusion of the more complex stresses experienced under service conditions.

For thin plating, where large rivets in relation to thickness are used, the diameter is based more nearly upon theoretical considerations, but if the same considerations were followed in determining the diameters for thicker plates, the rivets would exceed the limit practicable to drive, and spacing based even on using the same number of diameters would at some point become greater than indicated in the tables. Thick plates, however, are used where greater strength is required, and as the rivets used are much smaller in relation to thickness a greater number is necessary to develop the strength of the plating. The uniform spacing in diameters adopted in practice, substantially, for all thicknesses of plating, is a great convenience, and it is only necessary to increase the number of rows of rivets where greater efficiency of joint is desired. If the spacing suggested in the above tables is suitable for oil-tight work, it might be necessary to increase the number of rows to insure proper strength and friction of the joint, in which event there would be an increase in weight and the attempt to reduce the number of rivets defeated.

	Martell, 1894	Lloyd's 1919-20 rules		American Bureau 1919-20 rules		U. S. Navy		British Admiralty	
	O T	O T	W T	O T	W. T	O. T.	W T	O. T	W. T.
Shell plating seams	3	3½	4	3¾	4½	3½	3½-5	4	4-4½
Deck plating seams	3	3½	4½	3¾	4½	3½	3½-5	4	4-4½
Bulkhead plating seams	3	3½	4½	3¾	4½	3½	3½-5	4	4-4½
D. B. plating seams	3	3½	4	3¾	4½	3½	3½-5	4	4-4½
Tunnel plating	3	3½	4½	3¾	4½			4	4-4½
Frames to shell	6	6	7	6	*	8		4	7-7½
Deck bars		5	4½				4½	4	4½
Bulkhead bounding bars	3	5	5	5	5	5	5½	4	4½
Bulkhead stiffeners	6	6	7	†	†	6	6	6	7
Tunnel stiffeners	6	6	7	7	7			6	8
Shell butts	3	3½	3½	3¾	4½	3½	4½	4½	4½-5
Deck butts	3	3½	4	3¾	4½	3½	4½	4½	4½-5
Bulkhead butts	3	3½	4½	3¾	4½	3½	4½	4	4½-5
D. B. butts	3	3½	4	3¾	4½	3½	4½	4	4½

* 7 up to 27-inch frame spacing.
6 above 27-inch frame spacing.
5½ inch deep tanks.

† 7 generally.
5½ deep tanks.
4 for 15 per cent length each end.

SURFACE CONDENSERS

By LUTHER D. LOVEKIN, ESQ.[*]

ENGINEERS as a rule are always deeply interested in the conservation of natural resources, whether it be in connection with either marine or stationary appliances, and while for a long time the stationary field seemed to lead in economies, "and justly so on account of the space available," the marine field has of late received its share of attention in various directions since the advent of the turbine.

In the earlier days, when the old reciprocating engine held full sway, it was useless to consider high vacuums, as there was no economy to be had by the use of a high vacuum on account of the large volumes of steam to be cared for. In other words, any vacuum above twenty-five inches really proved to be a loss rather than a gain, as one might expect, due to the design of the ordinary reciprocating engine being such as to make it incapable of economically expanding the steam further than referred to.

Every engineer knows the great value of expanding steam as far as possible, providing it can be utilized economically, and the steam turbine has enabled us to go the limit in this respect. This has opened up a new field for surface condenser designing, and remarkable strides have been made by many engineers in this direction during the past few years.

The stationary engineers of the world, with the wonderful research laboratories at their command and the further advantages in being able to make exhaustive tests on actual installations, undoubtedly led the way for improving vacuum and also for taking care of other losses incident to high vacuum, and the marine engineer has been, and should be, content to profit by their experience in developing means for insuring high vacuum under decidedly different conditions.

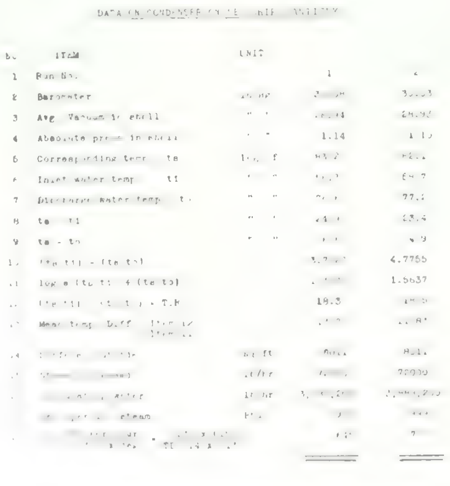
The marine engineer has an unlimited supply of water at his command with no cost other than the amount expended for pumping it through the condenser, while the stationary engineer has in many cases to pay for the water he uses. This has brought about various methods for using the same water over again, but costs money and therefore gives the marine engineer an advantage.

Other items that the marine engineer has to consider seriously are weight and space, so that what might be good engineering for stationary practice in condenser design would be impossible for marine practice. I refer more particularly to tubes above seven-eighths inch in diameter being used; in fact, all condenser tubes for marine work are practically confined to two sizes, namely, five-eighths and three-fourths inch outside diameter.

Apart from the design of condensers for steam turbines, marine engineers have shown little interest in designs for surface condensers, and even at the present time we find many engineers specifying condensers having so many square feet of surface per horsepower and a certain size of tube, with no regard whatever for the principal features of condenser design, such as velocity of water and the tube length necessary for extracting the British thermal units in the steam.

One might think that we had no knowledge of what a surface condenser really is if he could hear the arguments presented by various men who are unfamiliar with the principles of heat transmission, and, believe me, there are many such men who will neither take the time to study the proposition themselves nor profit from those who have made it a special study. The author is free to admit that until the past few years he was one of these men who were satisfied to design his condensers on a basis of so many square feet of surface per horsepower and trust to luck for the rest, knowing, however, that he could establish a good precedent for following such a crude practice by referring to many so-called successful installations on other ships. How many millions of dollars have been wasted in the past by following such practices will never be known, but the time has come when we must conserve both our natural as well as our physical resources, and to do this we must lay aside all prejudice and abide by facts. It is no disgrace for one engineer to know more than another about a certain subject, so why throw up our hands in horror at a new suggestion? Why not analyze or cause to be analyzed new suggestions and give encouragement to those who are willing to see or bring about new suggestions instead of saying, "The old practice is good enough for me."

Some interesting figures and designs are here presented which are the result of much thought on the problem of surface condensers. Data from the official trials of the battleship Tennessee, which is fitted with main and dynamo condensers of the author's design, embodying many new and valuable features, was also to have been included, but we must be content with the showing made by the United States transport Cantigny, as the trial of the battelship has been delayed.



DATA ON CONDENSER ON [illegible]

No.	ITEM	UNIT		
1	Run No.		1	[illegible]
2	Barometer	In. Hg	[illegible]	[illegible]
3	Avg. Vacuum in shell	" "	[illegible]	[illegible]
4	Absolute press. in shell	" "	1.14	[illegible]
5	Corresponding temp. ts	Deg. F	[illegible]	[illegible]
6	Inlet water temp. t1	" "	[illegible]	[illegible]
7	Discharge water temp. t2	" "	[illegible]	77.[illegible]
8	ts − t1	" "	[illegible]	[illegible]
9	ts − t2	" "	[illegible]	[illegible]
10	(ts − t1) − (ts − t2)		[illegible]	4.7755
11	log e (ts − t1) ÷ (ts − t2)		[illegible]	1.5637
12	[illegible] = T.R		18.3	[illegible]
13	Mean temp. Diff. Item 12 / Item 11		[illegible]	[illegible]
14	[illegible]	Sq. ft.	[illegible]	[illegible]
15	[illegible]	lb/hr	[illegible]	72000
16	[illegible] water	lb/hr	[illegible]	[illegible]
17	[illegible] steam	[illegible]	[illegible]	[illegible]
18	[illegible]		[illegible]	[illegible]

[illegible] circulating water thru tubes [illegible] feet per second.

Unfortunately we had no water measurement from the Cantigny either as to steam condensed or the amount used for circulating purposes, but to one familiar with turbine designs the amount of steam used can be determined with a reasonable degree of accuracy without weighing. Therefore the figure given me by our engineering department from trial data sheets will be used.

These condensers have shown such uniformly good results as to leave little further to be desired. Condensers of this same principle have been designed and built for use in connection with reciprocating engines and the tests made prove the principle to be correct.

It might be interesting to some of the author's associates to learn the reason for his departure in condenser design instead of following the beaten path which is so easy. Therefore, a few facts in connection with his work in this line will be given.

During the years of 1907 to 1910 the author made some very interesting and instructive tests in heat transmission for various purposes. These were followed by numerous tests on the same apparatus by the Engineering Experiment Station at Annapolis, Maryland. In 1915 he made a series of tests on single tubes, five-eighths inch outside diameter, placed inside of tubes of varying diameters. With a five-eighths inch tube, about four feet long, placed inside of a tube about one and one-half inches inside diameter, a temperature rise of 60 degrees Fahrenheit was obtained. By placing this same five-eighths inch tube inside a tube two inches inside diameter, a temperature rise of 100 degrees Fahrenheit was obtained with the same steam pressure and the same conditions of test. This showed conclusively that the steam space surrounding the five-eighths inch outside diameter tube was a most important factor.

The author then ran a series of tests with varying velocities of water and, much to his amazement, obtained a heat transfer of about 2750. An apparatus was then built having about 100 tubes, five-eighths inch outside diameter, with the conventional tube layout, and this apparatus was tested exhaustively by the engineers at the Annapolis station in both vertical and horizontal positions, these results showing a heat transfer of about 1000. This clearly proved the advantage of having ample steam space between the tubes, so it was decided to design a surface condenser with tubes spaced well apart at the entering rows and to gradually decrease this spacing to normal at the point where the condensate left the tubes.

The experiments on the various appliances showed that it was a serious mistake to fill up an enclosure with as many tubes as it could hold and call this a proper surface condenser design, as nothing could be gained by having the steam or condensed vapors traverse a mass of tubes after it had been condensed. Why not endeavor to produce a design whereby a maximum inlet area between the tubes could be obtained, so that with a volume of steam corre-

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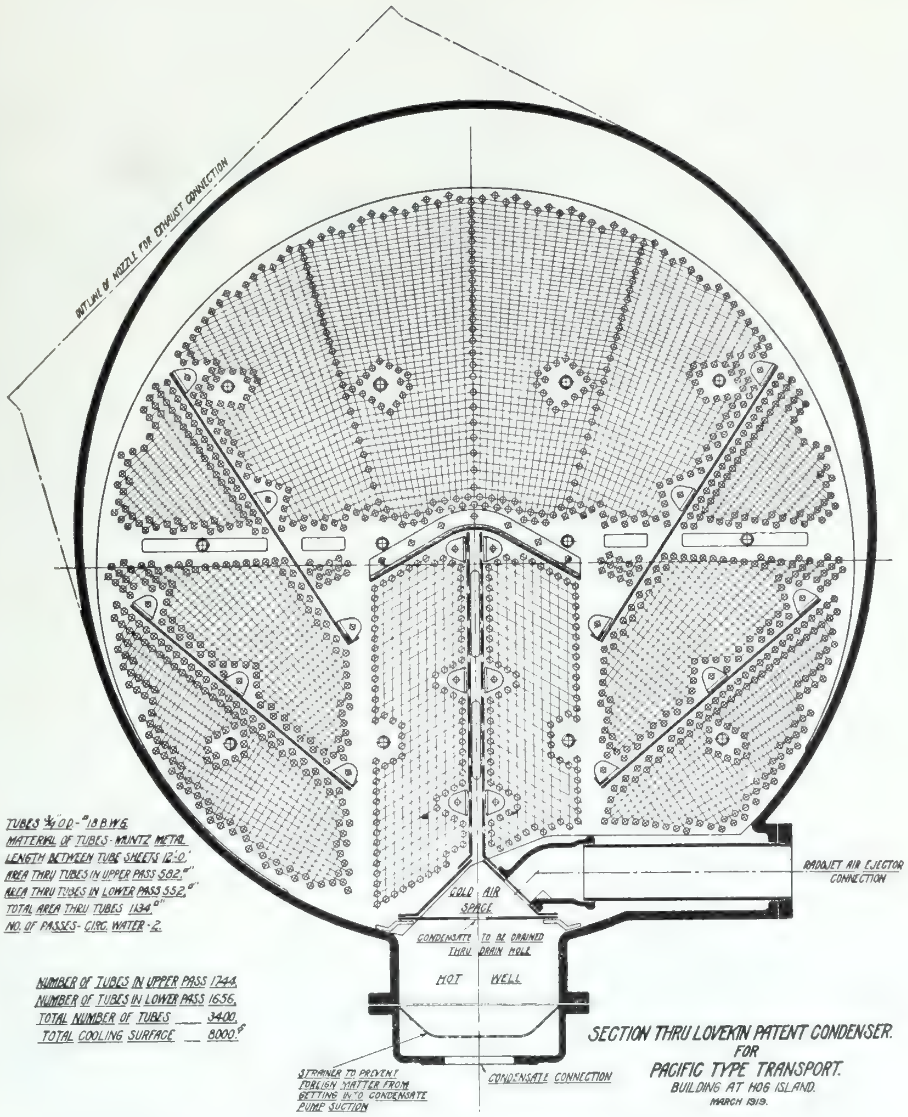
[*] Read at the twenty-eighth general meeting of the Society of Naval Architects and Marine Engineers, held in New York, November 11 and 12, 1920.


OUTLINE OF NOZZLE FOR EXHAUST CONNECTION
TUBES ¾" O.D. - #18 B.W.G.
MATERIAL OF TUBES - MUNTZ METAL
LENGTH BETWEEN TUBE SHEETS 12'-0"
AREA THRU TUBES IN UPPER PASS 58.2 □"
AREA THRU TUBES IN LOWER PASS 55.2 □"
TOTAL AREA THRU TUBES 113.4 □"
NO. OF PASSES - CIRC. WATER - 2.
NUMBER OF TUBES IN UPPER PASS 1744.
NUMBER OF TUBES IN LOWER PASS 1656.
TOTAL NUMBER OF TUBES ___ 3400.
TOTAL COOLING SURFACE __ 8000.□'
RADOJET AIR EJECTOR CONNECTION
COLD AIR SPACE
CONDENSATE TO BE DRAINED THRU DRAIN HOLE
HOT WELL
STRAINER TO PREVENT FOREIGN MATTER FROM GETTING INTO CONDENSATE PUMP SUCTION
CONDENSATE CONNECTION
SECTION THRU LOVEKIN PATENT CONDENSER.
FOR
PACIFIC TYPE TRANSPORT.
BUILDING AT HOG ISLAND.
MARCH 1919.

Diagramatic Cross Section of the Lovekin Surface Condenser Designed for U. S. Army Transport Cantigny

sponding to a vacuum of 28½ inches we would have a velocity of about 100 feet per second or less? Instead of the conventional method of permitting this steam to travel through a bank of tubes after it had already been condensed and allowing the cold circulating water to cool the condensate unnecessarily, "as it does in all condensers of ordinary design," it was decided to reduce the depth of the bank of tubes to about half of that ordinarily used and to permit the condensate to be drained from said bank of tubes at its maximum temperature, "which should be approximately that of the temperature corresponding to the temperature of the vacuum."

Realizing the great value of reducing the volume of air and non-condensable vapors, a liberal cooling chamber was provided of efficient form, this chamber also to condense any vapors that remained and the condensate from this chamber to fall into the common condensate space, where it would be removed at the bottom of the shell. When used for battleships or the like, this air cooling space was enlarged, thereby providing about 40 per cent of the total tube surface. This enabled the outer portion of the condenser to serve as a primary condenser and the so-called air-cooling space a secondary condenser.

Thus, when the turbines are operating at less than full load, "and particularly at steam capacities below half that of full load," the primary condenser can do all the work and retain its heat in the condensate instead of falling over a bank of tubes equal to about one-half the diameter or depth of the condenser, for no other purpose than to reach the bottom of the condenser so it can be drained off by the pump. Draining the condensate off in stages after it has been condensed appeared to be more rational, and the test data confirm this belief.

It is a matter of common occurrence with this condenser to have the temperature of the condensate and the temperature corresponding to the vacuum within a fraction of a degree, and where the temperature of the outboard delivery is kept within five to eight degrees of the temperature corresponding to the vacuum, the condensate continues to keep close to the temperature corresponding to the vacuum. If a wider range of temperatures be used, the results are very pronounced; that is, if the outboard delivery temperature is within twelve to fourteen degrees of the temperature of the vacuum in the condenser, the condensate will invariably show ten to twelve degrees higher than the temperature of the outboard delivery, thus showing that when pumping more circulating water through the condenser the temperature of the condensate still remains high. It has long been known that infiltration of air through cast-iron condenser shells is the source of great trouble and annoyance with high vacuums. In order to reduce this to a minimum we made tests without any coating on the shell, then with one coat of bitumastic enamel, and finally with two coats of enamel. The effect of the final coat was an improvement of nearly one inch of vacuum under the same conditions.

Particular attention is called to the air channel way in these condensers, it being formed of two plates running the entire length of the space between the tube sheets, these plates being spaced apart and having their sides perforated with small holes over the entire plate. This is done so as to prevent any air pockets being formed in any part of the condenser. Where the condensate pump and air ejectors are used, such as in the proposed surface condenser for United States battle-cruisers, the condenser head is cut away so as to clear the air ejector connection. This makes a very simple connection and yet prevents the air pipe being flooded with water. In order to ascertain the height of the water in the condenser shell, a water gauge glass can be connected between the condensate suction pipe and the shell which will readily show the height of condensate, if any, within the condenser shell.

It will be noticed that small angle bars are placed in the lower edges of all the drain plates. These angle bars are not continuous, but simply consist of short pieces with clear spaces of equal length between them so as to prevent the formation of a continuous sheet of water the entire length of the condenser running into the condensate space, which might interfere somewhat with the vapor and air entering the secondary zone.

It is almost unnecessary to state that the design of a surface condenser for battleships and the like which are subjected to their maximum speeds for comparatively short intervals of time is an entirely different proposition from that of the merchant ships, where the maximum speed is run the greater part of the time. In a case of the battleships we can afford to force a greater amount of water through the tubes than we can in the case of a merchant ship, for the reason that the cost of pumping the water for the short time that these vessels run under their maximum conditions is more than offset by the reduced size, weight and space which can be obtained by using more water.

In conclusion, I wish to emphasize the fact that had the marine engineers of the world fully understood the principles of surface condenser design during the past twenty-five years, as well as they do today, the surface condensers for most of our reciprocating engines in the merchant service could have been built with from 25 to 50 per cent less surface and still had the same reserve factor for dirty tube surface. This would have been a valuable conservation of both our physical as well as our natural resources.

HEAT LOSSES IN ELECTRIC STEEL FURNACES

By FRANK HODSON
President Electric Furnace Construction Company.

AN excellent paper was recently presented before the American Electro Chemical Society, Cleveland meeting, by Mr. M. R. Wolfe and V. de Wysocki on the heat losses through electrodes on a three electrode 6-ton furnace.

The figures given in this paper will, no doubt, surprise many electric furnace users as to the amount and cost of power they are losing through the furnace roof. After a close study of this particular problem for the last four years, the writer is only surprised that the losses recorded were not larger. If the amount of heat in the shape of flame that escapes from most furnace roofs were taken fully into account, the loss would be found to be nearer 30 than 18.7 per cent. The method employed by the authors of the paper, whilst giving actual heat losses from the electrodes, only gives heat absorbed by the water cooler—a great deal more than this is usually lost.

In considering these heat losses, which perhaps would be better described as through the furnace roof rather than through the electrodes, it might be interesting to consider how the conditions governing the loss of heat and power can be improved.

Broadly speaking, the causes are:

(1) Heating up of electrode, due to faulty electrode joint or defective electrode.

(2) Heating up of electrode, due to imperfect contact or badly designed electrode holders.

(3) Heating up of electrode, due to electrode penciling off at point of arc.

(4) Heating up of electrode, due to oxygen from the air combining with the carbon of electrode and burning off.

Item 1.—Special care should always be taken in jointing up electrodes—troubles due to this become increasingly worse as the melt proceeds. Good qaulity electrodes can now be purchased and it is economical to pay even a little higher price for proven brands.

Item 2.—Design of electrode holder should be carefully considered and changed if undue losses occur. With proper contact, little or no heating should occur here—on our own furnaces we have not found it necessary to install water cooled holders, looking upon these as an admission of failure to get proper electrical contact.

Items 3 and 4.—Penciling of electrodes. This is probably the indirect cause of more heat losses than any other feature. It is accentuated in cases where too large a space is left between the electrodes and the cooling ring, or where the furnace doors are not kept properly closed at the bottom or where, as in some cases, the melter has to unduly open his doors to inspect or rabble his molten charge. The air strikes the white hot electrode and burns away carbon, the hole in the roof acts as a flue draft, and the electrode pencils off, so that at the bottom, or arc end the area is often only one-fifth of what the furnace builders have designed to carry the power behind the furnace. The current continues to flow through this restricted area and its resistance to the current results in the whole electrode heating up, and dissipating energy which should have been concentrated in the arc. This heating also causes trouble with the joints, with the holders and all the outside electrical connections. Sometimes large pieces or flakes of electrodes break off, due to the increased resistance.

With the above facts in mind, our metallurgists have been working for the last five years to try and prevent this penciling and heating up of electrodes. It was realized early in the investigation that if the flame could be prevented from blazing out at the top penciling would be largely overcome. Experiments have been made with over a dozen different types of water cooler, and also attempts were made to insert gas under the furnace roof.

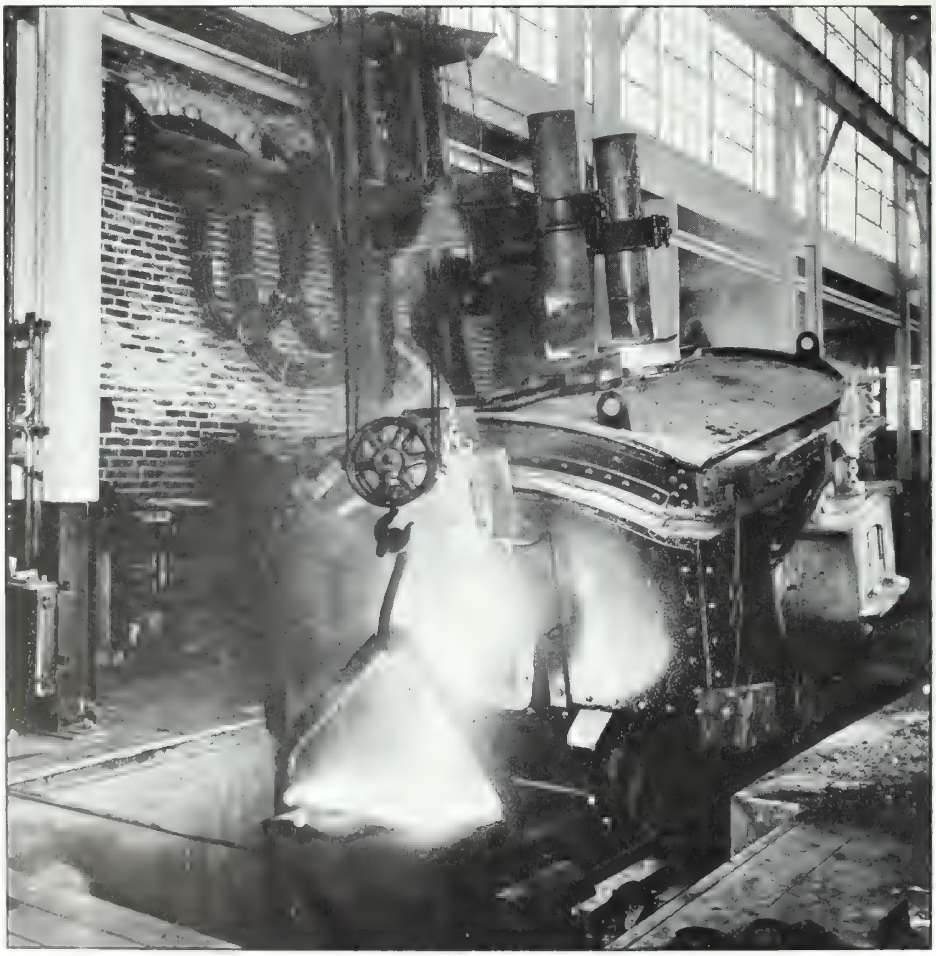
As a result of these experiments, Mr. F. W. Brooke, vice president of the Electric Furnace Construction Company, has developed a type of electrode cooling ring or "electrode economizer," now fitted as standard on all Greaves-Etchells furnaces, that really does prevent this flame and consequent penciling of electrodes and other troubles caused thereby.

These economizers have been fitted to a number of furnaces and have stood up remarkably well. Some have been in constant operation for six months, and are as good now as the day installed. The invention is covered by patents, but the company can supply these for all types of furnace. A full description of this device was presented at the recent meeting of the Association of Iron and Steel Electrical Engineers, by Mr. E. T. Moore, chairman of the Electric Furnace committee, pages 92 to 95, September, 1920, report, but a brief description will probably interest A. E. S. members.

The Brooke "economizer" depends for its action on the well known scientific fact that hot gases under pressure, if suddenly allowed to expand, quickly lose their high temperature. The gases generated in an electric furnace are only combustible at high temperature and in the presence of oxygen. All other cooling rings simply content themselves with cooling these burning gases. In the Brooke economizer the gases never do ignite, the roof ports and the electrode are kept reasonably cool and the gases leaving the furnace are at too low a temperature to ignite.

The design differs slightly with amorphous or graphite carbon electrodes, but the effect is that no flame is seen from the top of the furnace and the electrodes do not pencil off.

On a recently installed four-electrode furnace, the monthly figures were 12½ pounds of graphite electrodes per ton. The average over six months was 13 pounds.



Greaves-Etchells Electric Furnace of 3 ton capacity equipped with the new Electrode Cooling Ring. Note that no flames are coming through the rings on top of the furnace. Picture taken at the Dodge Steel Company's plant, Tacony, Pennsylvania.

Material Handling

DEVELOPMENT OF A SEAPORT

Some Comments and Suggestions for Harbor Engineers

By P. H. DOUGLAS
Port and Terminal Engineer for the Wellman-Seaver-Morgan Company, Cleveland, Ohio.

THE success of any port is to a great extent dependent upon the time required for a vessel to unload her cargo, take on return cargo and supplies, bunker and clear; also upon the speed with which the freight being shipped or received can be assembled or distributed. To secure the desired results it is obvious that a certain high degree of efficiency must exist in the organization for the control of the port, zoning of cargoes, mechanical equipment for handling cargo at ships side ,transit sheds and warehouses with rehandling devices, railway storage yards, loading and unloading tracks, trucking system, bunkering facilities, means for ship repairs, labor and stevedoring, tugs, barges and lighters. All these have a direct bearing on the "turn-around" of ships, and each must receive its proper consideration.

It is evident that a quick "turn-around" means either one of two things—that more ships can be handled during a year with a specified investment, or the investment required to handle a given number of ships will be less.

The majority of American ports, have up to the present time, presented vivid object lessons of lack of foresight and poor judgment in planning for the future. This is being overcome but at a tremendous cost and delay, which could have been avoided by careful study at the time the port was established or developed. As an example, at one of our leading ports the cost of delivering miscellaneous general merchandise from ships to cars or trucks has been given as $21 per ton, exclusive of insurance adjustments or recooperage of damaged packing.

Too much attention cannot be given to the proper layout of the adjacent railway terminals, and the economical handling and distribution of freight cars. According to statistics there are in the United States approximately 2,450,000 freight cars. They are in motion only 9 per cent of the time; 11.3 per cent being consumed in loading; the same time in unloading; while 68.4 per cent of the time is wasted in switching or unnecessary delays, and repairs. One hour saved per day on each car would give an equivalent of 102,000 additional cars.

It is claimed that during a single day 240 ships lay idle in one of our eastern ports, due to the lack of facilities for quick handling. It has been estimated that the "ship delay" waste amounted to $750,000 per day.

Again, at another Eastern port we have a concrete example of a coal burning vessel of about 6500 tons dead weight, docking to discharge a miscellaneous cargo of 2700 tons, and take on a similar one of 3800 tons. The average rate of discharge was 4¾ tons per hatch per hour and the average loading 5½ tons per hatch per hour. This operation should have been at the rate of not less than 50 tons per hatch per hour. She spent 15 days in port, two of which were consumed in bunkering after she was fully loaded. Six days total should have been ample. As the average daily expense including overhead and depreciation was nearly $4000, the saving of nine days time would have been approximately $36,000.

These illustrations are given to show that the excessive cost of shipping turn around is unnecessary. It is only reasonable to expect that where there is any choice of ports, ships will dock at those from which they can clear in the shortest time, as by so doing they can materially increase their earnings.

An exhaustive study of all the governing conditions should be made by a competent engineer or committee of engineers before the final layout is adopted. This engineer or committee of engineers should be familiar with not one, but all of the different requirements of a successful port. Climatic and tidal conditions, topography of the site selected, present water depths and dredging possibilities, foundations, labor situations, railway facilities, tonnages and classification of cargoes to be handled, as well as other governing features must be carefully considered.

If a port can be open for only a part of the year, special consideration must be given to the warehousing problem, as a greater capacity and a different arrangement will be required than for one through which a fairly regular flow of freight can be maintained.

Mechanical equipment, while a prime factor in the quick and successful operation of any port, loses its value to a great extent if adequate shed and warehouse facilities are not provided permitting a serious congestion and preventing the "flow" of freight.

The first point to be determined is whether the pier or quay construction shall be used. This will depend somewhat on the tidal conditions as well as on the available waterfront as compared with the tonnage for the handling of which provision is to be made. Geography and tidal conditions permitting, it is generally conceded, and we believe rightly so, that with an undeveloped waterfront, underlaid by fairly good foundation materials, a better and more efficient layout can be made on the quay system than on the pier system. Undoubtedly the former provides for a quicker flow in the transit sheds as the truck haul is naturally less and the subsequent recommendations are on this basis.

The arrangement of piling and the detail construction of the pier or quay can only be determined by local investigation.

The volume of tonnage to be handled may call for consideration of separate divisions in equipment and construction. These may be conveniently classed under type of cargo handled as: Miscellaneous package cargo; bulk cargo; cotton, wool or similar baled cargo; open wharfage for lumber, steel and similar materials; grain elevators and flour mills; cold storage; bunkering; general equipment; belt line railroad.

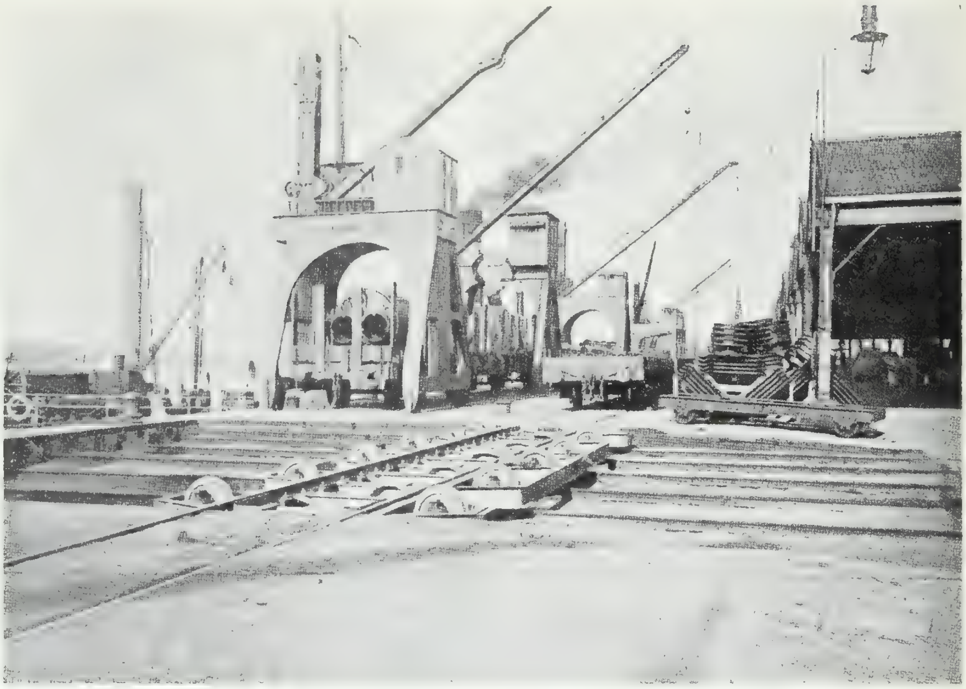
Miscellaneous Package Cargo.

This first division is probably the one to which the least thought has been given in many ports. Beginning at the ship's side there should be an "apron" or landing space, 20′0″ to 25′0″ wide, surfaced with concrete, adjoining which is the transit shed. The apron should have one or possibly two railway tracks, with rails set flush with the floor to facilitate trucking, and should be spanned by semi-portal gantry cranes, one crane rail being on the apron, the second on the transit shed. In some cases where, for local reasons, the transit sheds do not extend the full length of the dock, full portal cranes are necessary.

If certain layouts necessitate a narrow apron, roof cranes may be used advantageously. The semi-portal type however has been more generally adopted. Each crane should be of approximately three tons capacity and capable of handling fifty tons per hour, under normal favorable conditions, which can be done readily by a properly designed machine. It is considered good practice to provide one crane for each 100 feet of berthing space or one crane per hatch for the total number of ships to be handled at one time.

The transit sheds should be of tile or concrete construction with rolling or folding doors 16′0″ to 20′0″ wide by about the same height. To insure against congestion they should be two stories high, the second story being set

A Few Installations For Handling General Cargo at a European Point



The ports of Europe have for many years recognized the economies gained through mechanical handling of cargoes, and in all the important harbors of Western Europe machinery of proven efficiency has been installed with great profusion. The rule usually is one three to five ton crane for each 100 feet of berthing space.

back about 12'0" to 15'0" to provide a landing platform. If this construction is used incoming freight can be received on the first floor and outgoing freight assembled on the second floor. In either case, the shed must be wide enough to receive practically the entire ship's cargo in a length equal to that of the ship. Economy of space may be secured by stacking or tiering freight to a height of about 15 or 16 feet, by means of mechanical stackers, tiering machines or inclined conveyors. Automatic freight elevators should connect the two floors.

As the cargo is removed from the ship by the cranes, it should be lowered onto platform trucks or trailers, formed into trains of four or even more trucks, coupled to an electric tractor. By leaving ample aisle space in the sheds the tractors can deliver the freight to the location where it is to be stored temporarily, thus aiding materially in assorting the various commodities.

If desired, the trucks can deliver the freight inside the shed where it is transferred to its destination by monorail hoists suspended from the ceiling or roof trusses.

Still another method is to land the freight on conveyors which deliver it far enough inside the shed for the mono-rails or inside cranes to reach it. This latter system is conducive to congestion, and of the three the former is preferable.

The process for handling outgoing freight on the second floor is just the reverse of that for incoming freight, but due to the fact that there is generally more time available for assembling the cargo for an outgoing vessel, a little less floor space is permissible. This allows setting the second story back to provide the landing platform.

The ware houses should be directly behind the transit sheds, being separated from them by a roadway of ample width. Connection should be made to the second story of the shed by frequent enclosed elevated passageways of sufficient width to permit two trains of loaded trucks to pass.

The size of the warehouse will depend entirely on the length of time freight must be stored as well as the average daily tonnage. In addition to trucks, tractors, stackers, tiering machines and conveyors, the warehouse should be equipped with large platform automatic type elevators. A small portion of the first or second floors may be utilized as a charging station for the tractors and similar equipment operated by storage batteries.

Above all, both the transit sheds and warehouses must be of absolutely fireproof construction, and an adequate sprinkling system should be provided.

The arrangement of railway tracks, roadways, etc., in connection with the sheds and warehouses can best be determined after the general layout is tentatively decided upon.

Bulk Cargo.

It is impossible to make any concrete recommendations for this class of cargo, without analyzing the local conditions. It is not likely that any system such as is in use on our Great Lakes could be considered, as this requires specially constructed boats for unloading. In general a battery of gantry cranes may be advantageously used, fitted with grab or clam shell buckets of from ¾ yard to 2 yards capacity, depending upon the material to be handled. In some cases specially constructed conveyors might be employed economically, either to operate directly with the ship or in connection with the gantry cranes. The cargo can be left in open storage on the dock if not subject to deterioration by exposure to the elements.

If open storage is not permissible, the freight may be transferred to storage sheds at the rear of the open space, either by means of traveling bridges, transfer cars or belt conveyors. The size and arrangement of the storage sheds and the transfer system can only be determined by a careful consideration of actual or future conditions for which provision is to be made. One gantry crane per hatch and equivalent mechanical equipment throughout should be provided to secure the best results.

Baled Cargo.

The same recommendations apply here as for miscellaneous package freight with the exception that if the tonnage is great enough a special section may well be provided for these commodities. In this case the transit sheds might, advantageously be of different construction, being built on the compartment plan, each compartment being separated from the next by a fireproof wall, greatly reducing the fire risk. A small traveling crane serves each compartment and is so arranged as to take the bales from or deliver them to the landing platform. Electric tractors and trailers will be found to be most excellently adapted to handle this class of material to and from the warehouses and on the wharf apron. If there is not sufficient baled tonnage to warrant a separate docking section the handling may be combined with that of the miscellaneous cargoes.

Open Wharf Storage.

The amount of water frontage devoted to this work can only be termined by a study of actual conditions, but probably 1000 to 1500 feet will suffice. In general, very satisfactory results can be obtained by equipping the wharf with gantry cranes of about 100 feet span, each fitted with a traveling revolving boom trolley or carriage similar to those ordinarily used on dock cranes. The front, or water side leg of the crane should be set back a sufficient distance from the water line to admit two railway tracks which will be found of great convenience in handling freight direct between ship and cars.

For temporary storage of such freight as would be injured by exposure to the elements, one story sheds might be installed, parallel to the water line and located in such a position that materials could be deposited on trucks directly in front of them.

A standard gauge electrically operated locomotive crane would also prove to be a desirable piece of equipment for this section. Railway tracks may be located in the front or to the rear of the sheds as the accepted layout may dictate.

Electric tractors and trailers, in conjunction with a mono-rail or crane system within the sheds would hold the hand labor to a minimum.

Grain Elevators.

If such a unit is to be installed the elevator should be provided with conveyors and traveling or adjustable spouts for discharging directly into the ship's hold. The conveyors should be on elevated trestles at the water side and extend the full length of the berthing space allotted to this commodity. Both elevator and mill, if the latter is included, may be set back a convenient distance from the water front. If the quantity of grain handled is great enough the use of special box car unloaders may well be considered. All conveyor systems, cleaning and drying apparatus should be the most modern. Automatic sacking scales may be advantageously used for sacking grain when it is to be shipped in this form.

The entire construction must be fireproof and additional fire protection afforded by automatic sprinkling systems. Special traveling conveyors may be installed for handling sacked grain, or sacked or barreled flour. In many cases gravity and power conveyors will prove more economical in loading such materials if local conditions will permit their use.

In certain localities, ports have experienced very satisfactory financial returns by putting in flour mills for milling the grain before shipment to its destination. Whether or not such an investment would prove profitable, depends entirely on conditions existing in that particular section.

The Northern Central Elevator in Baltimore and the Public Grain Elevator at New Orleans have proven both economical and successful and might well be followed as a model.

Cold Storage.

Assuming such a plant is to be incorporated, it might well be located in the miscellaneous cargo section, back from the water front adjoining the warehouses. Duplicate refrigerating units of the latest type should be installed. As the demand for this plant may be uncertain, it might be well to build one or two stories at first, of such strength and with such foundations that additional stories may be added in the future. The arrangement of the refrigerating machinery should be made with this in mind. Little mechanical equipment for handling will be required. Electric platform trucks would prove useful for transferring goods. Tracks with portable hangers should prove sufficient for a great percentage of the goods handled. The different floors should be connected by automatic freight elevators.

Bunkering.

As in the foregoing, the facilities required for bunkering will depend altogether on the tonnage to be handled. For coal bunkering or loading on a large scale a car dumper and loading tower such as is used by the Southern Railway at Charleston, S. C., is desirable.

For regular bunkering from barges or lighters the Michener Coal elevator, has proven very successful. Ordinarily it is arranged for side hatches but can be provided with a cross conveyor or attachment for top hatches. This method permits the ship to be at least partially coaled at the same time that the cargo is being discharged.

There are a number of different types, more or less successful, of floating bunkering devices, consisting in general of a vertical elevator with adjustable discharge spout, working in conjunction with a hopper or lengthwise conveyor, all mounted on a barge or lighter.

A fourth but much less desirable method employs the use of a locomotive crane or derrick, on the dock or on a barge using a grab bucket which discharges the coal into portable hoppers placed over the coaling hatches during the process. Such a method could only be used for a very limited tonnage and will not be found highly satisfactory even for this.

If provision is to be made for oil burning vessels it can be very simple, consisting of a storage tank located in an isolated section and connected to a pipe line along the dock edge with flexible or jointed loading pipes attaced at proper intervals. A pump in the line could be utilized for feeding oil into storage from cargo or for filling the fuel tanks on the ship.

Belt Line Railroad.

As the success of any port depends greatly on the timely assembling and distribution of freight it is strongly urged that such a railroad be established under direct ownership or control of the port authorities. This road should connect with all trunk lines as well as the track system of each department of the port.

General.

In conclusion, too much stress cannot be put on the necessity of adequate and efficient mechanical handling appliances. It has been estimated that such equipment will, on the average, pay for itself in fifteen months while rarely would the time required exceed two years.

All installations should be made on the unit system as far as possible, with proper allowance for expansion. Permanent, rather than temporary equipment will prove its worth in a short time.

It is possible that many commissions will not favor such a complete layout as has been described, but it is important nevertheless that each department be considered and incorporated in the plans, in order that with the natural growth of the port, the general scheme can be completed without crowding or separating the facilities for the various commodities. This may require a slightly larger initial investment, but the wisdom of such a step will be self evident in a short time.

MODERN CARGO-TRANSFER INSTALLATION

By HENRY CUNNINGHAM, JR.

AN interesting installation of two Shaw overhead wharf cranes may be seen at pier No. 6, East River, New York City, the New York State Barge Canal Terminal. These cranes were manufactured by Manning, Maxwell & Moore, Inc., 119 West 40th street, New York City, at their Shaw Crane Works, Muskegon, Mich. They are of the overhead type, traveling on two tracks, one carried over the front row of building columns and the other ten feet back—over the roof of the pier. These cranes have four movements: travel, boom hoist, trolley rack and hook hoist. The boom which has an outboard reach of 32′ 6″ and an inboard reach of 10′-0″ is pivoted to the traveling frame. The capacity of each crane is three thousand pounds—with the boom horizontal or at any angle up to forty-five degrees and with the trolley in any position on the boom.

The modern method of handling freight at pier No. 6, East River, with Shaw overhead wharf cranes, has innumerable advantages. The cranes can be brought right to the location of the work to be done, with no loss of time. The cranes travel on tracks, above the pier shed roof, therefore, they do not obstruct the apron of the pier. While traveling, the boom is nearly vertical, in which position it can travel along the side of the pier shed with ample clearance of the shed and any ship's rigging. When the desired location for the crane is reached, the boom is lowered, the outboard end being over the hatch of the vessel and the inboard end reaching inside the pier shed. The load may be hoisted from the hold of the barge and deposited inside the pier shed, thereby serving a large floor space and relieving congestion due to hand distribution. The load is carried in a straight line, taking the shortest possible course from the hold of the barge to the floor inside the pier and eliminating the use of space necessary for swinging the old type boom. By utilizing simultaneously the hook hoist and trolley movements, the load may be carried in a diagonal line from loading to unloading points.

With the installation of two cranes, as at pier No. 6, two barges—one inboard and one outboard—may be unloaded or loaded at same time, by placing the cranes so that one works a forward hatch of one barge and the other works an after hatch of the other barge. By the same arrangement, the two cranes can work two hatches of one barge, at the same time, thus speeding up the freight handling operation 100 per cent. When necessary to work on a vessel floating higher out of the water, the boom may be raised to any angle, up to 45 degrees—the highest, efficient working position. A light trolley—not the entire crane—is started in motion and stopped with each horizontal movement of the empty hook or load. It handles long material without swiveling.

The hook hoist and rack have a speed of 125 feet per minute with the full load and 200 feet per minute with no load. The boom may be hoisted from horizontal to vertical position in one minute. The traveling speed is 100 feet per minute. The hook hoist, trolley, rack and boom hoist machinery is located on the crane frame well to the rear where it acts as counterweight, thus giving stability to the crane. The hook hoist and rack are operated by separate motors and are independent of each other in speed and direction of travel. The operator's cage being suspended from the crane frame at one side of the boom and at sufficient height gives the operator a clear view of the load.

Installation of Shaw Overhead Wharf Cranes at Pier No. 6, East River, New York

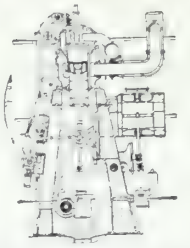
These cranes are equipped with type "Z" Shaw motors, 220 volts direct current, fully enclosed. The hook hoist and rack motors are 18 horsepower, compound wound, and the boom and travel motors 8 horsepower, series wound. All the motors are equipped with a solenoid operated band brake, series wound. The controllers are of the drum type, with vertical handles; the hook hoist and rack controllers being arranged for dynamic lowering, while the boom and travel are plain reversing.

The former method of handling freight at pier No. 6, East River, was by hand with the aid of a whip boom, block and tackle and a horse. The horse walked away with a line to raise the load from the hold of the barge, then the whip boom was swung around by hand and in order to deposit the load on the apron of the pier. The load then had to be moved by hand to deposit it under the pier shed. The swinging of the whip boom necessitated having space enough to clear the boat's rigging and the side of the pier, with load suspended. This condition caused many delays. In order to lower the whip boom and hook into the hold, the horse was walked backwards, which was a very slow and tedious operation.

The Shaw overhead wharf cranes handle loads, which could not be handled at all with former methods of freight handling and with greater speed and facility. They save time and labor, thus reducing considerably the cost of freight handling.

As an illustration, at pier No. 6, East River, with the former method of freight handling, it took eight men with a whip boom, block and tackle and a horse four days to unload a barge of 175 tons of freight. With one crane and two men in the hold of the barge, 175 tons of miscellaneous freight was unloaded in one eight-hour day. As the crane was new to the men, they were somewhat slow in having the freight in slings ready to be hoisted. The hook was out in the hold waiting before the sling could be adjusted. The operating cycle of the crane was thirty seconds, while the actual working cycle was seventy seconds, indicating that there was ample opportunity for still greater speed in their unloadings, in fact the barge in reference could have been unloaded in less than four working hours—with the same number of men employed.

Oil Engines and Motorships



MOTOR SHIPBUILDING IN EUROPE

INTEREST in the possibilities of the application of the oil engine to the propulsion of passenger liners is increasing considerably and in addition to the three large motor passenger vessels for the British India Steam Navigation Company the six motor liners with 7000 horsepower machinery which are being built in Italy, and a still larger vessel for the Brostrom Line to trade between Scandinavia and America, a motor passenger liner is now approaching completion on the Clyde for the Elder Dempster Company for the service between Liverpool and West Africa. In this case, however, it is not a new vessel which is being constructed, but the well known motor ship Glenapp which, during the war, conveyed thousands of American troops to France. She was at that time not fitted out as a passenger vessel but had been built for the East Asiatic Company as a cargo ship. Having been given back to her original owners at the conclusion of the war she was sold by them to the Elder Dempster Company. She has now been refitted as a passenger ship by Harland & Wolff and will shortly sail on her maiden voyage in her new role, accommodation being provided for several hundred passengers.

She is a large vessel, 470 feet overall, with a carrying capacity of 9600 tons which will be diminished to a certain extent after the conversion has been completed. Chief interest lies in the machinery installation which comprises a couple of eight cylinder Harland & Wolff engines each developing 3200 i.h.p. They are somewhat different from the new type which have been standardized by this firm for installation in 14,000-ton cargo ships and will probably not be run quite up to their full speed. Nevertheless it is anticipated that the boat will make a speed of about 14½ knots.

On the whole the Glenapp has run exceedingly well during her three or four years of service. She had one mishap in the form of a broken shaft but it is understood that the engines have now been remodeled and brought as nearly as possible up to date. This ship will have a fuel consumption of less than 20 tons of oil per day so that her economy compared with a coal burning passenger liner will be enormous.

More 14,000-Ton Motor Ships.

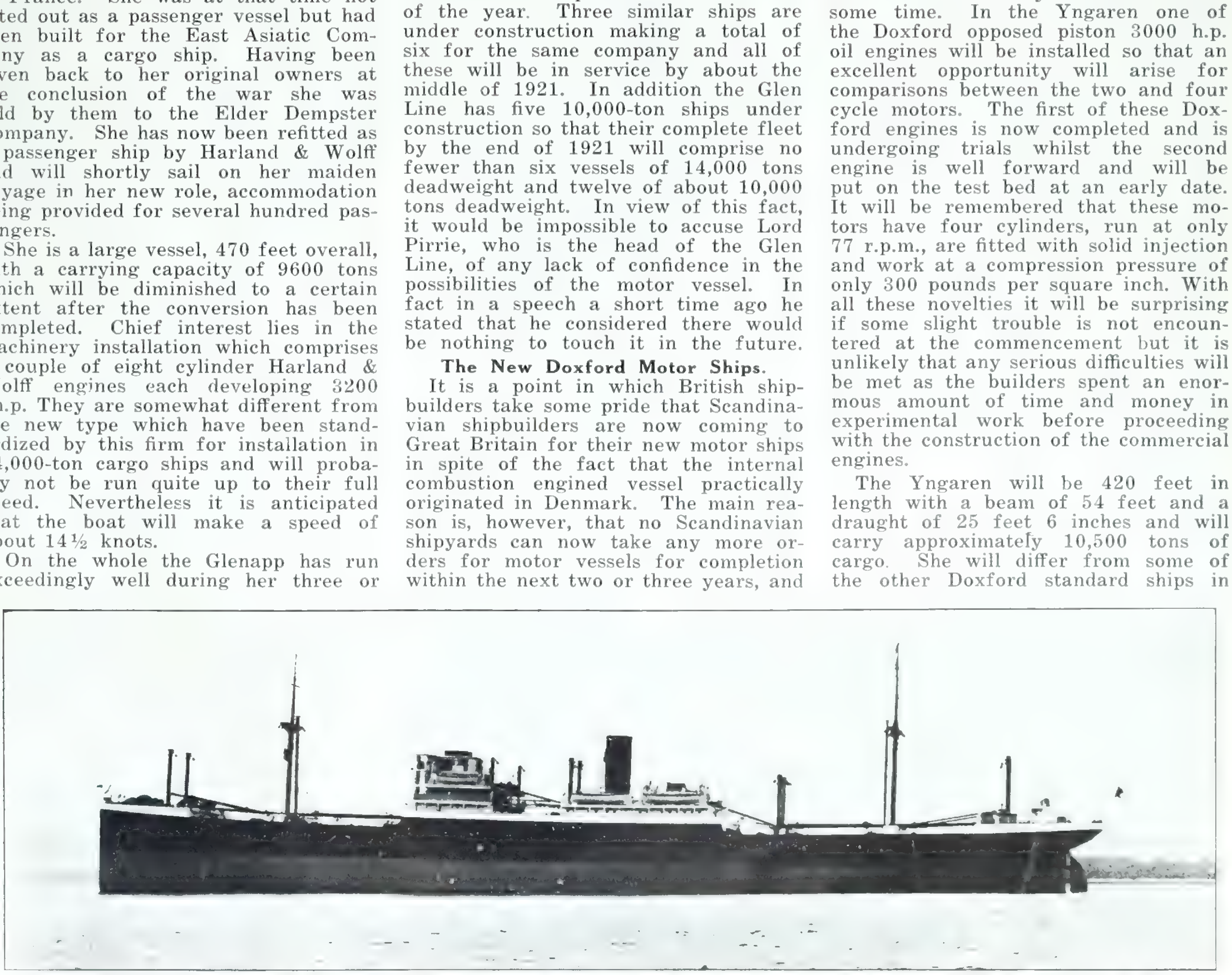
She has been renamed by the new owners as the Aba and the name Glenapp has been given to a new 14,000-ton vessel for the Glen Line which is now practically completed. She is the second ship of this size, the first, the Glenogle, being on her maiden voyage. The third, the Glengarry, was launched a considerable time ago and will be completed before the end of the year. Three similar ships are under construction making a total of six for the same company and all of these will be in service by about the middle of 1921. In addition the Glen Line has five 10,000-ton ships under construction so that their complete fleet by the end of 1921 will comprise no fewer than six vessels of 14,000 tons deadweight and twelve of about 10,000 tons deadweight. In view of this fact, it would be impossible to accuse Lord Pirrie, who is the head of the Glen Line, of any lack of confidence in the possibilities of the motor vessel. In fact in a speech a short time ago he stated that he considered there would be nothing to touch it in the future.

The New Doxford Motor Ships.

It is a point in which British shipbuilders take some pride that Scandinavian shipbuilders are now coming to Great Britain for their new motor ships in spite of the fact that the internal combustion engined vessel practically originated in Denmark. The main reason is, however, that no Scandinavian shipyards can now take any more orders for motor vessels for completion within the next two or three years, and it is not because British shipbuilders have established a supremacy in motor ship construction. Among such orders on hand are five motor ships for Norwegian interests now being built by the Ardrossan Shipbuilding Company whilst the first British built motor vessel for the Transatlantic Steamship Company of Gothenburg was launched a short time ago.

This is the second of the Doxford standard motor ships and is named the Yngaren, the first vessel, which is now awaiting its engine, being built for the Sutherland Company of Newcastle. The Yngaren is interesting from many points of view. All the other motor vessels for the same owners are fitted with four cycle Burmeister & Wain engines and three of these have been in satisfactory commission for some time. In the Yngaren one of the Doxford opposed piston 3000 h.p. oil engines will be installed so that an excellent opportunity will arise for comparisons between the two and four cycle motors. The first of these Doxford engines is now completed and is undergoing trials whilst the second engine is well forward and will be put on the test bed at an early date. It will be remembered that these motors have four cylinders, run at only 77 r.p.m., are fitted with solid injection and work at a compression pressure of only 300 pounds per square inch. With all these novelties it will be surprising if some slight trouble is not encountered at the commencement but it is unlikely that any serious difficulties will be met as the builders spent an enormous amount of time and money in experimental work before proceeding with the construction of the commercial engines.

The Yngaren will be 420 feet in length with a beam of 54 feet and a draught of 25 feet 6 inches and will carry approximately 10,500 tons of cargo. She will differ from some of the other Doxford standard ships in



British Motorship Glenogle of the Glen Line. This vessel is powered with two 3200 I.H.P. 8-cylinder Marine Diesel Engines of the Harland & Wolff, Burmeister-Wain 4-cycle type the auxiliary equipment which will be electrical instead of steam driven as no Scandinavian shipowner will now adopt the latter type on any of his new motor ships. There will be the usual accommodation for twelve passengers and the vessel will be specially fitted out for the Eastern trade with teak decks, fans, etc.

More Standard Ships.

There is a distinct significance in the nature of orders which are being placed by British shipowners for motor vessels. In nearly every case a fleet of several similar craft is contracted for, chiefly for the reason that the motor vessel offers greater opportunities both to the builder and owner from the point of view of standardization than was ever the case in connection with steamers. Following this general policy the Pacific Steam Navigation Company has given orders for six motor ships for the South American trade three to be of one class carrying 10,000 tons of cargo and three slightly larger boats carrying about 11,500 tons.

The first of the smaller ships was completed and sailed on her maiden voyage early in October. She is named the La Paz and is 407 feet in length with a beam of 54 feet, being equipped with two 1600 i.h.p. six cylinder engines of the Burmeister & Wain type. The La Paz was built by Harland & Wolff and has a speed at sea of approximately 11½ knots on a fuel consumption of 11 tons of oil per day including auxiliaries.

This class of machinery is now so well known that a detailed description need not be given but there is one important feature which will undoubtedly be of considerable interest to all engineers concerned with the trend of modern design of Diesel motors. This is in the arrangement of the operation of the reverse gear. Usually there is a compressed air engine, operated by a small lever, which gives the necessary movement to the maneuvering and cam shafts for setting the cams and gear in the correct position for ahead or astern running as the case may be. In the engines in the new vessel this operation is effected by means of a small electric motor through spur gearing, the control being through a small switch. The object of this change is, obviously, to lessen the demand on the compressed air reservoirs supplying air for starting purposes. In one or two motor ships there have been some difficulties in this connection and the owners decided that they would use electricity instead of compressed air to avoid the possibility of shortage. It is, however, not generally considered that this system will be standardized as on modern motor ships there are two auxiliary air compressors which are kept running when the ship is entering or leaving port so that with reasonable care there should never be any question of the supply of air running short.

The air compressors in the La Paz are electrically driven, two 90 h.p. motors driving two air compressors with two stages supplying air at 25 atmospheres. The electric generating plant follows along the usual standardized lines, three 100 k.w. sets being installed for the supply of the current to all the auxiliaries in the engine room as well as the winches, electric steering gear, etc. It may be remarked, however, that when all the winches are in service it is necessary to keep all the generating sets running and possibly it would be an advantage to have four sets or three of larger size.

Many New Orders.

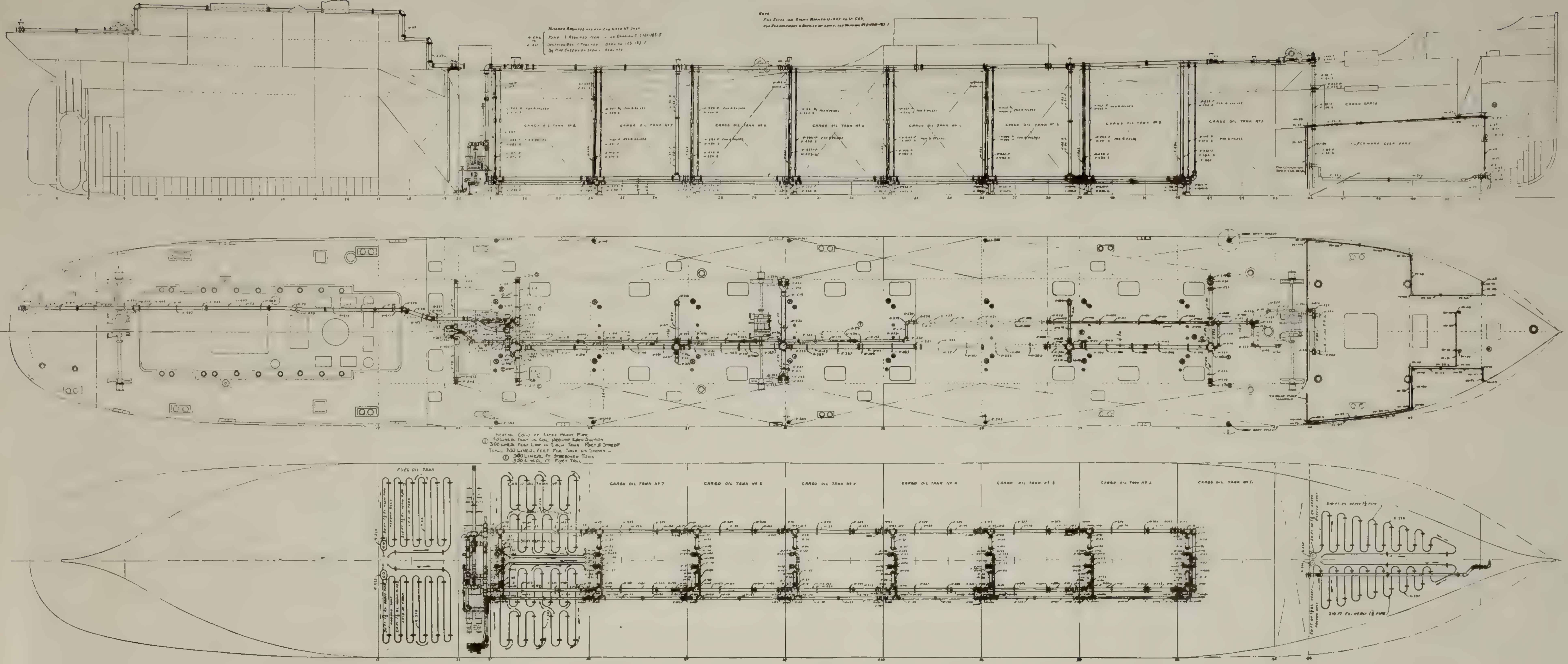
In spite of the depression in shipbuilding in Europe a number of new orders are being placed for motor vessels which is consistent with the prevailing belief that the greater the slump in shipbuilding the better will be the prospects of the internal combustion engined vessel. It is an interesting fact in connection with these new orders that quite a large proportion of them are for ships fitted with motors of the two cycle type. For instance four 8000 tonners are to be built in France in which machinery of 3000 b.h.p. constructed by the well known French armament firm of Schneider & Co. will be installed. These are two cycle sets of normal design with the old system of scavenging by valves in the head which many designers consider to be already obsolete. Other orders include an oil tanker to be built on the Clyde by William Denny & Bros., who are already constructing a 10,000-ton cargo ship for the United Steamship Company of New Zealand. This new tanker will be fitted with two Sulzer two-cycle Diesel engines developing a total of 2700 h.p. Another order is for a cargo ship of 11,700 tons for the Chargeurs Reunis of Paris fitted with engines totaling 3400 b.h.p. or approximately 4600 i.h.p. It is understood that in this new ship instead of the method of providing scavenging air by ordinary plunger pumps driven directly off the engine, electrically driven turbo pumps will be installed and the auxiliary Diesel machinery required for the vessel amounts to no less than 820 h.p. In Holland that important concern the Royal Netherlands Steamship Company has placed an order for its first motor ship, a 2200-ton vessel fitted with an 800 b.h.p. Werkspoor four-cycle engine, whilst in Sweden two 9000-ton cargo boats fitted with 2500 b.h.p Sulzer Diesel machinery have been ordered by Captain B. M. Banck of Stockholm. A vessel of practically the same type has also been ordered by Norwegian owners.

It is significant too that the conversion of steamers has already commenced. A 5000-ton Swedish-owned craft, Augusta, has just had the steam engines replaced by an 800 b.h.p. two-cycle Sulzer Diesel engine with four cylinders and although this craft has only been in service a month, the results appear to exceed expectations. Shipowners will note with some interest that the additional cargo carrying capacity is 300 tons and that the oil consumption works out at four tons per day against 20 tons of coal when steam engines were used. Even with the prevailing prices for coal and oil fuel in Europe at the present time, this represents a saving of approximately 50 per cent on the fuel bill.

Those who are interested in the development of high powered Diesel engines will learn with some satisfaction that drawings and designs have been prepared by Sulzers for a standard engine of 5400 b.h.p. in six cylinders and that they will build motors of this type under guarantee, with the same confidence as smaller sets. The engine follows along exactly similar lines to the existing type with the usual system of auxiliary port scavenging which has proved so eminently successful. With this arrangement it is claimed that the fuel consumption is only about 0.41 lbs. per b.h.p. hour and it is stated that the difference between this figure and that reached with the best four-cycle engine is almost negligible. It is apparent, therefore, that a battle royal is about to commence between the manufacturers of two cycle and four cycle machinery which should be all to the good for the oil engine industry. In connection with the development of high powered engines it is worthy of note that the famous Clyde firm of John Brown & Co. are now experimenting with the Camellaird Fullagar engine in the hope of constructing it in sizes suitable for large transatlantic liners.

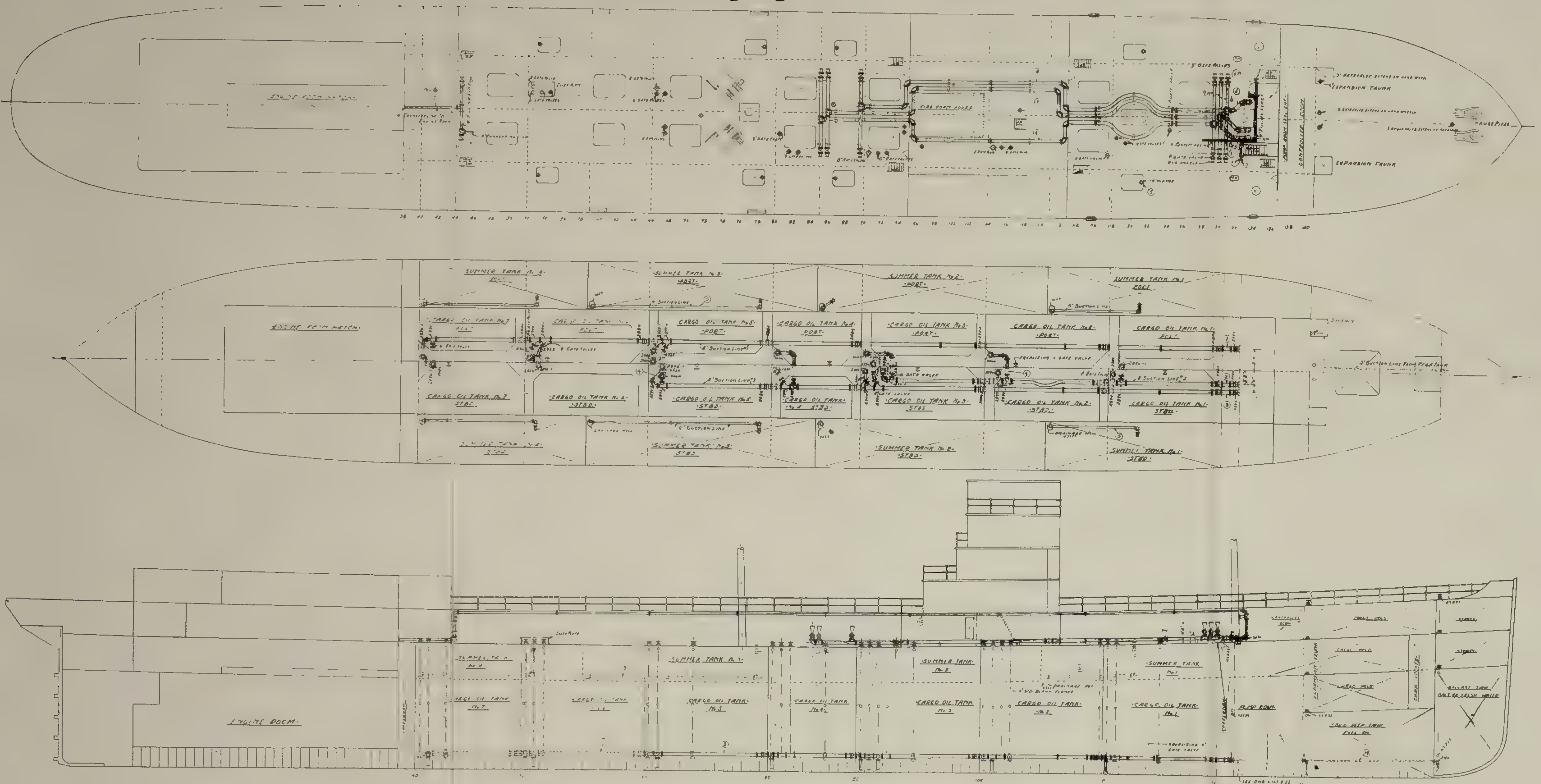
British Motorship Augusta. This 5000 ton vessel has just been converted from steam propulsion by the installation of an 800 B.H.P. 2-cycle Diesel Engine of the Sulzer type.

Cargo Piping Plan of Steam Tanker William H. Doheny

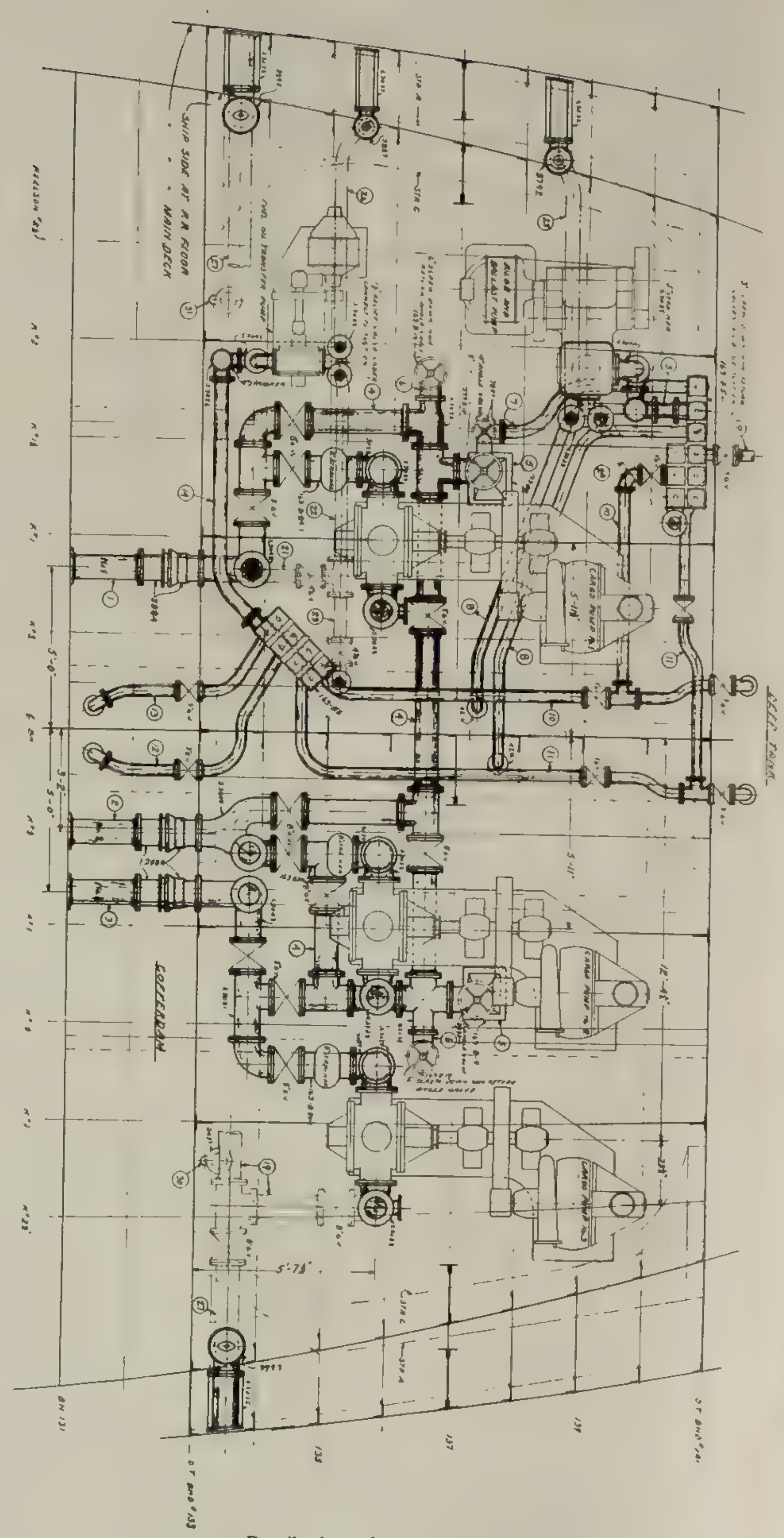


The William H. Doheny is the first of three built by Bethlehem for Pan American Petroleum Transportation Company. Their dimensions are: 435 L. B. P.; 56 beam; 33-6 molded depth; 10,200 deadweight tons; reciprocating engines, 2700 I. H. P.; three Scotch boilers, 15x11-9, working pressure 220 pounds, fitted with Howden forced draft; Isherwood framed. Three other vessels, of the same general dimensions, were built in 1917 and 1918 at the Alameda Works, Bethlehem Shipbuilding Corporation, the George S. Henry, S. M. Spalding, and Paul H. Harwood, but they were turbine-driven. The Doheny's main engine is 27x47x78, 48-inch stroke; the propeller is right-handed, 18 feet in diameter, and drove the vessel at a speed of 11 knots on her trial. The Doheny is an oil-burner and is equipped with the Dahl oil-burning system.

Cargo Piping Plans of Motor Tanker F. H. Hillman



Inboard profile, and deck and tank plans



Detail plan of pump room piping

MOTOR SHIPBUILDING IN AMERICA

FOR some months Pacific Marine Review has been publishing regularly in this section of the magazine articles from a very reliable European source on European developments in motor shipbuilding. These articles have called forth considerable favorable and unfavorable comment—favorable from our readers who were interested in knowing what their competitors on the other side of the water were doing, and unfavorable from some of our readers who were more interested in having presented in our columns the activities of Diesel engine builders in America. We are, therefore, now starting a similar series of articles showing just what is being done by American engine and ship builders in the development and construction of Diesel engines and motorships.

The most prominent phase of American activities in this direction at the present time is that of the Bethlehem Shipbuilding Corporation, who, after the successful trials of their Diesel-driven ore carrier, the Cubore, have contracted to build for the Bethlehem Steel Company four ore carriers engined with a similar type of Diesel to be of 20,000 tons' deadweight capacity each. The propelling machinery for these ships will consist of twin 3200 I. H. P., six-cylinder, two-cycle engines of the new Bethlehem-West type, having 25½-inch diameter and 48-inch stroke. It is figured that these engines, turning at 105 revolutions per minute, will give the vessels a speed of 11½ knots. It may be said, therefore, that at this time America is building the largest motorships in the world, although they are not the highest powered nor the fastest. The most valuable point in connection with this program of the Bethlehem Shipbuilding Corporation lies in the confidence in Diesel engine propulsion that it is calculated to inspire among other American ship owners, operators and builders.

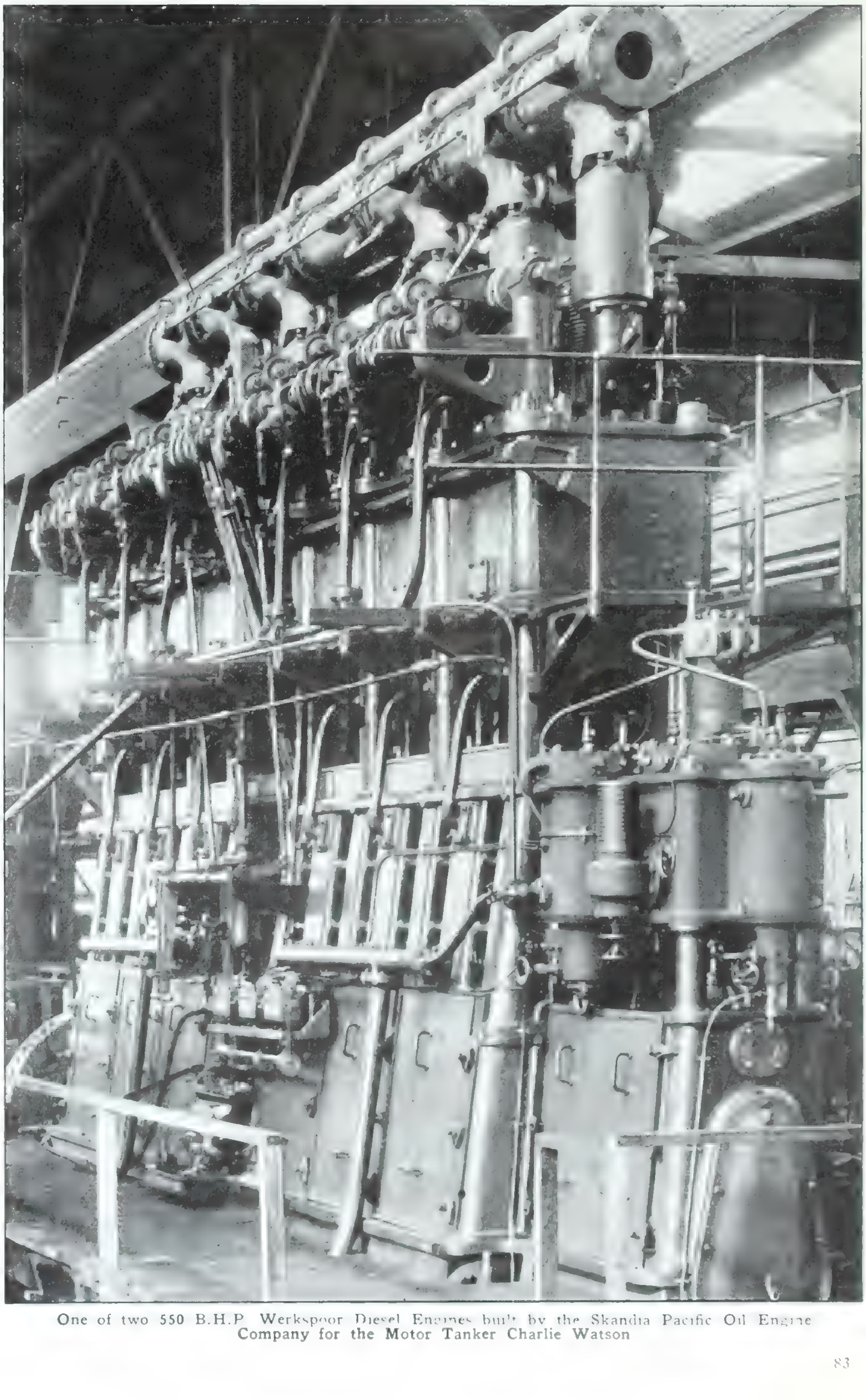
Another notable event in motor shipbuilding in America was the recent launching of the ship William Penn at the Gloucester yards of Pusey & Jones. This ship is to be fitted with Burmeister & Wain marine Diesel oil engines and is the only motorship of the entire United States Shipping Board Emergency Shipbuilding Corporation fleet, apropos of which it is very hard for marine Diesel engineers to understand why only one motorship, while ten large freighters are being converted from mechanical reduction gearing to electrical reduction gearing at great expense and practically no saving in operating economy.

The American - Hawaiian Steamship Company have on order at the yard of the Cramp Shipbuilding Company, Philadelphia, two motorships of 11,200 deadweight ton carrying capacity, to be powered with twin Cramp - Burmeister & Wain Diesel engines of 2250 I. H. P. each, and the Submarine Boat Corporation of Newark, New Jersey, is building for its own account one motorship of 9000 tons deadweight carrying capacity, to be powered with Craig four-cycle Diesel engine of 2500 I. H. P.

So much for the East Coast.

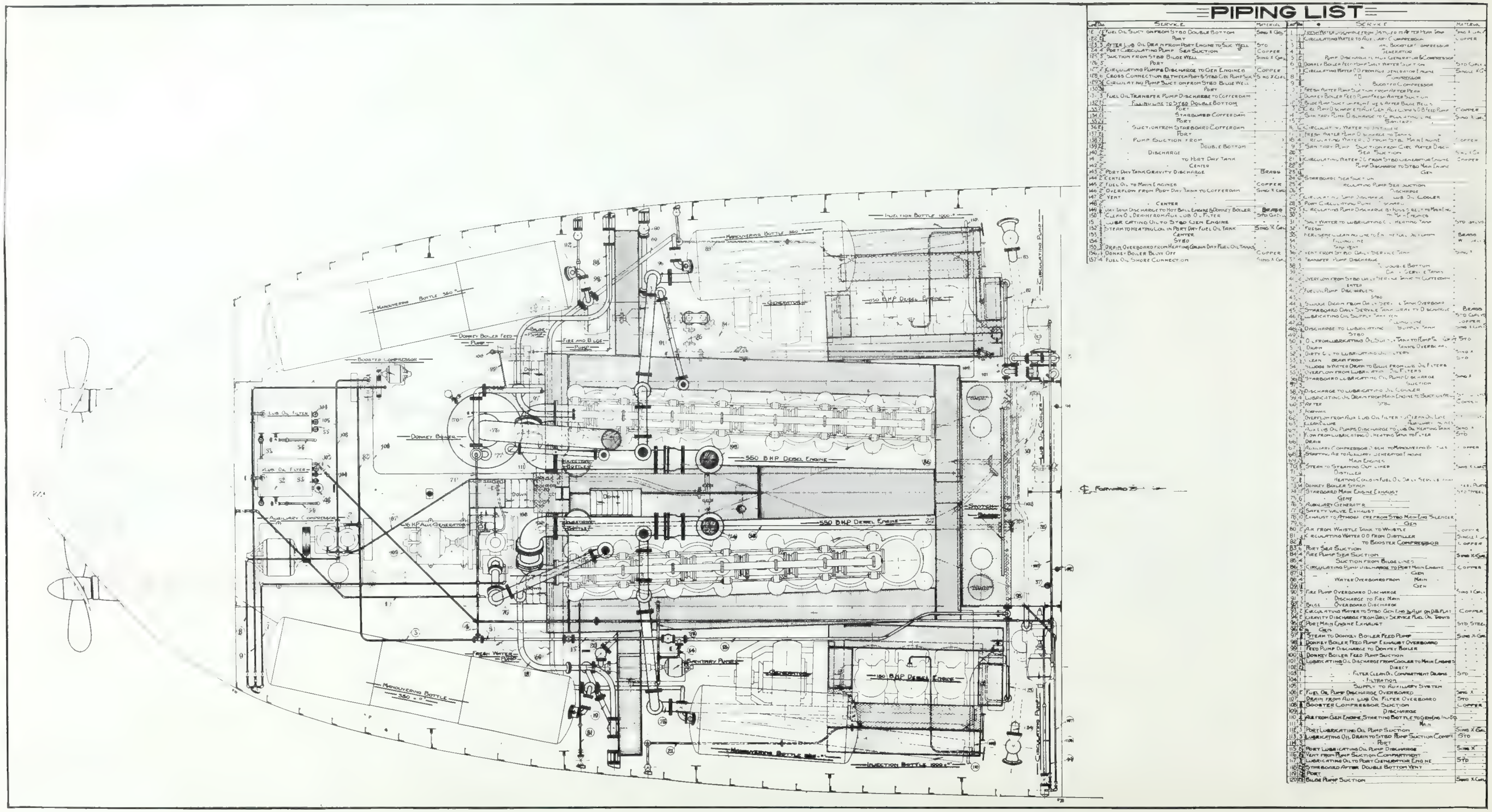
On the Pacific slope the Union Construction Company has just carried out very successfully the trials of the Diesel-driven tanker Charlie Watson for the Standard Oil Company of California, which vessel, engined with two 550 B. H. P. Werkspoor Diesel engines built by the Skandia Pacific Oil Engine Company, Oakland, California, is now in service on the Pacific Ocean. This vessel is 250 feet long between perpendiculars, 37 feet beam, with a carrying capacity of 2000 deadweight tons on 15-foot 6-inch draft. Her contract called for 11 knots. She is remarkable on account of the completeness of her plant and equipment. Practically all of the functions requiring the expenditure of energy on this ship are taken care of electrically, outside of the main propelling machinery and the auxiliary plant for generating electricity. Even the galley equipment, the lighting and heating and ventilation of all crew spaces, are entirely electric. The auxiliary plant consists of two three-cylinder 150 B. H. P. Diesel engines built by the Dow Pump & Diesel Engine Company of Oakland, each direct connected to a 100 kilowatt 250-volt direct-current General Electric generator.

The Standard Oil Company of California has under construction a much larger motor tanker, the F. H. Hillman, at the Moore Shipbuilding Company of Oakland, the machinery and equipment layout of which is substantially the same as that of the Charlie Watson. This vessel will be powered with two



One of two 550 B.H.P. Werkspoor Diesel Engines built by the Skandia Pacific Oil Engine Company for the Motor Tanker Charlie Watson

General Arrangement and Piping Plan of the Engine Room on the Motor Tanker Charlie Watson



The Drawing above shows very clearly the compact and convenient arrangement of the main propelling engine and the auxiliaries in the engine room of this fine motorship. The Union Construction Company of Oakland, California, and the Standard Oil Company of California have good reason to be proud of this job.

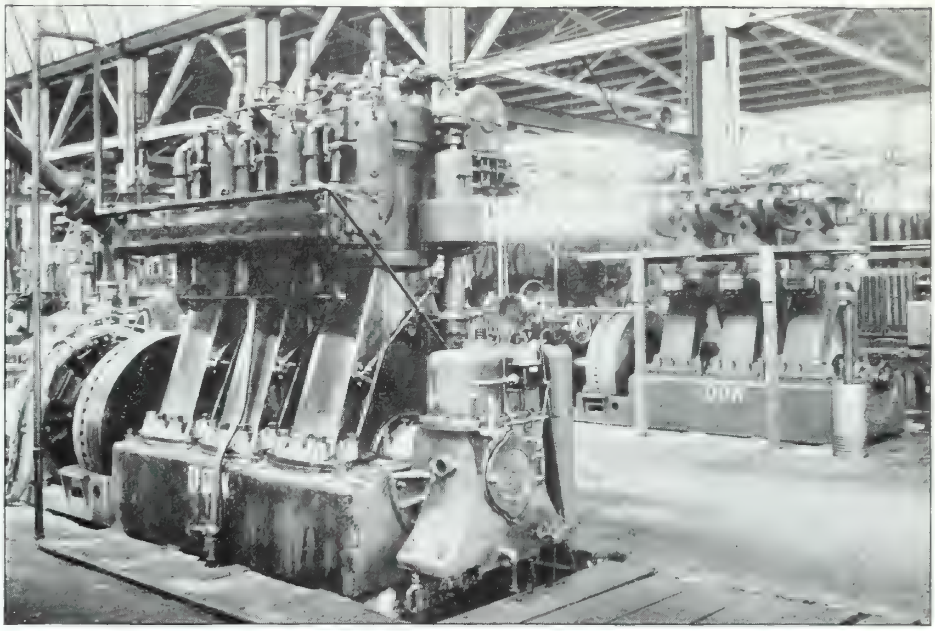
1000 horsepower Werkspoor full Diesel engines built by the Skandia Pacific Oil Engine Company and will have a speed of 11 knots. She is to be 330 feet in length, 46 feet beam and 27 feet molded depth, with a deadweight carrying capacity of 5010 tons on 21-foot 6-inch draft. The power of the auxiliaries and lighting on this ship will be supplied by three 150 horsepower Diesel engines built by the Dow Pump & Diesel Engine Company, Oakland, connected to three 100 kilowatt 250-volt General Electric generators.

Another steel motorship has recently been contracted for on Puget Sound by the Todd Dry Dock & Construction Company, Tacoma, for the Alaska Steamship Company. This vessel, the keel for which has just been laid, will be 360 feet in length, 49 feet 6 inches beam molded, 26 feet 9 inches depth molded, with a loaded draft of 22 feet. The cargo capacity will be about 6500 deadweight tons, and she will be engined with two McIntosh & Seymour Diesel engines of the four-cycle type, each having six cylinders and developing 1200 I. H. P. at 140 revolutions per minute. This vessel will be provided with tanks of sufficient capacity to take 1500 barrels in the regulation fuel oil stowage and 4500 barrels as cargo, which amount of oil at her estimated average consumption will insure a cruising radius of 26,000 miles. All the auxiliary machinery and equipment will be electrically driven, power for this being provided by two 100 horsepower McIntosh & Seymour engines direct connected to direct current generators. Very liberal provision has been made for the comfort of the officers and crew, and an innovation in this regard has been provided in a library and social hall.

The Long Beach Shipbuilding Company of Long Beach, California, has under construction for Mr. J. F. Craig a motor yacht, the Edythe, 105 feet long between perpendiculars, 21 feet beam, 18 feet 10 inches loaded draft with a speed of 12 knots, this yacht to be powered with twin Nelseco Diesel engines of 360 B. H. P. The same company is building also a coast freighter for the California-Mexican Steamship Company, 119 feet long between perpendiculars, 24 feet beam, 10-foot loaded draft, and 9 knots loaded speed, powered with Fairbanks-Morse semi-Diesel engines of 200 B. H. P.

In the meantime the Pacific Motorship Company of San Francisco is demonstrating the successful operation of motorships on the Pacific with its fleet of eight wooden motorships purchased from the Australian government. These ships are powered with McIntosh & Seymour engines, four of them having electric auxiliaries and four being equipped with donkey boilers and steam auxiliaries. Notwithstanding the handicap imposed by the weights of wooden hulls in comparison with steel and the disproportionate waste of fuel in small freighters on donkey boiler equipment, these vessels have been giving a good account of themselves commercially and are looked upon as a very practical demonstration of the savings that may be effected by Diesel propulsion over any form of steam propulsion. It may be said that no operator in America figuring on new construction can afford to overlook the advantages of the Diesel drive.

In this connection it might be well to point out for the benefit of marine engineers and naval architects that the majority of the problems connected with the application of Diesel engines to marine propulsion lies in the reversing and maneuvering of ships. Direct reversal through the Diesel prime mover adds many complications and operation difficulties and, while these have been largely overcome due to skill in the designing of ingenious apparatus for this purpose, it should not be overlooked that there is a very decided gain in economy and in weight to be achieved if we can find a satisfactory substitute for the direct reversal of the propelling engines. Such a substitute has been sought for up to date along three lines with apparent promise of success in each—namely, by electrical connection between engine and propeller, by the Hele-Shaw hydraulic clutch reduction gear,, and by the means of reversing rudders, notably that recently perfected in England and known as the Kitchen rudder.


The Erecting Shop of the Dow Pump and Diesel Engine Company, Oakland, showing two 150 H.P. Diesel Engine Generating Sets

MOTORSHIP TANKER CHARLIE WATSON

THE Standard Oil Company of Calfornia has recently added to its fleet the new motorship tanker Charlie Watson. This vessel is the first steel sea-going motorship built on the Pacific Coast, and her builders, the Union Construction Company of Oakland, take great pride in the fact that she is the first motorship tanker to be finished in the United States. The main features of her construction and her equipment were described and illustrated in detail in Pacific Marine Review for February, 1920. She finished her trials to the complete satisfaction of her owners and builders and is now in service on the Alaska route of the Standard Oil Company of California.

The Charlie Watson was built especially with the idea of carrying distillates of crude oil under the conditions usually met with on the San Francisco-Alaska and Alaska coast service. No provision is made for fires of any kind aboard. All cooking, heating, pumping, in fact the operation of all auxiliary machinery, is done by electric power provided by two 100 kilowatt General Electric generators directly connected to two 150 horsepower Dow three-cylinder Diesel engines.

The Charlie Watson is a Pacific Coast product. All the principal items of her equipment were furnished by Pacific Coast firms. The main propelling engines are of four-cycle Skandia Werkspoor full Diesel type built by the Skandia Pacific Oil Engine Company of Oakland. The auxiliary engines referred to above were built by the Dow Diesel Engine Company of Oakland.

We are illustrating herewith the general arrangement and piping plans of the engine room on this ship, showing the compactness and convenience of the arrangement of her main engines and auxiliaries.

The pump room is located forward of bulkhead 98, a two-frame space cofferdam being interposed between the forward oil tanks and the pump room compartment. The three motor-driven Kinney pumps are so arranged that they can discharge either individually or into a common header. This common header runs straight across the ship with an overboard discharge at each end to be used in case of emergency or for discharging water ballast. The discharge pipe from each pump leads to one of three athwartship headers, each of which has valves with standard hose connection at each end. The suction pipes from the oil tanks to the pumps are arranged with an eight - inch McComb strainer in each line and with bypass arrangements so that any pump can be used on either of the three main lines. It is confidently expected by the Standard Oil Company of California that records in discharge and loading of bulk oil will be made with this installation.

The Union Construction Company and the other California manufacturers who have contributed to this first new steel motor tanker built on the Pacific Coast are to be congratulated on their achievement, and the Standard Oil Company of California is to be congratulated upon its forward-looking policy in taking the lead in America in the introduction of Diesel propulsion to tanker tonnage. It is hoped that this vessel and the motor tanker A. F. Hillman will be but the forerunners of a great fleet of steel motorships on the Pacific.

THE DIESEL ENGINE

Its Design, Development, and Construction, Particularly as Applied to Marine Propulsion

III.

THIS brought forth a system which is still used to considerable advantage in two-cycle engines, while in this case it was applied to the four-cycle principle. Figures 19 and 20 show section through working cylinder, the lower part of the engine being of similar design as before. Details of the lower cylinder head are shown in Figures 21 and 22, while Figure 23 shows the camshaft drive. As can be seen, this design is in its general arrangement similar to the design of four-cycle engines of today, with the exception of the loading pump and compressor. The cylinder and cylinder head are of cast iron and water cooled.

The combustion space, which on the first engine was located in the piston, on the second in the cylnder head, is now the cylindrical space between head and piston, an arrangement which became general practice in Diesel design and which has been improved upon only on a few of the engine types of today.

The piston is water cooled as today in larger engines. The general design shows still the influence of steam engine practice, especially with regard to piston rod design and connection. Inlet and exhaust valve are separate, as are their respective connections.

The fuel valve is of a design similar to what is used today except for the fuel and air supply, which do not lead directly to the fuel cage but go through the cylinder head. To make the joints tight it was necessary to grind the fuel valve cage into the cylinder head, a rather expensive and unsatisfactory arrangement. Of interest is the gear operating the fuel needle, by means of which no stuffing box is necessary on the needle, avoiding the possibilities of sticking. In an improved way this design is still used on Sulzer and Swedish engines.

The lower end of the cylinder is closed by a head which carries the inlet and discharge valve of the loading pump (Figure 19). Both of these valves are mechanically operated. A receiver leads the air from the lower head to the intake valve in the upper head. The engine is again of the crosshead type.

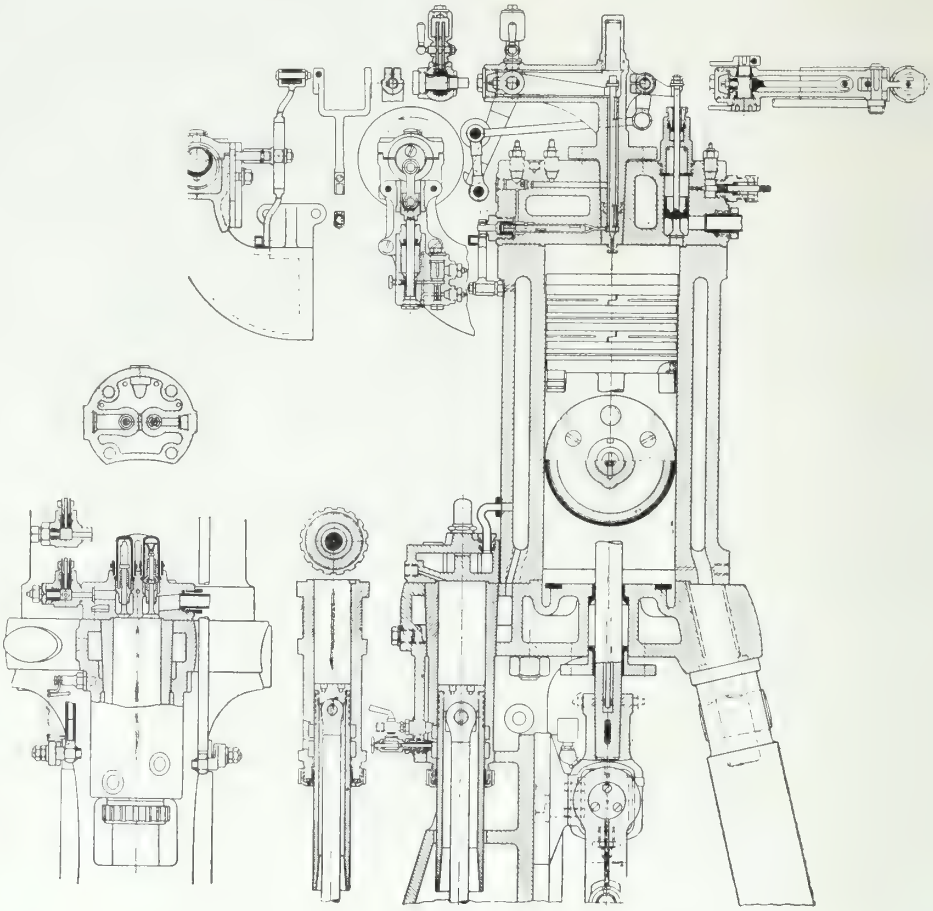


Fig. 20

The compressor body is cast integral with the frame and has a liner. Its piston is operated by means of a rocker arm from the connecting rod. The air is taken from the loading pump receiver.

A combined injection and starting air tank was used having in its head a safety bursting plate. These plates were left thicker in the center so that the break occurred on a circle; that is, the whole center of the plate got blown

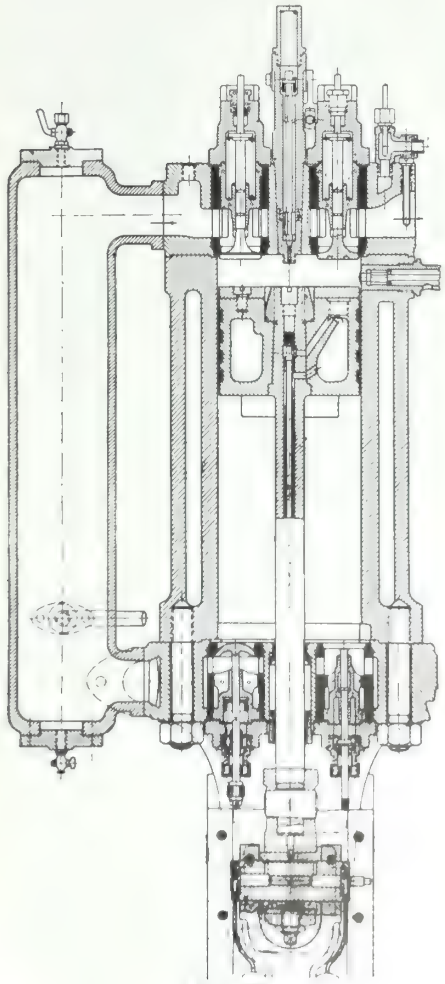


Fig. 19

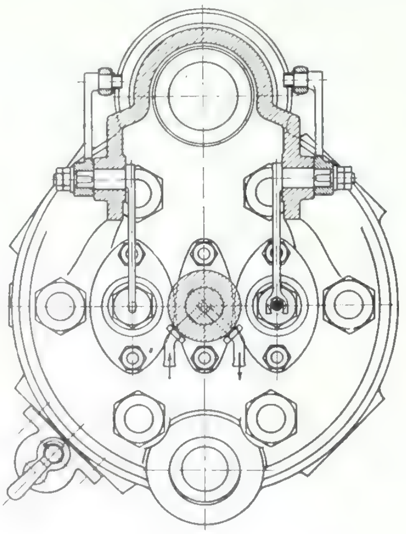


Fig. 21

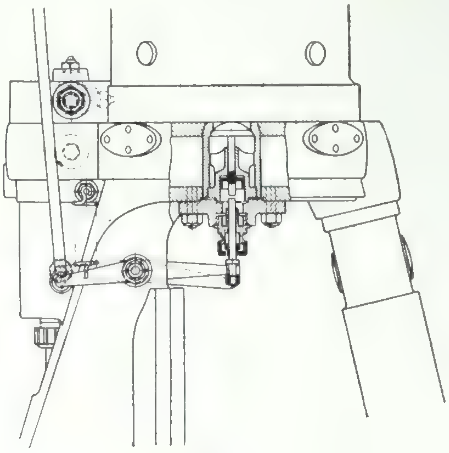


Fig. 22

out when excessive pressure or explosions occurred. The careful and extensive use of just such safety devices is no doubt the reason that during the five years of experimental work not even the slightest accident occurred.

In October, 1896, this engine was ready for test, and after a few minor mechanical changes the influence of the charging method upon the combustion process was investigated. The diagram shows this influence very clearly (see Figure 25), as the area increased considerably and showed an M. I. P. of 150 pounds per square inch

During further tests the design of the atomizer was gone into quite thoroughly, first with regard to the nozzle opening, and an arrangement similar to the one used in former tests and as shown in Figure 26 gave very good results, but was still improved upon considerably by using an atomizer as shown in Figure 27. This atomizer is located immediately back of the needle seat and consists of two plates with a ring of fine holes between these plates, and on the sleeve separating them are several layers of fine wire mesh. The influence of this atomizer was a great step forward and resulted in an absolutely clear exhaust with an M. I. P. of 114 pounds per square inch. The arrangement of a fuel pump, which delivered the fuel directly into the atomizer instead of, as before, into a pressure tank and from there through a needle valve adjustment to the fuel valve, improved matters also very much. This new design consisted of a pump with an adjustable needle valve bypass (see Figure 27). In this way it was possible to time the introduction of the fuel to the atomizer, and the only drawback to this system was that the amount of the by-passed fuel would vary with the speed of the engine also instead of only with the load.

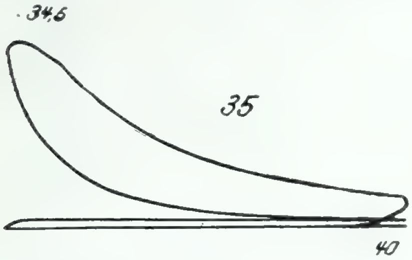


Fig. 24

Interesting are the comparative test results with and without the method of charging.

January 12, 1897—Test with charging method, full load condition:

Thermal efficiency, per cent	24
Mechanical efficiency, per cent	65
Over-all efficiency, per cent	15.7
Fuel consumption, grammes per I. H. P.	260
Fuel consumption, grammes per B. H. P.	396

January 29, 1897—Test without charging method—that is, the air enters the working cylinder under atmospheric pressure instead of from the receiver.

	Full Load	Half Load
Thermal efficiency	31.9%	38.4%
Mechanical efficiency	75.6%	61.5%
Over-all efficiency	24.2%	23.6%
Fuel consumption, per I. H. P., pounds	.43	.4
Fuel consumption, per B. H. P., pounds	.57	.58

The results of these comparative tests show the undesirable influence of the charging method which for this reason was discarded, and the final outcome is the standard four-cycle Diesel engine.

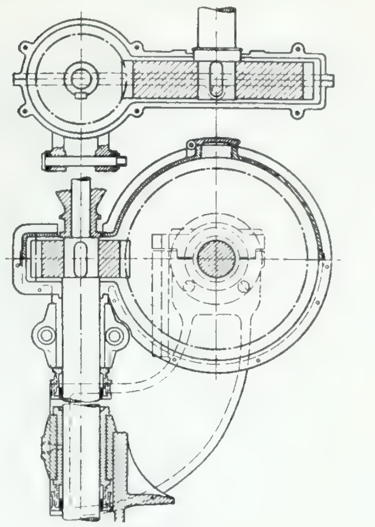


Fig. 23

As far as the further development of this engine is concerned, from this stage it was mostly carried out by the licensees independently. The only vital additional change was in the design of the fuel pump, where, instead of the adjustable bypass needle valve which was only suitable for constant speed operation, the mechanically operated suction valve was introduced (Figure 28). With this arrangement the suction valve of the pump is held open during part of the discharge stroke, allowing some of the fuel to bypass, while after the valve is dropped on its seat the remainder of the fuel is forced into the atomizer, the timing of this valve being under direct control of the governor.

The tests, with the exception of a very few, on this original engine were from then on only conducted for the benefit of parties interested in securing a license agreement. The following is a list of the parties and licensees:

Gasmotorenfabrik Deutz, Germany.
Sulzer Bros., Winterthur, Switzerland.
Vickers Sons & Maxim, England.
Mirlees Watson Company, Glasgow.
Societe Francaise des Motor Diesel, Bar-le-Duc, France.

Burmeister & Wain, Copenhagen, Denmark.

Adolphus Busch, St. Louis, Missouri.

In November, 1897, tests were made by Howaldt Brothers of Kiel, Germany, with a view of using this new type of engine for marine purposes. These tests were very encouraging, as it was possible to reduce the speed of the engine down to 40 R. P. M. under very light load conditions without misfiring. The above firm built later in 1912 the first German motorship, the Monte Penedo, equipped with two-cycle direct reversible engines built by Sulzer Brothers, Winterthur, Switzerland. This latter firm also holds the honor of having built in 1905 the first direct reversible Diesel engine.

But this chapter of the development of the Diesel engine would not be quite complete without touching upon the research work done by Dr. Diesel with regard to the often discussed coal dust engine and the compound Diesel motor.

The tests with coal dust were conducted on the same engine, but not strictly on the Diesel principle, in that the coal dust was introduced with the air taken in during the suction stroke of the piston. At the end of the compression stroke a small quantity of fuel oil was introduced in the usual way, igniting the charge. Fair diagrams and exhaust were obtained, but the lubricated cylinder walls were immediately covered with the coal dust, and the oil and coal formed a veritable grinding compound which would have ruined the engine in a very short time. These tests were also of very short duration, from five to seven minutes, on account of the coal dust deposit on piston and cylinder walls.

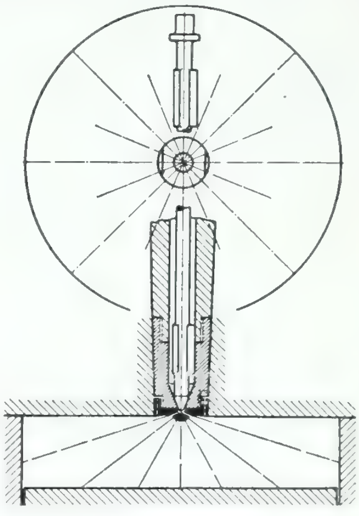


Fig. 25

A further interesting experiment was the Diesel compound engine. An engine of this type with two high pres-

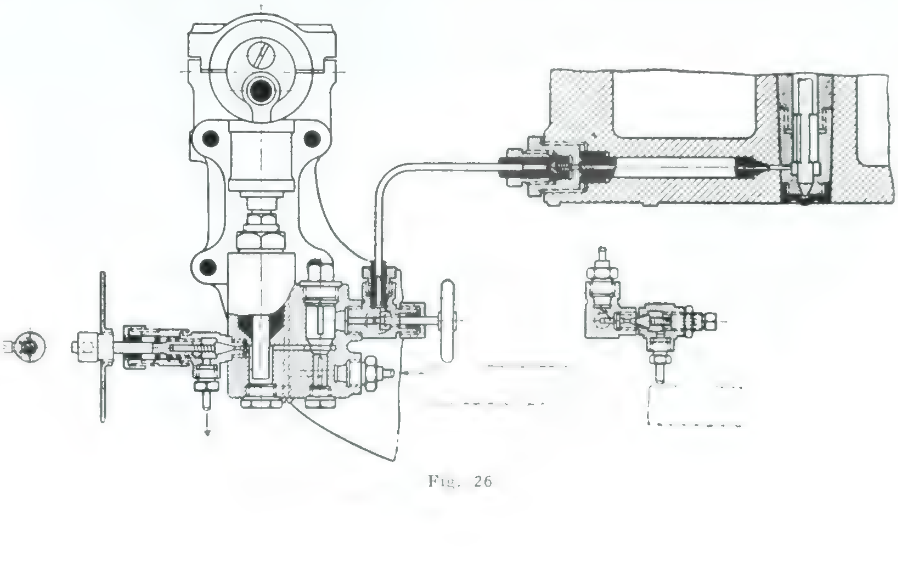


Fig. 26

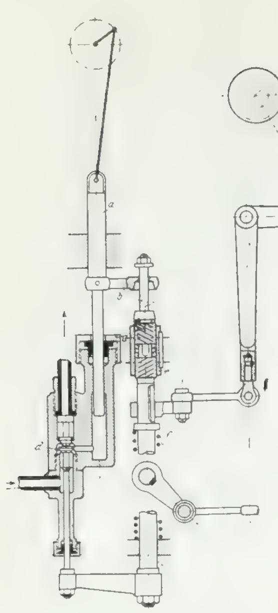


Fig. 27

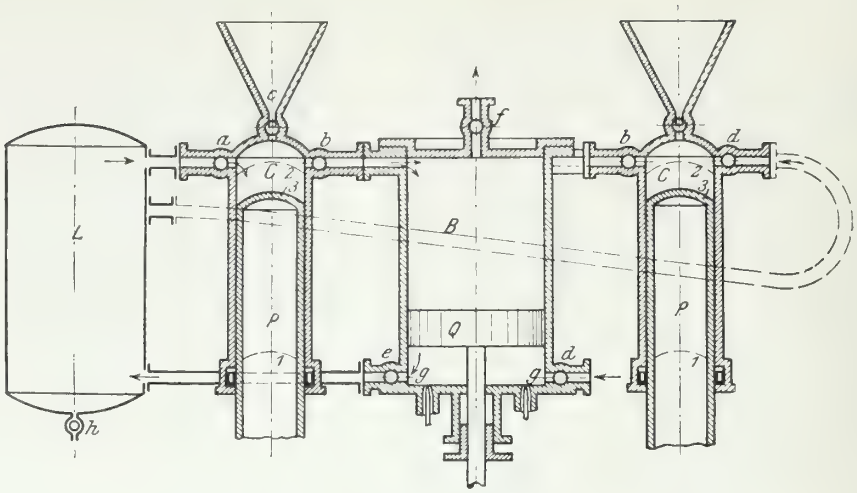


Fig. 28

sure cylinders and one low was actually built and tests were started in September, 1897. Figure 29 shows schematically the cylinder arrangement of this engine. "C" are the high pressure cylinders receiving the combustion air from the lower side of the low pressure cylinder, which acts as air compressor pumping into the receiver "L." From the high pressure cylinders the gases enter the low pressure cylinder "B" through the valves "b" and on the upward stroke exhaust through "f."

During the tests it was found that the heat losses between high and low pressure cylinder were such as to make this system impossible, and the idea to further improve the thermal efficiency of the standard Diesel type in the above manner had to be given up as hopeless.

Practically the only further important tests made by Diesel were the ones of the self-injection type, of which we speak later in connection with some engines of similar type of today.

From this point on further development was wholly in the hands of the licensees, and the progress made can be best judged by their products of today, but it was felt that a short account of the early development would be interesting to the reader and also answer many of the questions that will be brought up by study of the Diesel engine.

This ends this series on the historical development of the Diesel principle as applied to internal combustion engines. In the next installment the writer will begin his treatment of the Diesel engine as applied to marine propulsion.

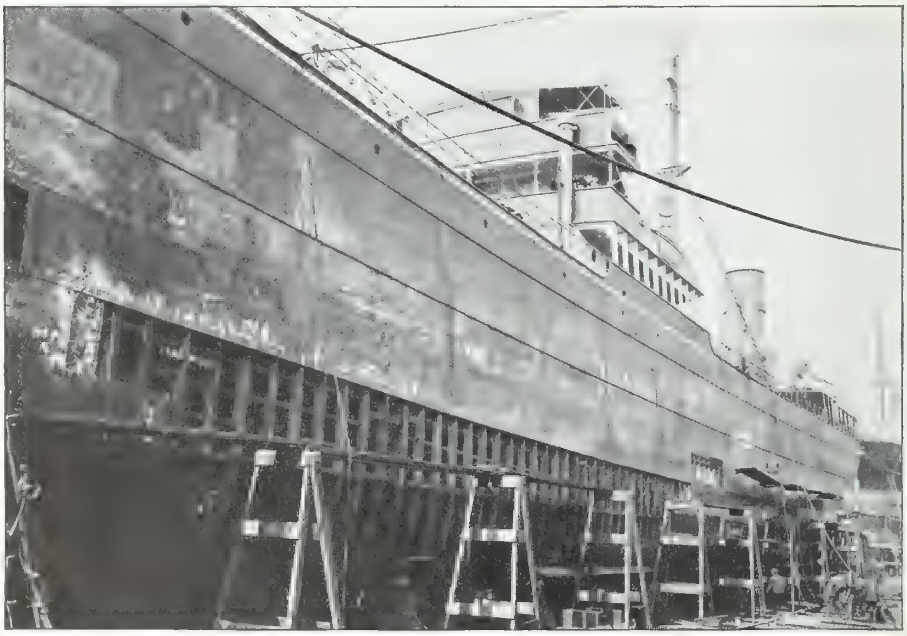
MOTOR TANKER OVERHAULED

OUR illustration shows the motor tanker Tancarville in the dry dock of the Morse Dry Dock and Repair Company at Brooklyn.

The Tancarville has had an interesting history. She was formerly an iron steamer built in 1899 at the yard of Craig Taylor & Co., Stockton, England. Some years ago she was sunk after a boiler explosion off the coast of Siam and was subsequently salvaged and completely fitted out in Hongkong, being converted to a motor ship by the installation of two 500-horsepower Bolinder semi-Diesel engines and having her hull equipped for the carriage of oil in bulk. This installation made for her a very satisfactory power plant and has given excellent service. She was put up at the Morse dry dock for repairs on the hull which was completely reconditioned, new plates being put on and others straightened and made watertight.

The Tancarville carries 2818 tons of coconut oil and is thoroughly equipped with heating pipes and coils in the tanks for keeping this material in first-class condition. She makes an average speed of seven knots per hour at sea, and in the voyage from Manila to New York via Hongkong, Suez and London neither engine had to be shut down for any purpose whatever except when stopping at port.

The Philippine Vegetable Oil Company, owners of the Tancarville and the Katherine, have found the conversion of these old iron hulls very profitable, and now that the Tancarville has had a thorough overhauling at the Morse plant, she will be good for many years' active service.



Motorship Tancarville in the dry dock of the Morse Dry Dock & Repair Company for hull repairs

Brown's Nautical Almanac for 1920

Six hundred and ninety pages. Board covers, red buckram back. Published by James Brown & Son, Glasgow, Scotland. Price 3/6 net.

This British handbook for navigators, combining the nautical almanac with an harbor and dock guide of the daily tide tables, has been published annually by James R. Brown for over forty years. It contains a great variety of miscellaneous information useful to all navigators, but, of course, particularly adapted to the use of British navigators and to coasters in the United Kingdom. When one reads the pages devoted to the lights, beacons and buoys of the United Kingdom in this book one begins to realize that Great Britain and Ireland are practically one big seaport. The book contains many pages of advertisements and much of the most valuable information is on the advertising pages. This is all the better, as it would be absolutely impossible to produce such a volume at the nominal price charged, were it not for the revenue derived from these advertising pages.

STEEL RAISED DECK SEA GOING TUG

By R. Z. DICKIE

IN the past few years most sea going tugs of British design are of the raised deck type, that is the shelter deck is carried up to the height of the top of the house, which permits a large amount of room for accommodations and makes a very desirable sea boat.

This type of design has been objected to principally on the grounds that it would not work out well when handling vessels alongside, but those who have used these boats alongside say that this raised deck is not an inconvenience if strongly built and arranged to take the shock and thrust which may be placed upon it at any time.

An advantage of the raised deck type is that it also gives ample room for exercise on a dry deck, which is very essential when the vessel is on long tows keeping a crew at sea for many days.

The outline design is for a 150 foot sea going tug with a raised deck equipped with a 1000 h. p. electric drive, the power plant consisting of two 500 h. p. Winton Diesel engines directly connected to generators operating a double armature driving motor at a speed of 116 revolutions a minute running light, provision being made for altering the field resistance so that the driving motors will exert full power at 90 revolutions a minute when towing.

This power plant is very reliable as, if necessary, either one of the engines can be used to operate either armature of the driving motor.

The anchor windlass, capstan, steering gear, heating and lighting system and galley range are operated electrically, thus giving the crew the opportunity of using the latest electrical appliances.

The towing machine can be of the regulation steam type operated from the compressed air receivers, which have to be fitted to comply with the law.

The accommodations have been worked out very carefully and are very spacious and comfortable for this size vessel so that the best type of men can be obtained for crew personnel and can be held for the boat's operation.

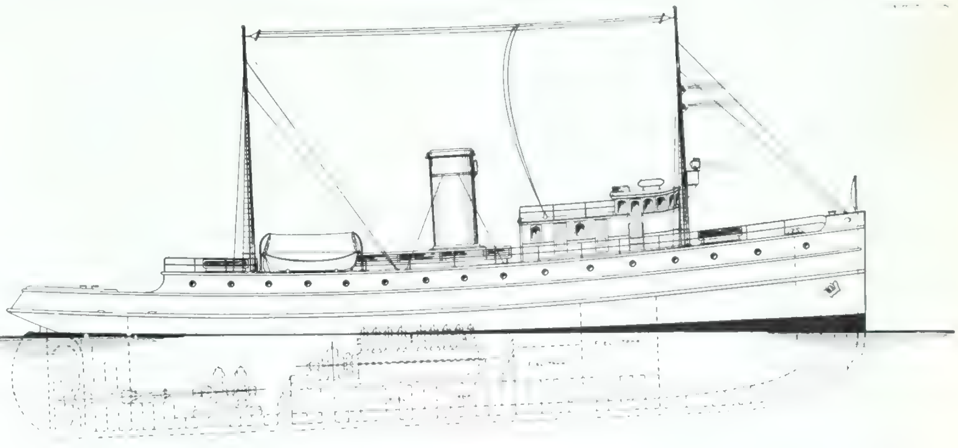
The forward compartment is for deck stores and the crew's space comes next with a small hold below for extra stores or wrecking gear. The crew's quarters are lighted by a skylight on the hatch on the shelter deck, which will make their accommodations light and airy. A large spare room is placed immediately aft of the crew's accommodation and directly under the pilot house floor, which is raised above the deck, allowing light ports for the room below. Large cold storage rooms are fitted with plenty of lockers for linen and cook's stores. Bath rooms and toilets are fitted on the sides for the accommodation of the deck officers and crew.

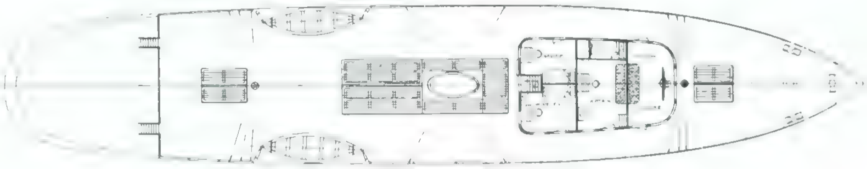
The engineer's accommodations are aft with a wash-room and toilet and the chief engineer's bath is so arranged that it can be used by the other engineers if necessary.

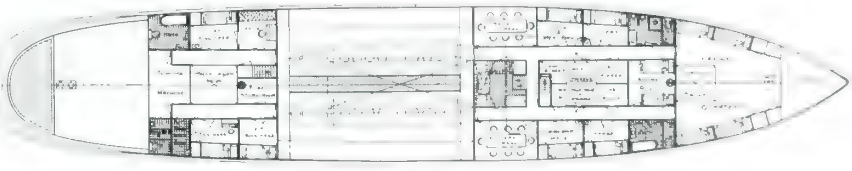
Ample space is left below in the motor rooms for the engineer's stores, etc. Bath water and water in the crew's washroom can be heated electrically.

From an engineer's standpoint, the following table recites the comparative advantages of steam propulsion in a sea going tug and Diesel-electro drive, as outlined above:

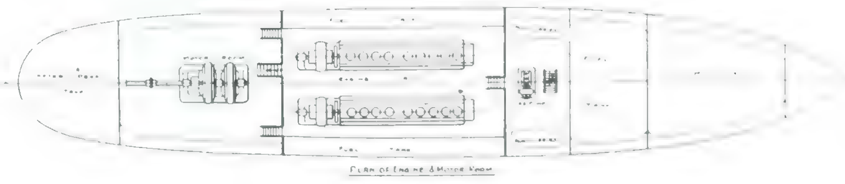
	Steam	Diesel Electric
1—Block coefficient of hull	.48	.48
2—Indicated h.p.	1,000 h.p.	1,000 h.p.
3—Weight of power plant, tons	240	195
4—Weight of water for power plant, tons	30	0
5—Weight of fuel carried, tons	310	385
6—Fuel carried in barrels	2,200	2,520
7—Bunker capacity running full power	25 days	75 days
8—Fuel per h.p. per hour	1.182 lbs.	.45 lb.
9—Fuel used per hour	3.75 bbls.	1.4 bbls.
10—Fuel used per day	90 bbls.	33.6 bbls.
11—Fuel used per year (300 days)	27,000 bbls.	10,080 bbls.
12—Lubricating oil used per day	6 gals.	20 gals.
13—Lubricating oil used per year	1,800 gals.	6,000 gals.
14—Days in operation per year	300	300
15—Cost of fuel oil per bbl.	$2.00	$2.08
16—Cost of lubricating oil per gal.	.43 cts.	.29 cts.
17—Cost of fuel oil per day running	$180.00	$69.88
18—Cost of fuel for one year (300 days)	$54,000.00	$20,966.40
19—Cost of lubricating oil one year (300 days)	$774.00	$1,740.00
20—Crew for tug (engine room only)		
	Steam Tug	**Diesel Electric**
Chief engineer	$ 225.00	$225.00
1st assistant	175.00	175.00
2nd assistant	160.00	160.00
3 oilers	270.00	270.00
3 firemen	270.00	....
Total for one month	$1,100.00	$830.00
21—Engine room wages for one year	$13,200.00	$ 9,960.00
22—Total cost of fuel oil and lubricating oil	$54,774.00	$22,706.40
23—Total cost of crew, fuel and lubricating oil	$67,974.00	$32,666.40







Main Deck



Plan of Engine & Motor Room

BRITISH MARINE DEVELOPMENT

Exclusive Correspondence of Pacific Marine Review

THE maritime outlook is not very bright here at the moment, for this article is being written just after the commencement of the national coal miners' strike. Not a ton of coal is being mined in the country at present, which means that we shall be falling behind in production at the rate of between four and one-half and five million tons per week. This will lead to reduced train services and reduced shipping movements.

Simultaneously with the opening of the strike the government forbade the shipment of coal from this country, an edict which will do a lot of damage to industry, which is not shaping very well just now. Just how long the miners' strike will last no one can say. In a day or two's time the railwaymen meet to discuss the shape of their support, as also do the transport workers. Between them these three bodies number over 2,000,000 trade unionists. If matters run very quickly we shall also have the other big unions straining at the leash and then nobody knows what will happen. Therefore it can be gathered that the outlook at the moment for shipping and for every other industry is as black as possible.

British Sailors' Wages

At the present time able seamen in the British mercantile marine get $46 a month and firemen $48 (at an exchange rate of four dollars to the pound sterling). Other grades of course receive higher rates. These were fixed during the war and were a big advance upon the pre-war figures—about 100 per cent higher, in fact. For some time past, however, the men who go down to the sea in ships have been wanting more money. There exists in this country a body called the National Maritime Board made up of panels representing every grade of worker on the ship and shipowners as well. There is a sailors' and firemen's panel, for example, a masters' panel, a cooks' and stewards' panel, etc.

The board is of course the outcome of war legislation and was designed to avoid any open rupture and strike. It evidently works very well. The seamen put in a claim for higher wages recently at one session of the board and at the next session the shipowners brought down facts and figures showing how freights had fallen, and these, backed up by other grounds, were sufficient to induce the sailors to postpone their wage increases for a certain two months. As we know, of course, freights have got better again, but the whole position is very doubtful and at the same time there is a lot of unemployment among our sailors, 2000 being out of work in Cardiff alone.

Cunard on the Pacific

It has been a fairly open secret for some time past that some of the big new Cunarders were destined to break a way for the company into the Australian express passenger trade, and there has been a good deal of speculation as to the exact manner of the move. There were possibilities of the reinforcement of the Commonwealth and Dominion service, a purely Cunard service through the Panama Canal or a service between San Francisco and Sydney in opposition to the Oceanic and other lines. Few people reckoned on a service between Vancouver and Sydney via the Orient, in direct competition with the Canadian Pacific for a large part of the way. Yet that is apparently the route on which they are going to run, and it is hoped to have three of them on service early in the New Year. As the Cunard's St. Lawrence service should be running in pre-war fashion by that time or soon after, there will be two-all-red routes to the Orient. The one will be by Cunard and Canadian National Railway, and the other the Canadian Pacific all the way through. Whether the C. P. will intensify the competition by extending the route of the big Empresses to Australia is a matter of conjecture, but it is not by any means improbable.

Fabricated Ships

The Chepstow establishment of the Monmouth Shipbuilding Company seems to be making first-rate progress with the fabricated ships which it is completing for the Ministry of Shipping. The third of them—the War Odyssey—has recently been launched, and not inappropriately she was "christened" by Mrs. Henry Boyd, whose husband was formerly a director of the National Yards and is now a director of the Monmouth Company. Like her predecessors, the War Odyssey was launched with steam up, and proceeded on her official trials immediately after the launch. She has, however, already established a record of her own, for her turbines were first turned under steam as she lay on the ways.

Lloyd's Report

The report of Lloyd's Register of Shipping for the twelve months ending with June last—the first complete year since the close of the war—shows that the work of the society was of a very wide and far-reaching character. The year was one of continued endeavor in all maritime countries to make good the loss of mercantile tonnage caused by the war, and the magnitude of the society's share in this effort is shown by the unprecedentedly large number and tonnage of new vessels classed. Altogether the committee assigned classes to 1319 vessels of 4,253,523 tons, as compared with a total of 3,800,000 tons in the previous year, while at the end of June vessels aggregating 4,930,340 tons were being constructed with a view to classification. The countries in which the great bulk of the new tonnage was built are the United Kingdom, the United States, and Japan. Other countries in which there was considerable shipbuilding activity, and in which at present a large volume of tonnage is being built under the inspection of the society's surveyors, are Holland, Canada, Italy (including the Trieste district), Sweden, Spain, and Denmark.

Of the 1319 vessels classed during the year, 594 of 1,391,808 tons were built in the United Kingdom, 480 of 1,930,705 tons in the United States, and 105 of 571,129 tons in Japan. Of the total, 2,009,495 tons were built for the United States (1,735,318 tons being for the United States Shipping Board), while the tonnage built for the United Kingdom was 1,234,911, and that for Japan 444,957. At the beginning of the war—in the year 1914-15—the total classed was 1,295,623 tons, so that the work of the past year represents between three and four times that total. It will be noticed also that the American total classed was larger than that of the United Kingdom, and that the tonnage built to Lloyd's classification for United States ownership was larger than that built for British ownership. The number of vessels now classed in the Register Book is 9587, with a total measurement of 25,018,919 tons gross. Of that total over 96 per cent consists of steel or iron steamers, motor vessels, and auxiliary craft.

Types of Vessels

It is pointed out that, although the vessels of great size which were lost during the war have not yet been replaced (the more urgent demand being for the replacement of general cargo vessels), there has been a striking increase in the number of large vessels in course of construction. There were at the end of June no fewer than fifty-six vessels, each of 10,000 tons and above, building under the society's survey. Included in the tonnage classed there were 121 vessels of 740,430 tons built on the Isherwood system of longitudinal framing, of which forty-three vessels of 253,975 tons were oil tankers. The total classed for the carrying of oil in bulk consisted of fifty-five vessels of 275,714 tons. The new ships classed and fitted for burning oil fuel consisted of 426 vessels of 1,995,788 tons gross, as compared with 211 vessels of 1,193,650 tons classed during the previous twelve months. It is also noted that a large number of vessels have been converted from the use of coal as fuel to that of oil, and that of the total world's tonnage of 100 tons and upwards 76 per cent now use coal, 16.3 per cent use oil as fuel for boilers, 1.7 per cent use oil in internal combustion engines, and 6 per cent have sail power only. These figures compare respectively with 82 per cent, 10.5 per cent, 1.5 per cent, and 6 per cent in the previous year, so that there has been a net transference of about 6 per cent from coal fuel to oil as steam-raising fuel.

Shipbuilding Position

News from the leading shipbuilding districts of the United Kingdom is all to the effect that work is rapidly falling off. Men who have been round the yards declare, however, that there is no particular outward and visible sign of this as in practically every yard the building berths are fully occupied and in the majority there are a number of vessels yet to be laid down. What it means, apparently, is that liner construction is keeping the trade going. As for vessels of the very first class—capable of carrying on services in conjunction with the Aquitania and the Olympic, for example—there is none such on order, and there is not likely to be for several years. What is wanted here, as elsewhere, is a reduction in the cost of construction.

With regard to the slower and less luxurious vessels now under construction or projected, strenuous efforts are being made by owners and builders to keep the cost within reasonable limits, and this accounts to some extent for the delays in the yards. The owning firms, as a writer in the Times Engineering Supplement points out, endeavored, when they drew up their programs of new construction, to obtain economy by laying down ships in series, by designing on similar lines as many vessels as they were likely to require during the period of recovery from the effects of the war—the period which they saw must elapse before they would again be able to order individual vessels from individual firms of builders. In some cases the series consisted of about a dozen ships, all of moderate size and speed, all designed for large cargo-carrying capacity and passenger accommodation of a comfortable, but plain and non-luxurious, character, and all intended for propulsion by double-reduction geared turbines obtaining steam from oil-fired boilers.

But it was impossible to place a series of such vessels with any one firm of builders, so that in every case the owners had to distribute their contracts over several shipyards. One result of this is that there is a continual interchange of plans and of blue prints between the yards concerned. No matter how complete and detailed the original designs were, they had to be subject to the conditions ruling in the respective establishments, and the naval architects and superintending engineers of the owners must always be co-ordinating them and endeavoring to see that uniformity is obtained in the finished article, so that when all the vessels are completed they may be alike and capable of running under common service conditions. This all arises out of the necessity for obtaining good ships at the lowest costs possible under present conditions in the shipyards.

PICTORIAL NAVIGATION

By CAPTAIN E. ARMITAGE McCANN

Marine Consultant to Motion Picture Producers and Others

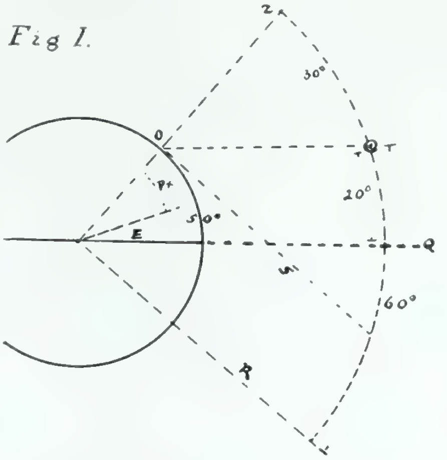
It is a lamentable fact that the great majority of the mercantile marine officers of this country have but the most sketchy knowledge of navigation, the most important requirement of their profession.

They go to sea for a few years and then in a navigation school, free or otherwise, are taught to put together a few figures, sufficient to pass them through the Department of Commerce examination, which is far too easy.

The sailor learns to abstract from his book of tables certain log-tangents, sines, co-secants, or what not of angles he has obtained by some mysterious process of addition or subtraction; these logs he proceeds to subtract and add by another formula learned by rote, divide by two and, and there's the answer, or, it should be, but if you were to ask him to take a pencil and draw a tangent, most likely he would not know what you were talking about, not realizing that these figures he uses are logarithms of trigonometrical ratios, and that the whole problem cannot only be worked by figures from a book, but can be drawn on paper like a picture, and that these sines, secants and tangents with their complements are lines having proportional value to each other and to the radius of a circle which in all ordinary navigation problems is the circumference of the earth.

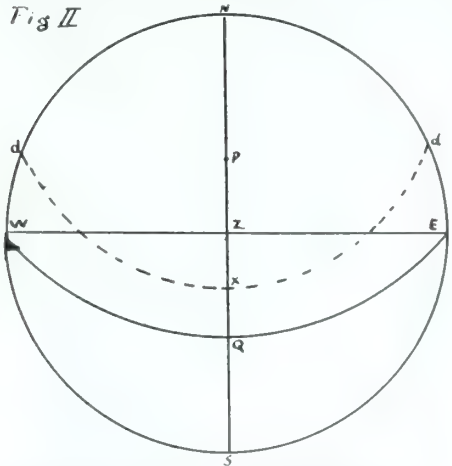
To suggest that they should thoroughly know trigonometry is perhaps asking too much, but they ought to know something about it. The officers of most countries, even second mates, are required to solve problems in plain trigonometry, to prove some simple formulae and draw figures explaining each of their calculations, and masters have to know spherical trigonometry. To adopt these requirements in American practice would be a step in the right direction.

Fig I.



O. The Observer
☉ The Sun
Z. The Zenith
Pr. Parallax
(Here 20° owing to the exaggerated size of the Earth)
E. The Equator
Q. The Equinox
S. The Sensible Horizon
R. The Rational Horizon
The Latitude is 50° N. Declination 20° N
Altitude 60°. Z. Dist 30°.

Fig II



The Circle Represents the Rational Horizon
Z The Zenith
N Z S The Meridian
W Z E The Prime Vertical
W Q E The Equinoctial
d x d The Declination
X The Object at Observation
S X The Altitude
Z X The Zenith Distance
Q X The Declination
Z Q The Latitude

Our officers get good wages and have plenty of spare time, so it is not unreasonable to expect them to have some real knowledge of mathematics and to take an intelligent interest in their work.

Quite a slight understanding of trigonometry gives a wonderful insight into what one is doing when working navigation; it enables one to get the mental picture of the whole problem, which is a more interesting and more intelligent way of working and makes for much less liability to error.

Take a very simple case which does not even involve the use of logs, and ask a young navigator what is latitude and how do you ascertain it? You will most likely get the copy-book answer: "The latitude of a place is its distance from the equator, and you find it by measuring in the sextant the height of the sun or other heavenly body when on the meridian and adding or subtracting certain corrections." This is right as far as it goes, but how many could go further and draw a diagram like Figure I to explain their meaning? If they can do this they know what they are talking about; if not, they don't. This figure is an elevation, or, it shows the earth and heavens from a point of view on the plane of the equator.

Figure II illustrates the same problem, but is a plan and is looking down from a point of view at the zenith; if the student gets either or both of these well fixed in his head by drawing one, preferably Figure II, to suit his calculation each time he obtains the latitude, for a dozen or so times he will know what he is about and not make mistakes, nor have to remember so many little rules like "Same name add, different names subtract."

In each case dip, refraction, parallax and semi-diameter have been ignored as they are only minor corrections, but they should also be understood in a graphic way.

An important factor in this graphic method of studying navigation is that it teaches one to think, which learning by rote never does, and this faculty gradually extends to other walks in life much to the benefit of the thinker and those who have dealings with him.

Problems like day's work, Mercator sailing, amplitudes and azimuths are easy to show graphically; longitude is more difficult to thoroughly grasp, but not at all beyond the capabilities of the ordinarily intelligent man, and ships' officers are certainly in that class.

It is not intended here to enter into a treatise on navigation or astronomy, but Figure III may be of interest and help to give some concrete idea of sines, tangents and secants with their co's—which is short for complements.

An excellent and interesting way to impart this information would be by means of the motion picture screen, in the form of a series of short reels, and such a course could profitably be extended to college students, as, after all, these are matters of great general interest.

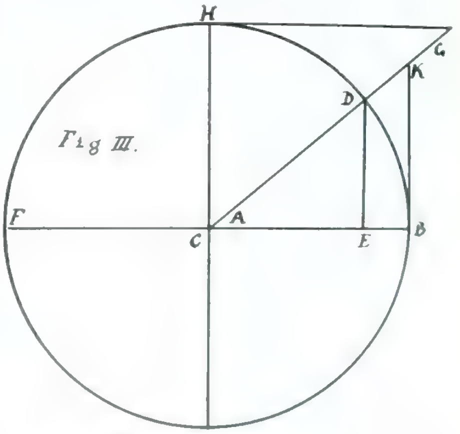
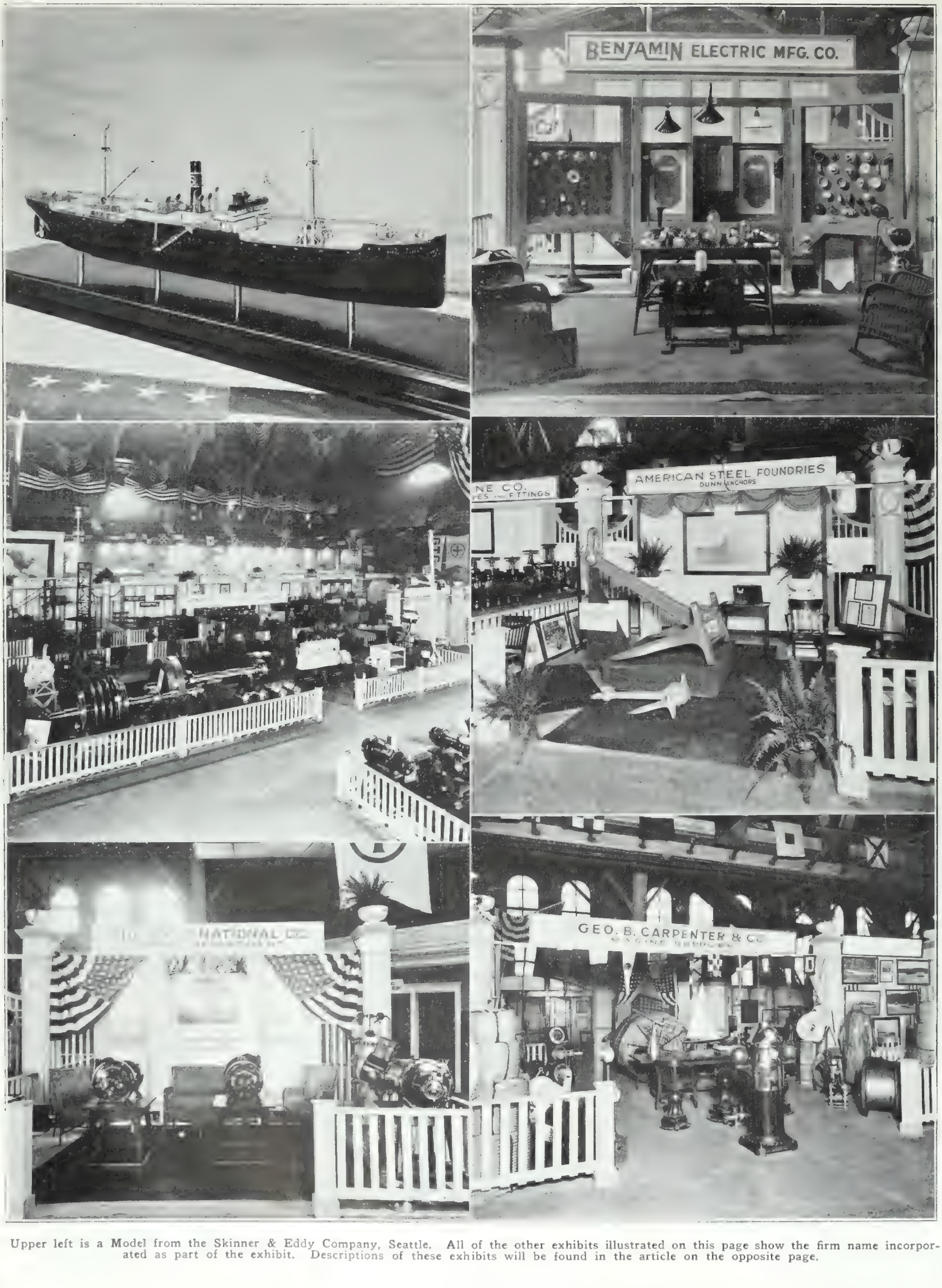


Fig III.

A is the Angle
DE is its Sine
KB its Tangent
CK its Secant
BC its Versed-sine
CE its Cosine
HG its Cotangent
CG its Cosecant
FE its suversed-sine

SOME EXHIBITS AT THE NATIONAL MARINE EXPOSITION



Upper left is a Model from the Skinner & Eddy Company, Seattle. All of the other exhibits illustrated on this page show the firm name incorporated as part of the exhibit. Descriptions of these exhibits will be found in the article on the opposite page.

NATIONAL MARINE EXPOSITION

DURING the week of October 18-23 the National Marine League held its second National Marine Exposition. Our readers will remember that the first exposition under these auspices was held in New York in April of this year and was very largely instrumental in stimulating the interest of American people in marine affairs.

Realizing the necessity of bringing this stimulation before the minds of the American people of the great Middle West, the second exposition was planned for Chicago and it was arranged to secure the great Coliseum for the purpose. Enthusiastic co-operation was met with by the National Marine League from steamship companies, shipbuilders and manufacturers from all over the United States. Our illustration on the opposite page shows a few of the exhibits which added to the attractiveness of the exposition.

The following list of exhibitors is practically complete and shows the wide range of marine industries and the territory covered: All America Cables, Inc.; Aluminum Cooking Utensil Company; American Bureau of Shipping; American Car & Foundry Company; American Chain Company, Inc.; American Library Association; American Steel Foundries; Atlas Sootblower Company; Benjamin Electric Company; Brown Portable Conveying Machinery Company; George B. Carpenter Company; Consolidated Shipbuilding Corporation; Crane Company; De Vilbiss Company; Charles D. Durkee & Company; Hubbard H. Erickson Company; Fairbanks, Morse & Company; Ferguson & Lange Foundry Company; General Electric Company; Goodrich Transit Company; Hanlon-Gregory Galvanizing Company; International Mercantile Marine Company; Irving Iron Works; Albert Kingsbury; Kroeschell Brothers Ice Machine Company; Link-Belt Company; Luckenbach Steamship Company; Lunkenheimer Company; Maritime Hydraulic Oil Service; Marshall Field Company; The McNab Company; Mercury Manufacturing Company; Metal & Thermit Corporation; Munson Steamship Line; New Process Chemical Company, Inc.; New York Engineering Company; Niles-Bement-Pond Company; Oriental Navigation Company; Pacific Mail Steamship Company; Pneumercator Company; Pyle-National Company; John A. Roebling's Sons Company; Seamen's Service Center; Simons-Boardman Company; South Atlantic Ports Association; Sterno Corporation; Submarine Boat Corporation; The Texas Company; W. & J. Tiebout; United States Mail Steamship Company, Inc.; United States Rubber Company; United States Shipping Board; Valentine & Company; Wailes-Dove-Hermiston Corporation; White Fuel Oil Engineering Corporation; D. T. Williams Valve Company; Worthington Pump & Machinery Company.

Probably the most spectacular exhibit in the Coliseum at the time of the visit of the representative of Pacific Marine Review was that of the Submarine Boat Corporation and its component companies; the Trans-Marine Corporation; the Atlantic Port Railway; the Newark Bay Shipyard; the New London Ship & Engine Company of Groton, Connecticut; the Elco Boating Works, and the Electro-Dynamic Company. The principal features of this exhibit were two models. One of these models was a remarkably complete and accurate representation of the standard ship built at the Newark Bay Shipyard. This model is seven feet long and is said to be one of the most complete ever built, being accurate to scale down to the minutest detail.

The other model represents the plant and its contiguous territory, including Newark Bay, New York Bay, and all those portions of New York City, Staten Island and Bayonne which lie within a seven-mile radius of the center of the plant. This bas relief model was thirteen feet long by eight feet high, and the background of this exhibit was a huge painting, a portrait of the Goddess of Commerce seated with her feet on the world, a locomotive on the one hand and a cargo ship on the other. Over the head of the figure of Commerce was a golden arch supported upon columns, one of which rested on the locomotive and one upon the ship, the arch bearing the Trans-Marine Corporation's message to the shipper, "From rail to ship," the whole exhibit being calculated to show how the Submarine Boat Corporation is putting into actual practice its own faith in the products of its shipbuilding yard and is operating its plant as a combined shipyard and terminal with direct rail connections and with enormous facilities and space for the proper stowage and distribution of cargo in transit from ship to rail or vice versa.

Another exhibit which attracted a considerable amount of attention was that of the General Electric Company, which contained models of their various marine products, including a 10-kilowatt generator set for marine use with enclosed steam engine; a model of a 2500-horsepower marine geared turbine set; and a marine geared turbine with the turbine rotor and gears exposed. In the background were models of Diesel oil engine generating sets for Diesel electric marine propulsion; a three-wire marine switchboard; searchlights; and various types of marine motors. In one corner was a mast carrying a set of running and signal lights with the telltale board.

The Benjamin Electric Company exhibited numerous devices and fittings for marine purposes, among others being the Benjamin watertight bell, which was demonstrated to be reliable when immersed in water.

The Todd Shipyards Corporation exhibited a working model of the new Todd burner, the most recent development of the White Fuel Oil Engineering Corporation in the way of mechanical oil-burning equipment.

A great deal of interest was also manifested in the exhibit of the new Kitchen maneuvering and reversing rudders at the booth of the McNab Company.

Many of the steamship companies displayed interesting models of their passenger vessels, and on the whole it was felt that a great deal of interest in marine matters had been stimulated by this show.

We are informed that the National Marine League is about to stage another show in New York or at some other Eastern seaport, and that it is their intention to bring one to San Francisco some time early next year. The idea occurred to us while looking over these exhibits that it seemed a great pity that they could not be made permanent and at the same time portable by fitting up one of the larger unused Shipping Board steel freighters on each coast with an exhibit of these products in actual working conditions on board the ship and running this ship around to the various ports, holding exhibitions on the waterfront. This, of course, would not reach the people of the interior, but would make very good publicity propaganda for the National Marine League and also for the exhibitors.

COMPLIMENTARY DINNER

ON the evening of October 28 Mr. M. E. Farr, president of the American Ship Building Company, gave a very delightful dinner at the Union Club in Cleveland complimentary to Mr. J. C. Maugham, shipping editor of the London Times. Mr. Maugham will be pleasantly remembered by many of our Pacific Coast readers as one of Mr. Schwab's party when as chairman of the Emergency Fleet Corporation he made a tour of the shipyards of the United States and stimulated so much enthusiasm among the men in the shipyards toward producing ships in record time for the transportation of troops and supplies to Europe.

At this dinner were present also Mr. W. H. Gerhauser of the American Ship Building Company and Mr. J. S. Hines, publisher of Pacific Marine Review.

As shipping editor of the London Times, Mr. Maugham may be said to represent in himself in a peculiar way the national sentiment on shipping matters of the British Empire; Mr. Farr, as executive of the American Ship Building Company, may be said to represent the conservative shipbuilding, ship owning and operating interests of America; Mr. J. S. Hines, as publisher of the national magazine of shipping, may be said to represent the shipping sentiment of America in general and particularly of the Pacific Coast. We venture to hope that the splendid constructive type of optimism which prevailed in the discussion of shipping problems at this dinner may be prophetic of a future in which the best of American and British marine traditions and experience will prevail in the sea-carrying trade of the world.

LOS ANGELES SHIPBUILDING AND DRY DOCK COMPANY

ORGANIZED in April, 1917, for the purpose of establishing a shipbuilding and repair plant in Los Angeles harbor, the Los Angeles Shipbuilding and Dry Dock Company, with a remarkable degree of energy and force, transformed sixty-nine acres of tidal marsh on Smiths Island in the west basin of Los Angeles harbor into a splendidly equipped and well arranged modern shipyard.

The keel of hull No. 1 was laid on July 23, 1917, since which time a total of thirty 8800 deadweight ton capacity cargo ships and five 11,500 deadweight ton has been contracted for with the Emergency Fleet Corporation. Of this total twenty-seven 8800-ton vessels have been delivered at the date of this writing, making an aggregate tonnage of 237,600. With the exception of the West Arvada, which was sunk in September, 1919, off the coast of Holland after collision with submerged German mines, all of these ships are giving excellent sea service in various parts of the world. At the present time hulls Nos. 29 and 30, 8800-tonners, and 31 and 32, 11,500-tonners, are under construction on the slips, and keels are yet to be laid for hulls Nos. 33, 34 and 35. When these vessels are completed the plant will have turned out more than 320,000 deadweight tons.

Like all of the shipyards that had any intention of permanency, the Los Angeles Shipbuilding & Dry Dock Company has during the last year been preparing for the end of the emergency shipbuilding program by the proper equipment of its shops and yard and the sifting of its personnel for entering into the work of repairing and reconditioning of ships; in fact, during the entire construction and equipment of the plant the management was looking forward to the present condition and therefore established their machine shops, erecting shops, foundries, etc., with the idea of making in their own yard practically everything that went into the ships.

There has been built at the plant and is now in operation a 12,000-ton floating dry dock, the only docking equipment adequate to take care of deep-sea vessels between San Francisco and the Panama Canal. This dry dock is built in six sections of 2000 tons' capacity each, and an excellent idea of its size can be obtained from the accompanying photograph. The cost of construction of this dock was approximately one and one-quarter million dollars, and the situation of the dock in the west basin of Los Angeles harbor, taken together with the splendid machine shop, woodworking and foundry facilities in the plant of the Los Angeles Shipbuilding & Dry Dock Company, should make it a very great asset for the convenience of shipping in Los Angeles harbor.

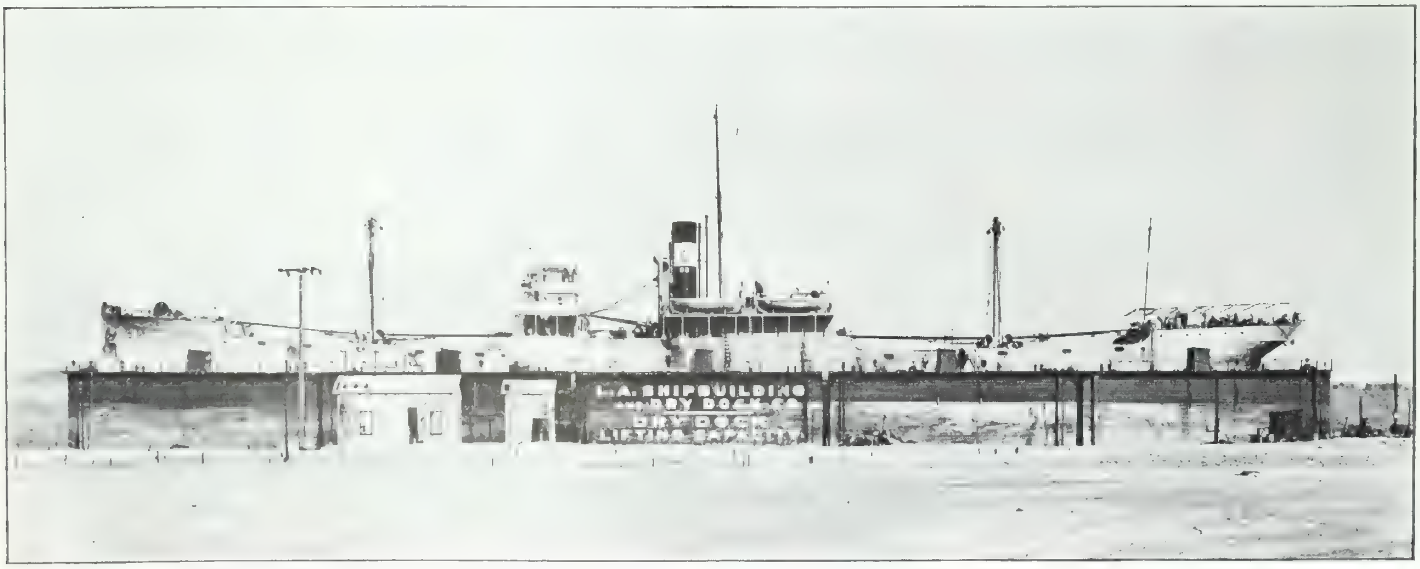
The Works Tug Bahada of Los Angeles Shipbuilding & Dry Dock Company

A brief summary of the number and class of tools in the various shops will give perhaps a better idea of the extent and completeness of the equipment. We find in the machine shop: one 36-inch Niles slotter; one 96-inch by 96-inch planer (Los Angeles Shipbuilding make); one 13-foot 6-inch between columns by 30-foot long over the bed planer rebuilt in the company's machine shop; one 10-foot Sellers boring mill; one 84-inch Cincinnati boring mill; one Niles horizontal mill capable of taking 20-foot diameter solid propellers; two No. 280 Pawling & Harnischfeger horizontal mills; one 60-inch by 34-foot George F. Wright lathe; one 52-inch by 48-foot Putnam lathe; three 27-inch by 30-foot Prentiss lathe; ten turret lathes, represented among them being Warner & Swasey, Greenlee, and other well-known makes; forty-eight engine lathes; two No. 35 Landis boring mills; one No. 331 Lucas boring mill; one 12-foot Baush radial drill; two 6-foot Baush radial; one 6-foot Prentiss radial; one 12-foot Betts boring mill; two 10-foot Niles boring mills; two Pratt & Whitney gear cutters; one Brown & Sharpe gear cutter of 72-inch capacity; one No. 1 Kempson milling machine; one No. 2 Van Nomen milling machine; one No. 3-B Milwaukee milling machine.

As has often been noted in these columns in dealing with Pacific Coast shops, we find that the difficulty in obtaining speedy delivery of certain classes of machines from Eastern manufacturers, especially during the war period, led to a great deal of ingenuity being displayed in the design and construction of what might be termed "home-made" machine tools, and in the shop of the Los Angeles Shipbuilding & Dry Dock Company there are many of these products, among them some very notable portable milling machines, both single and double, vertical and horizontal types, which have been used with great economy on work in the shops and in the yard.

The executive personnel of the company is as follows: President, Fred L. Baker; vice-president and general manager, S. L. Napthaly; assistant to general manager, James Reed; comptroller, F. C. Phillips; works manager, John Murray; secretary, E. M. Leaf; naval architect, L. E. Caverly.

Both Mr. Baker and Mr. Napthaly have had a great deal of experience in industrial executive management. James Reed has had a very adequate technical training and a large experience in naval construction in navy yards. John Murray is a product of the Clyde and has had a long experience in Pacific Coast working conditions in the old Union Iron Works and in the Northwest Steel Company at Portland.



Shipping Board Steamer West Eldara in the dry dock of the Los Angeles Shipbuilding and Dry Dock Company

Marine Insurance

DEVELOPMENTS IN MARINE INSURANCE

By C. F. HOWELL

THE widely advertised movement to secure such a modification of Section 45 of the New York Insurance Law as would remove reinsurance from the restrictions imposed by that celebrated statute has not even been heard from for two months past. It has been that long, or longer, since the group of marine underwriters, composed of American and foreign admitted company representatives waited upon Insurance Superintendent Jesse S. Phillips and undertook to convince him of the urgent necessity for securing a remodeling of the disputed section. Officials of the New York Department who were present at the audience state that it was impossible to learn just what the committee really wanted on account of the diversity of opinion entertained by the latter. Several of them wanted permission to pay the 2 per cent tax and make the required deposit for their reinsurers; others had a different scheme in mind. It was the old story of a lack of harmony and unanimity among marine underwriters on this side of the water. The Insurance Department proposes to do nothing until a definite proposition has been written out and presented; one that appears to have the backing of a fair majority of the complainants. If injustice is being done insurance interests, and the American underwriting market is unduly curtailed by the operation of the New York law, it is certain that Superintendent Phillips will call the attention of the Legislature to the facts in the case and present the grievances of the injured parties for redress. "There has never been an important occasion when our marine underwriters have acted in concert," says a prominent official of the New York Insurance Department, "with the sole exception of the organization of the syndicates — and they probably would not have done so then if they had not had absolute assurance that unless they got together and figured out what they really wanted and would do, the government would take the bull by the horns and go into marine insurance itself."

Loadline Outlook

It must not be thought that because the loadline bill did not become a law at the hands of the last session of Congress it is therefore dead and buried. Quite the contrary. It passed the House unanimously, and is now with the Senate Committee on Commerce. It will be one of the first considerations to come up when Congress convenes on December 6, with every prospect of a successful passage. The opposition of the Atlantic Carriers' Association was sufficiently strong to hold it back during the last session, but much less of trouble is anticipated from that quarter now that coastwise vessels will not be required to carry loadline restrictions identical with those of ocean-going craft. It is reasonable enough to make a certain allowance in favor of coastwise vessels, in this respect, as they are not subject to the exacting conditions of heavy sea service required of the ocean type, but it would be absurd to permit shipping interests to go so far as to exclude them from loadline restrictions altogether — which is vigorously sought by certain prominent shipowners. If loadline advantages are worth while they should apply to coastwise shipping as well as to other classes. Further, if opposition to the bill should prevent its ultimate passage, American shipping would most certainly have been dealt a staggering blow; and the results would bitterly react upon the shortsighted opponents of this important measure when foreign governments began, as they could, to hold up American vessels from clearing until their seaworthiness had been satisfactorily established. But such an eventuuality as the defeat of this bill is most unlikely. Important meetings have been held in New York City recently by advocates of the bill, some of which have been attended by Admiral David W. Taylor, the greatest construction expert of the Navy, who is chairman of the loadline committee appointed by Secretary Alexander of the Department of Commerce. It is not generally known, but this committee has been very active all through the summer. It has a strong membership, with marine insurance interests represented by Hendon Chubb and Vice President W. W. Parsons of the Atlantic Mutual Insurance Company. There are three sub-committees of the main committee—one for the Great Lakes, one for the Pacific Coast, and one for the Atlantic and Gulf Coasts. The chairman of the Great Lakes sub-committee is Professor Sadler, of the chair of naval architecture at the University of Michigan; Professor Durand is chairman of the Pacific Coast sub-committee, and he is the incumbent of the naval architecture chair at Leland Stanford; and Professor McDermott, of naval architecture at Cornell, is the chairman of the Atlantic and Gulf Coasts subcommittee. An exhaustive study is being made by these sectional sub-committees with respect to conditions affecting the loading of vessels in their respective fields, and they will shortly report their findings to the main committee, which will thus be in possession of full information for working out the application of loadline regulations to every class of American vessels.

Steady progress is being made by the American Bureau of Shipping in extending its efficiency in important quarters abroad. One of its vice-presidents is at work on the other side, investigating and reporting as to where there is the most urgent need for the appointment of surveyors or exclusive branch offices. The bureau already maintains exclusive branch offices at Havre, Hamburg, San Juan (Porto Rico), Havana, Rio Janeiro, and Antwerp. It also has non-exclusive surveyors in every important port of the world. Exclusive surveyors are maintained by it at Shanghai, Liverpool (Nova Scotia), and Toronto. There is no branch of American maritime interests that has shown such important development during the past two or three years as this bureau.

Identification Marks

Frequent inquiries come from shippers as to what is expected of them in the matter of aiding in the reduction of theft and pilferage losses by systematic alterations in trade or identification marks. Underwriters are replying that such changes should be made not less frequently than every six months, and that a still better plan is to leave identification marks off altogether. The theft and pilferage situation has become so acute from the steady accumulation of claims from this source that many underwriters are refusing to cover this hazard under any circumstances or for any rate. Others are laying down restrictions that are, sometimes, so sweeping as to preclude the employment of any identification marks whatever; while still others are insisting upon such marks being changed periodically. The reason is obvious. Certain well-known brands are household words, and when they represent commodities popular with thieves (leather goods, for example) they merely assist the criminal and facilitate his work. Both shippers' and consignees' marks should be regularly changed, if they are to be used at all. By the end of a reasonable period of hoodwinking the thieves, the latter have discovered the alteration and have settled down to working on the new marks.

Delays and Deviations

The inevitable has come, in the shape of a heavy loss at Havana on account of the abnormally congested conditions of that harbor, and others may be expected. The burning of the Polish-American Navigation Company's steamer Krakow has involved an estimated loss of $1,500,000, and will necessitate the determination of many mooted questions respecting the liability of marine insurance policies for losses occasioned through insured perils to cargo delayed in transit beyond the ordinary course

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of the insured voyage. The Krakow lay in Havana harbor for nearly three months, unable to get her cargo discharged and subject to the continual depredations of thieves; indeed, it is suspected that her burning may have been of incendiary origin, effected to cover theft and pilferage losses. Her officers and crew were arrested on a charge of arson. The Krakow is an example of the dangerous character of coverage in connection with vessels subject to such abnormal port conditions as have been prevailing at Havana for some time past, where millions of dollars worth of cargo have been tied up on ships and on docks. Most of this cargo has been insured in the New York market and under warehouse to warehouse contracts. Bankers are vitally interested, because they have financed the shipments. To date no action has been taken by underwriters as to liability on delayed shipments, and they are far from entertaining uniform views on the subject. Those who admit liability during detention are, in many instances, requiring additional premium for cargo detained beyond a certain period, usually fifteen days; some admit liability but ask no additional premium; while others are frankly uncertain as to just where they stand. In many quarters the question is raised as to whether delay may be construed as a deviation. All marine policies carry the implied condition that the insured voyage will be prosecuted with due dispatch and in the customary course of pursuing the specified voyage. If a delay can be held to be a deviation, the assured would be covered during the delay under the deviation clause. If the delay at Havana is neither unreasonable nor wilful there has been no deviation, which would, if this view is correct, establish the insurance as in force and not subject to additional premium; but if the delay has been voluntary or wilful there has been deviation, and if the policy contains the deviation clause the insurer is not discharged, but is entitled to additional premium. It is probable that the same principle applies to goods held on Havana docks under the warehouse to warehouse clause.

Valuation Problems

The decline in shipping values has brought to the front a new problem involving the question of valuation. This has been increased by the weakening of freight and charter rates. The fall in capital values has not been balanced by any marked reduction in the cost of repairs, particularly abroad; the situation being that while the principal at risk has been reduced the liability for minor damages has actually increased; and, consequently, heavy damage claims are falling on materially lower values. A method of meeting this condition has been arrived at, on the other side, by which owners make no change in the values insured against "all risks," but will receive a smaller sum in case of a total loss of the ship, with an allowance in the premium for the difference in the sums insured. The Review, of London, illustrates how this system works out; thus: "In the case of a ship valued for insurance against "all risks" at £100,000, and insured for a premium of 6 per cent per annum, representing a total premium of £6000, in the event of an owner declining to receive, say, only £80,000 in the event of total loss, allowance would be made for the difference of £20,000, on the basis that the total loss premium was worth one-third of the all-risk premium. The total loss premium in the case of an all-risk premium of £6 would be assessed at 2 per cent, which, in respect of the difference of £20,000, would represent £400, and so would reduce the total premium payable from £6000 to £5600. Consequently the premium on the whole sum of £100,000 would be reduced from £6 to £5 12s. per £100. The effect is to maintain the value insured for "average" claims, while reducing the sum receivable by owners in the event of total loss to amounts representing more closely actual current values. There would be obvious disadvantages in maintaining the values insured against total loss risks on a basis that would do much more than compensate owners for the loss of a ship."

Leakage Losses

Coverage against leakage has never been popular with marine underwriters, and the steady increase in claims on this hazard has not tended to rehabilitate it. Like theft, pilferage, breakage and similar hazards, considerations of accommodation have forced this brand of insurance, when arising from causes other than marine perils, on the insurers against their better judgment; but there has lingered an impression that certain classes of leakage might be advantageously written at a moderate rate. One of these exceptions has been edible olive oil, and its rate has been consistently low. But of late losses have grown so rapidly with this commodity that it will have to come off of the preferred list. Even the superior care with which edible oil is packed—in small casks and frequently protected by straw covering—appears to make little difference. Importers are unable to account for the present heavy losses, and have expressed their entire willingness to co-operate with the underwriters in minimizing them. The smaller size of the container does not appear to have much effect upon conditions of carriage, although it is generally known that a small container is better than a large one because it is the weight of the cask and its contents that lead to the springing of the staves. The moral hazard enters extensively in the shipping of edible oil. Instances have come to light of late where the invoice quantity greatly exceeded the capacity of the casks; and this is material to the underwriters because claims are generally adjusted on the basis of the difference between the invoice and the out-turn quantity. Short shipments are also foisted upon the insurance people by the simple process of not entirely filling the barrels, and this is generally successful, unless detected, as there are always signs of leakage about the casks, and the precise amount so lost would be difficult to ascertain. Conditions, as at present granted, are too liberal—3 per cent in excess of 1 per cent deductable leakage on each cask. In many conservative quarters the leakage risk will not be written unless on a basis of 5 per cent average in excess of ordinary deductable leakage on the entire shipment. This is a safer method of coverage, from the underwriting viewpoint, because the ordinary deductable leakage is determined by a separation of the sound and damaged casks and a comparison of the invoice and out-turn quantity of the sound barrels; this percentage is applied to the damaged barrels to determine the deductable damage. Edible olive oil is now worth $5 per gallon, and some better method of shipping it will have to be devised. Iron drums would settle the matter, but their cost probably makes them unavailable.

Again, Brokers' Certificates

Interest continues to be taken in the determination of leading banks to no longer accept brokers' certificates, as discussed in our last issue. Mr. Joseph A. Thomassen, insurance manager of the Guaranty Trust Company of New York, has come out with a declaration supporting the announcement of the National City Bank of New York to that effect. "We feel," says he, "that brokers' certificates constitute only an additional credit risk and should be eliminated from banking transactions. It has been our attitude in the past to require that on insurance effected in the United States we be furnished with the actual definitive insurance company's certificate, and in cases where insurance is effected abroad we require that the

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policies be delivered to our branch offices and that we be informed by cable of such delivery. We feel that this request is only reasonable and provides us with proper protection, also that it does not work any hardship to the American insurance brokers." In the opinion of leading international marine brokers this policy may be sound enough, but it will involve delay and expense. The only procedure left to the broker will be to find out what foreign bank the American bank wants the documents deposited with, and then cable his correspondent there to deliver the papers to the designated bank. This would mean the delay of two or three days, while the information is being exchanged, and also the expense of the cable costs to the insured. It applies, in the main, to foreign-placed business, as in the case of business placed with an American insurance company the local agent of the latter has the authority to sign and issue the necessary documents, which would take him but an hour or two. One authority believes that the refusal to accept brokers' certificates would lead to the accumulation of a profusion of documents by the banks, because lines are placed in fractional amounts with different companies. All, however, are agreed that there is justice in the banks' stand, in view of the undeniable risk involved in losses on account of financially irresponsible brokers.

WELDING A FRACTURED RUDDER FRAME

WHEN the 4341-ton Green Star Line freighter West Grama was recently placed in drydock for repairs at the Robins Dry Dock & Repair Company, South Brooklyn, New York, the frame of her nine-ton cast-steel rudder was found to be fractured in four places. The fractures all extended from eight inches to ten inches into the chunky side of the casting. To replace the rudder by purchasing a new casting would have cost $9000, not including the cost of installing the renewal and the almost inestimable loss due to the idleness of the vessel while awaiting delivery of a new rudder, which would have taken about four months. It was, therefore, decided to repair the rudder frame by Thermit welding.

In making this repair the rudder was unshipped and laid on the dock with the frame in a horizontal plane. The metal surrounding the four breaks was then cut out wiah an oxy-acetylene torch and chipped with a pneumatic chisel, so that four gaps, each about three inches in width, were made in order to provide space for the Thermit steel to enter when poured. The usual steps customary in Thermit welding were then followed.

As the fractures in this particular repair extended only partly across the casting, it was necessary during preheating to offset contraction strains by heating the ribs at the ends of which the welds were located.

Each pair was poured simultaneously as the yellow pattern wax had been shaped so as to connect the two gaps in each pair of welds. Four hundred and fifty pounds of Thermit metal was used in each of the two crucibles. Both welds were found to be satisfactory in every respect. The welds were completed within five working days after the fractures had been cut out.

CUTTING REPAIR COSTS

RECENTLY when the steamship S. B. Hunt was dry docked at the Morse Dry Dock and Repair Company, Brooklyn, New York, her stern frame was found to be badly buckled so that the rudder would not properly function and the pintle bearings were badly worn. To have taken the stern frame out of the ship for straightening in the shop would have meant a delay of about twenty days and an enormous expense to the ship owner. It was suggested by the Morse Dry Dock and Repair Company that the frame be straightened in the hull and, permission being obtained, they set about very ingeniously to perform this difficult operation.

By the use of special heating boxes with coke filling and kerosene blow torches, the stern frame was heated sufficiently so that it could be straightened out by means of hydraulic jacks and differential pulleys. The worn pintle bearings were built up and machined in place, the stern frame made straight and true, and the ship sent upon her way in record time.

It has been estimated that the ship owner was saved by this method $25,000 in actual costs on the work, to say nothing of the time saved over the ordinary routine, which in actual value would have amounted to very much more.

Our illustration shows the method of heating the stern frame by means of the kerosene torch.

Heating Stern Frame of S.S. S. B. Hunt Preparatory to Straightening same with Hydraulic Jacks

FEDERAL AID IN PORT IMPROVEMENT

IN an address on "Government Co-operation in Port Development" delivered before the annual convention of the American Association of Port Authorities, Captain F. T. Chambers calls attention to the fact that it is provided in the Merchant Marine act (Jones bill) that "it shall be the duty of the Shipping Board in co-operation with the Secretary of War with the object of promoting, encouraging and developing ports and transportation facilities in connection with water commerce over which it has jurisdiction to investigate territorial regions and zones tributary to such ports * * * to investigate the causes of the congestion of commerec at ports * * * to investigate the subject of water terminals * * * to advise with communities regarding the appropriate location and plan of terminals * * * to investigate the practicability * * * of improvements in connection with foreign and coastwise trade, and to investigate any other matter that may tend to promote and encourage the use by vessels of ports adequate to care for the freight which would naturally pass through such ports."

The section also directs the board, if after such investigation the board deems such action necessary, to submit its findings to the Interstate Commerce Commission so that "rates, charges, rules or regulations of common carriers by rail" may be revised in any way necessary to promote proper development of ports and the transportation facilities in connection therewith.

Particular attention is called to the injunction on the Shipping Board to co-operate with the Secretary of War on account of the control and supervision which the War Department exercises with regard to rivers and harbors. The policy of Congress with regard to water transportation, ports, and facilities is also emphasized by reference to paragraphs bearing on that subject from the "River and Harbor act of March 2, 1919" and "Section 500 of the Esch-Cummins bill for the termination of the Federal control of railroads."

Captain Chambers then reviews the work of the Port Facilities Commission of the Shipping Board, of which he was chief engineer, outlining the efforts of that commission to place adequate dry docking facilities in the ship repair yards of the country to meet the requirements of the war emergency ship operation program and showing how, as time went on, the commission was able to devote considerable attention to terminal design and to investigation of both domestic and foreign facilities, and stating how, when the country was about to lose practically the entire port facilities force built up by the Shipping Board, the board of engineers for rivers and harbors of the War Departemnt offered to take over all that part of the personnel engaged upon United States port work.

This board of engineers is now engaged principally in advising the transportation division of the War Department and in designing coal and general cargo terminals for that department. They are still open as a consulting body for local port authorities and are making a plea to the Chambers of Commerce and the Boards of Trade of seaboard cities to provide them with adequate information and statistics upon which to base their findings with regard to the desirability of future developments. It is pointed out that the Government policy through this board will be to advise Government aid as to channels and anchorage ground only for such ports as will do their share in regard to terminal development; that it is the policy in States which possess only one first-class harbor to have that harbor looked upon as the property of the entire State to be developed at State expense.

Investigation has shown that in many of our principal harbors where no State or municipal control exists the waterfront is being occupied more and more by industrial plants which in many cases require little or no actual berthing space for ships. Jacksonville, Fla., is cited as a prominent example of this condition.

Great stress is laid upon the necessity for educating the people of the United States to an appreciation of proper port development. The board of engineers for rivers and harbors possesses in its own organization a well balanced nucleus for the proper investigation of and for sound well based advice to our ports. This organization is in constant touch and is co-operating with other departments of the Government having important sources of information at their direct command, such as the Shipping Board, Bureau of Customs, Bureau of Foreign and Domestic Commerce, the Interstate Commerce Commission, the Office of Naval Intelligence. It is proposed to form an advisory commission or board composed of these various interested departments which will meet from time to time and coordinate the efforts of all. This should prove of immense benefit in the one matter alone of unifying statistics and putting them upon the proper basis for correct study of port data.

A very comprehensive questionnaire has been prepared and will shortly be sent to all districts. When completed, this will show for every port upon an identical basis all of the information that is necessary to properly analyze that port's facilities. As this information is gained and completed, pamphlets will be published containing port facilities data for each large port or port facilities for district groups of smaller ports. It is hoped by the dissemination of this information to bring about a much more unified and coordinated effort on the part of the various port authorities and the co-operating Government bodies for a scientific development of all American ports.

In this connection it is interesting to note that John H. McCallum, president of the Board of State Harbor Commissioners, San Francisco, California, returning from the annual convention of the American Association of Port Authorities and from a trip of inspection over many of the Eastern seaports of the United States and Canada, presented a very enthusiastic and masterly address at the California convention of Port Authorities at Seattle on the subject, "Establishment of Uniform Policies and, Insofar as Possible, Uniform Charges at the Publicly Owned and Controlled Ports of the Pacific Coast."

In this address Mr. McCallum pointed out the value, from the standpoint of foreign trade, of making uniform all systems of charges and gave it as his opinion that the system now in operation at the ports of Seattle and San Francisco — namely, that of charging practically all fees against the cargo and of imposing adequate penalties for failure to achieve proper rate of discharge of cargo and of dispatch of cargo from the wharves—was the best system now in vogue. He also strongly advised all harbor boards and port authorities to put into operation the system which had been inaugurated in San Francisco of working in conjunction with advisory committees of ship-owners, ship-operators, importers and exporters, transportation companies, chambers of commerce, warehouse men, stevedoring contractors, and draymen, and recited the advantages which had come to San Francisco by this method of managing the port.

In San Francisco the advisory committee consists of the leading representatives of these various interests, and this general committee has organized, elected its own chairman, and divided itself into the following sub-committees: foreign commerce, ships and shipping, transportation, harbor extensions and improvements, wharves, stevedoring and equipment, warehouses and drayage. No important action is taken by the Harbor Board without consultation with and the approval of these committees, and this co-operation has resulted in a much greater harmony of action and has stimulated the confidence of the community in the management of the board. This matter is of course of especial interest in connection with those ports which are controlled by the state and not by the municipality, and it now may be said of San Francisco that while financially, politically and nominally the control of the board is in the hands of a state commission, its actual practical working out in the everyday affairs of shipping is very largely under the control of a committee of San Francisco business men.

In his closing paragraphs President McCallum pointed out that the great world movement in shipping was rapidly shifting to the Pacific Ocean and that it was the psychological time for Pacific Coast ports to co-operate in taking advantage of this great world movement so that they might be ready to take care of their proper share in the great increase that is coming.

WITH THE EXPORTERS AND IMPORTERS

Pacific Ocean Rates

As regards Pacific Coast rates during November, the outstanding features were: publication of the schedule of intercoastal import rates on Australasian goods; an improvement in the prospect of acquiescence by the railroads east of Chicago in the readjustment of import and export rail tariffs; progress in the plans for extending the import and export rail rate principle to goods moving between the Middle West, the Pacific Coast and the West Coast of South America; and the passing of the threat of rate-cutting in Pacific westbound business.

Blue Funnel Follows Mitsui

The last received considerable attention in the Pacific Coast newspapers during the month, but the situation, as it clarified itself, was not so serious as first appearances indicated. The trouble arose from the withdrawal of Mitsui & Company from the Pacific Westbound Conference. This action was due to the desire of the company to find cargo for a vessel that it could not fill at going conference rates, withdrawal from the conference being a precedent to reductions; but, inasmuch as the Mitsui fleet is primarily engaged in transporting cargo for that great Japanese company, the effect of the withdrawal and the consequent rate-cutting was not considerable. When the Mitsui vessel reduced the going conference rates, however, the Blue Funnel, which although not a member of the Pacific Westbound Conference, had been upholding the tariffs, scented trouble and followed the Mitsui lead, with the result that flour and cotton and perhaps other rates fell, cotton, for example, from $1 to 75 cents. In this manner the Mitsui withdrawal served as a spring to start a movement of great potentialities.

Mitsui Rejoins Conference

Prompt action was taken by the T. K. K., N. Y. K. and O. S. K.; representations were made to Mitsui of the gravity of the situation, and the head office in Tokyo immediately directed that the United States office rejoin the Pacific Westbound Conference. When this was done the Blue Funnel signified its intention of abiding by conference rates, but of fulfilling contracts already made; and thus the storm blew over.

As for eastbound rates, the Trans-Pacific Freight Tariff Bureau of Japan appears to have the situation well in hand. A tariff effective November 1 strengthened rates materially, fish, bean and nut oils going from $6, the old Shipping Board rate, to $7.50; rice from $6 to $7.50; and general cargo from $9 to $10. No comparison can be made of the new rates with any of the old, except those of the Shipping Board, because of the chaos that prevailed in the eastbound situation prior to the organization of the new conferences in the Orient.

Railroads May Acquiesce

Despite strong pressure brought to bear on the Eastern railroads to induce them to decline to acquiesce in the readjustment of import and export rail rates, prospects late in November were that they would fall into line. As has been noted heretofore, the readjustment whereby the Pacific Coast can compete with the Atlantic for Oriental business, is effective only to Chicago; the increases as of August 26 still hold to the east of that city.

Opposition to the proposed readjustment was made by the traffic bureau of the Merchants' Association of New York, which, in a letter to G. C. McGinty, secretary of the Interstate Commerce Commission, contended:

1. That it would divert traffic from New York.
2. That the proposed rates more than equalized all-rail rates to the Atlantic seaboard plus the ocean rates to the Orient.
3. That the Pacific Coast ports would be preferred as against the Atlantic ports under the proposed adjustment; and
4. That a diversion of a substantial portion of the business originating in the Middle West away from the Atlantic seaboard to the Pacific Coast would place increased demands upon the Eastern carriers for revenue which might fall upon our (New York's) local traffic.

Suspension of tariffs therefore was requested on the ground that the proposed rates were unjust and discriminatory; to this Mr. McGinty replied that the commission held that it should not exercise its authority to suspend the tariffs and that the schedules were subject to formal complaint. The traffic bureau of the Merchants' Association of New York thereupon awaited action by the Eastern railroads.

On South American Business

Progress is being made in the proposed application of the import and export rail rate principle to the South American trade. Lines plying between San Francisco and the West Coast of South America heretofore have not been able to command freight originating in the Middle West because of the high overland freight rates, as the principle of reduced charges for exports to and imports from South America had not been recognized as it had in the case of the Orient. Inquiry made of the railroads indicates that the proposal is acceptable, but the general tenor of replies is that the roads do not see their way clear to a direct and blanket application of the Oriental import and export rates to South American business; and other tariffs, based upon the New York and San Francisco water rates, probably will be drawn. In the meantime, however, the steamship lines are working on a schedule covering some principal commodities that is based directly upon the Oriental export rail tariff. The earnings of the water lines as shown in this are quite favorable as compared with those of the companies operating to the Far East. If this tariff is made effective by the steamships the railroads will be invited to extend to agricultural machinery, for example, moving to Chile, the same rate from the Middle West as governs such goods destined to the Far East. The West Coast steamship lines do not expect, however, to be able to compete with the Atlantic-South American companies for business originating east of Chicago.

Australasian Import Tariffs

Australasian water import tariffs were published during November by the Pacific Coast-North Atlantic Eastbound Conference. That such tariffs were being prepared was stated in the November issue of Pacific Marine Review. Preparation of like schedules to apply to Oriental business is going forward, but the situation is so complicated that progress necessarily is slow. The Australasian rates became effective November 4, the day of issue, and apply to freight moving from Australia and New Zealand to the Pacific Coast for trans-

EFFECT OF NEW WATER IMPORT TARIFFS ON PACIFIC COAST-AUSTRALASIAN STEAMSHIP LINES

			Former Situation			Situation Since November 4			
Commodity	Rail Lines' Import Tariff Item No.	Cubic Measurem't in Feet of 2000 Lbs.	Direct Water Rates to New York, 2000 Lbs.	Present Import Rail Rates, 2000 Lbs.	Pacific Steamship Lines' Revenue, 2000 Lbs.	Coast-to-Coast Revenue, 2000 Lbs.	Pacific Lines' Gross Revenue, 2000 Lbs.	Tolls and Handling Charges, 2000 Lbs.	Approximate Net Revenue, Pacific Lines, 2000 Lbs.
Hemp	175	90	$33.60	$20.00	$13.60	$12	$21.60	$1.90	$19.70
Gums	230	60	32.03	26.70	5.33	12	20.03	1.90	18.13
Hides, green	250	40	33.54	29.30	4.24	14	19.54	1.90	17.64
Hides, dry	415	120	43.75	43.30	.45	18	25.75	1.90	23.85
Rabbit skins	410	140	102.00	53.30	48.70	40	62.00	1.90	60.10
Casings	380	45	34.37	40.00	Loss	18	16.37	1.90	14.47
Cocoa beans	65	75	43.75	22.70	21.05	16	27.75	1.90	25.85
Tallow	450	50	34.37	33.30	1.07	18	16.37	1.90	14.47
Seed grass, fog seed	390	75	52.50	33.30	19.20	18	34.50	1.90	32.60
Wool grease	495	84	51.05	33.30	17.75	18	33.05	1.90	31.15
Wool, scoured	500	100	58.33	43.30	15.03	22	36.33	1.90	34.43
Peas, dry	70	48	21.75	25.10		12	9.75	1.90	7.85
Meats, canned	......	43	19.20			12	7.20	1.90	5.30
General cargo	......					30			

Note: These rates will apply to cargo moving on through bill of lading only, and cargo must move through Pacific ports within the specified free time allowed by the rules and regulations of the individual ports. Tolls are 30 cents a ton; handling charges, $1.60 a ton.

shipment by the intercoastal lines to the Atlantic seaboard; primarily, their effect is to increase the earnings of the trans-Pacific lines, due to the lower cost of handling the commodities by intercoastal steamships than by the transcontinental railroads.

Old and New Rates

In the accompanying table the changes brought about by the import tariffs may be understood at a glance. All rates have been reduced to tons of 2000 pounds, in order that direct comparisons may be made; but the number of cubic feet in each deadweight ton appears in the third column. The next three columns, bracketed under the heading "Former Situation," show the direct water rates from Australasian ports to New York, on which the Pacific Coast combined water rates are based; the present import rail rate, and the earnings remaining to the trans-Pacific lines after the rail rate has been deducted from the basic all-water charge. A study of these columns will leave no one in doubt as to the situation of the Pacific lines under the old system; an extreme instance appears in casings, which were transported by the all water route from Australasia to New York for $34.37 a ton of 2000 pounds, but for which the transcontinental railroads demanded $40 a ton, leaving the Pacific steamship companies an actual deficit of $5.63 a ton if they wished to compete with the New York lines on the basis of the all-water rate. And, of course, if they were to compete, they had to meet the direct tariffs.

Some Earnings Tripled

The last four columns, bracketed under "Situation Since November 4," make manifest how greatly the situation of the trans-Pacific steamships has been improved. Only an approximation of their net revenues can be shown in the last column, because a few minor charges have not been included in the $1.90 charge for tolls and handling; but the necessary additions would not be considerable. Thus we discover such increases in earnings of the trans-Pacific companies as these: from $5.33 for gums to $18.13; from $4.24 for green hides to $17.64; from 45 cents for dry hides to $23.85, and so on.

Don't Apply to Vancouver

Emphasis should be placed on a few points that might escape attention. Most important is the fact that the tariffs do not apply to cargo moving through United States Pacific Coast ports; that is, goods landed at Vancouver will not be granted the lower intercoastal rates. As stated in the preamble to the tariff, the commodity rates are for the San Pedro-Puget Sound range only; which would appear to exclude San Diego. Inasmuch as two of the three Pacific Coast-Australasian lines affected, the Oceanic and the Union, make calls at no other Pacific Coast port, and the principal terminal of the Australasian service of the General is at San Francisco, that city will receive the greatest benefit from the new tariffs, although Seattle, Tacoma and Portland, in common with San Francisco and Los Angeles, will be aided by the Oriental schedule. A quotation of $30 a deadweight ton for general cargo supplies a lack, inasmuch as the eastbound import rail tariffs have not offered anything of the nature, although an all-commodity rate of $2 a hundred pounds in the westbound export tariff covers everything not elsewhere granted a specific rate. Finally, the action of the conference in granting the import rates to any quantity is in marked contrast to the carload minima that generally obtain on both rail and steamship lines.

As regards competition with the transcontinental railroads, the intercoastal companies will be able to make themselves felt primarily in the Atlantic Coast zone; because goods destined to Chicago, for example, would be subject to a rail rate from New York, with the result that overland delivery from San Francisco probably would be cheaper. But the unwillingness of the Eastern railroads to acquiesce in the reduced import rail rates granted by the Western lines had tended to shut the trans-Pacific steamship companies out of the Atlantic seaboard business, so that the intercoastal rates will be felt at precisely the desired point. Moreover, so far as Chicago and territory to the west of that city is concerned, reduced import and export rail rates already are effective.

Companies in the Trade

In the Australasian-Atlantic direct service are Norton, Lilly & Company, the New Zealand Shipping Company, Shaw-Saville Company and the United States and Australian Steamship Company. The Pacific lines, which heretofore have been at a decided disadvantage in competing with the direct steamships are the General Steamship Corporation, the Union Steamship Company of New Zealand and the Oceanic Steamship Company.

The Australian import tariff follows in full:

"Pacific Coast-North Atlantic Eastbound Conference, Tariff No. 2, naming import commodity rates from United States Pacific Coast ports (San Pedro-Puget Sound range) on shipments originating in Australia, New Zealand, Fiji Islands(or beyond) to United States North Atlantic ports. Rates named in this tariff apply only on cargo moving on through bills of lading from Australia, New Zealand, Fiji Islands or beyond. Shipments entitled to import rates must move through the ports of entry within the specified free time allowed by the rules and regulations of the ports of entry. Prepayment of charges on import traffic must be made by delivering lines in all cases. Rates named herein cover only through charges for transportation of freight; all other charges—namely, tolls, drayage, wharfage, handling charges, storage charges, cost of making initial custom house entry—must be paid by trans-Pacific line. Issued November 4, 1920. Effective November 4, 1920. Issued by Pacific Coast-North Atlantic Eastbound Conference."

Any Quantity Accepted

(In the following schedule the item appears first, then the commodity, and last the rate in cents a hundred pounds, any quantity.)

65, beans, cocoa, in packages, 80.

70, beans (exclusive of cocoa, vanilla and tonka beans), lentils, peas, dry in bags, 60.

175, fiber, flax, jute, straw, hemp, jute, raw sisal; straw, rice; tow, flax; waste, flax, spinners'—in pressed bales, 60.

230, gums, including: gum copal, gum damar, gum kowrie, gum shellac, East India gum, Manila gum, pontinac gum, bird lime—in packages; cutch, catechu, gambier, japonica or terra japonica, jelotong—solid, in boxes, bags, bales or mats, 60.

250, Hides, viz., cattle, goat, sheep—green or green salted, in bundles, or pickled in barrels, 70.

380, sausage casings, pickled, in bulk, in barrels or in boxes, 90.

390, seed, viz., alfalfa, beet, canary, clover, fescue, flax, grass, fog, hemp, millet, rape, sesamum, sorghum, sunflower—in packages, 90.

410, skins and hides, viz., badger, buffalo, cat, dog, fox, kangaroo, kolinsky, marmot, mink, o'possum, pahmih, rabbit, raccoon, squirrel; tails, fox; tails, weasel; wallaby, weasel, wombat, 200.

415, skins (dry) and hides (dry), rugs and mats, viz., cattle, deer, goat, hair seal, horse, sheep, sheep slats, 90.

450, tallow and grease, animal (inedible), in barrels, 90.

495, wool and mohair, in grease, in bales, compressed, 90.

500, wool and mohair, scoured, in bales, compressed, 110.

600, meats, canned, in cases, 60.

700, general cargo, N. O. S., 1.50.

No charge will be made in the practice of the Pacific Coast-Australian steamship lines by reason of the new tariffs. Heretofore the companies have accepted cargo at Australasian ports at the going all-water rate, have landed the goods at San Francisco, paid the overland or intercoastal charges and pocketed the difference. This they will continue to do. Commodities that demand prompt delivery may continue to go by rail, although the average steaming time between San Francisco and New York of twenty-three days is not much, if any, longer than the time required for rail transit across the continent.

Two Interesting Possibilities

In connection with the new import tariffs two promising possibilities present themselves: more direct discharge or cargo and a milling and transit privilege. As for the first, San Francisco steamship officials already have suggested that the unloading of cargo by, say, an Oceanic steamship on its regular pier, the transportation of that cargo across the city to the Luckenbach wharf and the reloading for New York, with the consequent expense, should give way to discharge at a common pier, to which the intercoastal steamship would go for loading. Much of the handling and tolls charge of $1.90 a ton might be saved, provided only that sufficient freight offered to warrant the adoption of such a plan. The second suggestion is that the extension of a milling and transit privilege would increase business and work to build up the Pacific Coast industrially. That privilege would result in something of this nature: 5000 tons of copra, for example, could be discharged at San Francisco; the oil extracted; the cake sold on the Pacific Coast, and the oil, or a product manufactured from the oil, reloaded on an intercoastal vessel for New York or Philadelphia within a specified time, and the import rate for 5000 tons still apply on the goods shipped to the Atlantic. Railroads have built up communities by this method; on the Pacific Coast, the action of the Salt Lake route in extending the milling and transit privilege to Los Angeles has resulted in that city taking large quantities of lumber from the North, milling it and dispatching it at the through rate instead of being compelled to pay two local charges, one from the North by water and the other from Los Angeles by rail.

Freight Report

November 16, 1920.

Since our last circular, dated October 14, freights have continued to weaken.

The Portland Flouring Mills chartered the steamer Wawalona from Portland to Cadiz, Spain, at $22 per ton; also steamer Diablo from Puget Sound to the United Kingdom at $20, and steamer Havilah from Portland to the United Kingdom at $20.

Kerr, Gifford & Company engaged space by the British steamer Myrmidon from Seattle to Liverpool or Glasgow, on about 3000 tons of wheat at about $19, and also have the option of shipping barley at $21.

The first cargo shipped in bulk from this coast to Europe was arranged through Charles P. Coles, Vancouver, as agent, they having engaged space for 4000 or 5000 tons by one of the Johnson Line boats. We have no doubt that other vessels will be taking bulk cargoes just as they do from the Atlantic and the Gulf of Mexico to Europe. This means that elevators will be erected to handle the bulk-cargo business at the most important shipping ports on this coast. The reason that this coast has always had to ship grain in bags was because most of the cargoes to Europe were carried by sailing vessels, and they had to make the trip round the Horn, and for fear of cargo shifting and so on, the insurance companies insisted that vessel should be properly lined and in addition carry grain only in sacks. We have been surprised that it has taken until now for steamers to carry grain in bulk, as danger described above for sailers does not exist with steamers, and now steamers, of course, and also many of our sailers, are all going to Europe via the Panama Canal.

From San Francisco Strauss & Company chartered the steel bark Golden Gate at $21 per ton United States gold, prepaid, with barley to a United Kingdom port, but if Leith $22.50 per ton.

Balfour, Guthrie & Company chartered French sailer Rene Kerviler for barley to the United Kingdom at 130/-, less the usual 6¼ per cent, and freight payable at destination.

The Ocean Lumber Company chartered three Shipping Board steamers for ties to the United Kingdom at $40 if two ports of discharge, and $39.50 if one port of discharge.

At the present moment, shippers indicate only $35 for full cargoes of ties to the United Kingdom.

Grace & Company chartered steamer Redwood for lumber from the North to Callao at $30, and the schooner Forest Pride for a cargo of coal from Newcastle, Australia, to Callao at £5/5, with the option of some coke at £7/10 a ton.

Andrew Weir & Company chartered a British steel sailer, name unknown, for a full cargo of nitrate to a South African port at 65/-.

Balfour, Guthrie & Company chartered the steamer Juneau at $30 for lumber to Talara Bay, and the steamer Waban at $16 with wheat from Portland to Callao; also American schooner Meteor at $32.50 for lumber from Puget Sound to Melbourne.

Amsinck & Company chartered the motorship Sierra at $30 for lumber to Callao.

Linderman was fortunate enough to get $18 per ton for the Henry T. Scott with sugar from Peru to New York.

J. J. Moore & Company chartered the schooner Samar at $30 with lumber to Dunedin, New Zealand; also the schooner Vigilant at $30 from Puget Sound to Adelaide.

Hind, Rolph & Company arranged a charter for the steel sailer William T. Lewis at £5/5 with a full cargo of coal from Newcastle, Australia, to a nitrate port, or £5/10 if discharged at Valparaiso.

Sudden & Christensen chartered the steamer Dellwood at $25 from Puget Sound to Cuba.

The Pacific Export Lumber Company arranged a cargo for the steamer Kogosan Maru, on private terms, from Columbia River to Calcutta or Bombay.

About November 1, cables arrived in San Francisco giving the information that the Australian government had chartered steamers for the new crop loading in Australia to the United Kingdom, to carry 600,000 tons of wheat, and that steamers had been paid up to 150/- per ton. No doubt, some were chartered as low as 140/-.

The small amount of chartering of vessels with lumber to Australia, New Zealand and Africa has been caused by the inability of these countries to open credits in London. Once, however, that their wheat begins to move, and their money begins to come in for the same, their credits will be re-established in England, and we hope then to see better demand for lumber, etc., from this coast to the Antipodes.

The most interesting sales reported have been the purchase by Mahoney & Crowley, at an average price of $125,000 each, of the two French steam schooners Robert Sudden and Lucinda Hanify, which were originally sold by Hanify & Christensen to the French government at a reported rate of $550,000 each. This is quite an example of the depreciation of steamer tonnage since the war days.

PAGE BROTHERS, Brokers.

Intercoastal Business

Due to the marked increase of intercoastal shipping, Pacific Coast ports generally are gaining greatly in business. As an example, Seattle reports that its domestic commerce for the four months ending September 30 aggregated 1,497,154 tons, as compared with 1, 313,987 tons for the corresponding period of 1919, a gain of 183,167. Moreover, the intercoastal business should increase rapidly as a result of several developments. Competition of the steamships with the railroads is becoming keener, with consequent savings to shippers. The Luckenbach Steamship Company has announced reductions in carload rates, eastbound, as follows: Fruit or vegetables, dried or evaporated, reduced from $1 to 90 cents a hundred pounds; hay in bales, tightly compressed, from $1 to 80 cents; hemp seed in sacks, from $1.10 to 80 cents; ochre in bags or barrels, unquoted heretofore, 75 cents. All intercoastal lines are affected.

Officials of the Luckenbach Line said: "In view of the recent activities of the Furniture Dealers' Association, and also because of the desire of California manufacturers to facilitate the movement of their products to Eastern markets, it has been considered advisable to establish the same rates on eastbound shipments as now apply westbound. The same valuation clauses are to apply eastbound as are now in effect westbound, and the same freight rates and carload minimums will be used.

"Regarding the reduction on dried fruits and other commodities mentioned, this action was deemed advisable in view of the present market conditions, and was taken for the purpose of assisting as far as possible the producers to stimulate sales."

Steel rates from the Atlantic to the Pacific have been reduced 25 per cent, which is expected to be of immediate benefit to shipyards and other Pacific Coast industries that compete with the East.

Shingles by Water

As an immediate result of the increase in transcontinental rail rates, a large volume of shingles will move by water from the Northwest to Atlantic ports, negotiations having been concluded between the mills and the American-Hawaiian Line by which the rate has been reduced from 90 cents to 75 cents a hundred pounds, plus 18 cents for distribution to the interior of the East, as compared with a rail rate of $1.20. Seattle advices state that 360,000 tons of shingles will be dispatched by water during the next year. Besides this development, Seattle expects large quantities of Montana copper to move to the Atlantic by water, the differential in favor of the rail movement to Seattle and thence to the Atlantic via Panama being $6.25 a ton; and the announcement of Swayne & Hoyt that through rates and bills of lading had been made effective by the Pacific-Caribbean-Gulf and the Mississippi-Warrior barge line is welcomed as an action that will permit Northwestern lumber to move cheaply to distributing points at St. Louis and Cairo.

Request Refrigerator Ships

Apple shippers of the Northwest are interested in moving the crop to the East by water, and, in order to be in a position to make representations to the Shipping Board in behalf of the assignment of refrigerator ships to the intercoastal service, the Seattle and Yakima chambers of commerce are assembling data on costs of storage, wharfage, handling charges, short rail hauls, etc. If the intercoastal water rate were fixed at 50 cents a box, said the Yakima Commercial Club, apples from Eastern Washington could be laid down in New York at 28 cents less than the overland rail haul would cost.

These and other reductions serve to give point to the statement made in Vancouver, Washington, that the G. M. Standifer Construction Corporation had saved $291,000 a year by having its freight dispatched by water instead of by rail. Because of its water-borne freight, the Standifer corporation and the Vancouver port commission are requesting dredging of the channel from the mouth of the Willamette river to the eastern side of Vancouver harbor.

Market Surplus Material

A contract has been signed by the Shipping Board and the Barde Steel Products Corporation for the disposal by the corporation of $15,000,000 worth of surplus shipbuilding material in Pacific Coast yards. The corporation guarantees the board 50 per cent of the appraised value; of amounts in excess of 60 per cent the board will receive 75 per cent and the corporation 25, and the corporation also will receive 10 per cent of the appraised value, provided that receipts are 60 per cent.

FULL SPEED AHEAD

With Pacific Operators

Matson Expands

Two developments of the month bring the Matson Navigation Company prominently into the limelight. One is the announcement, made in Honolulu, of the purchase by the Matson company and by Castle & Cooke, its agents in Honolulu, of a large interest in the old-established firm of Theo. H. Davies & Company. The other is the completion of arrangements for the first intercoastal service of the line, which will be maintained with two of the new 535's of the Shipping Board between Baltimore, Los Angeles, San Francisco, Honolulu and return.

Old British Firm

Theo. H. Davies & Company are one of the important sugar factors and general firms of the Hawaiian Islands, being known popularly as one of the "Big Five." The company dates from the early days of white men in Hawaii, when it was an outpost of the Hudson Bay Company, which, in common with other fur traders, found the islands a convenient way station; and during the times of the Hawaiian monarchy, it was a center of British influence. Now, through the joint purchase of the Matson company and Castle & Cooke, it has become largely American, although the purchase of stock is not large enough to remove control from the hands of the Davies family and of other independent interests. E. D. Tenney, president of the Matson Navigation Company and of Castle & Cooke, has joined the Davies directorate. In shipping the company has been identified principally with the Canadian - Australasian Royal Mail Line, which operates vessels under the British flag between Vancouver, Victoria, Honolulu, Suva, Auckland and Sydney.

New Baltimore Service

Formal announcement of the new Baltimore service of the Matson Line also was made during the month. The first of the 535's, the Hawkeye State, will sail from Baltimore on or about February 15 for Havana, Panama, Los Angeles, San Francisco, Honolulu and Hilo on the first regular intercoastal service of the company. The sailing also will restore a direct Hawaii-Atlantic service, which formerly was maintained by the American-Hawaiian Steamship Company but which the islands have not had since the suspension of sailings by that line in 1916. For this first voyage the entire first cabin accommodation of the Hawkeye State has been taken by 200 members of a prominent Middle Western organization, which will send 200 members. After calling at Havana and passing through the Panama Canal, the Hawkeye State will proceed to Los Angeles, whence the party will motor to San Francisco, to resume the voyage to Honolulu and Hilo after four or five days. Two days will be spent at Honolulu; thence the steamer will sail for Hilo, where she will remain two days, affording an opportunity for the travelers to see the Volcano of Kilauea; and her stay in the islands will be closed with two days more at Honolulu. From San Francisco the Middle Western party will return home overland.

35-Day Sailings

Two months or so after the sailing of the Hawkeye State, the sister ship, the Buckeye State, will follow. Thereafter sailings will be maintained at intervals of approximately thirty-five days, each vessel requiring seventy days for a complete round trip. The running time between Baltimore and San Francisco probably will be fourteen or fifteen days; and between San Francisco and Honolulu the regular six-day schedule of the Matson vessels will be maintained. Both vessels will have as nuclei officers of the Matson fleet; and in other respects the service will be that of the other vessels, attention being paid to such details as motion pictures and Hawaiian orchestras.

Offices have been established at 26 South Clay Street, Baltimore, and the Los Angeles office will be opened about about January 1. Both will be manned by Matson employes. In the Atlantic city the vessels will use the double-deck piers of the Baltimore & Ohio.

Sugar to Atlantic

An auspicious beginning has been made as regards passenger business. As for freight, the new service promises well. An estimated aggregate of 50,000 to 60,000 tons of cargo has moved from the Atlantic zone to the Hawaiian Islands each year, heretofore either by rail or by water for transshipment at San Francisco. This amount alone will give the 535's approximately half the cargo required. Cargo moving from Hawaii has as a nucleus probably 60,000 tons of canned pineapple a year, to which will be added raw sugar in sufficient volume to make up full cargoes. Although the entire Hawaiian crop of between 550,000 and 600,000 short tons has been refined on the Pacific Coast by the California & Hawaiian and Western refineries for the last four years, some at least of the coming crop will go to the Atlantic. Whatever the amount, the 535's probably will have no difficulty in filling for the eastbound voyage; and, whatever the amount, the disposition of the crop will be entirely amicable, inasmuch as the Hawaiian sugar plantations, the Matson Navigation Company and the California & Hawaiian refinery are very closely allied.

In common with all services heretofore maintained by the Matson company, the Baltimore-Honolulu service will be based on the islands; that is, the Matson Line, being concerned primarily with Hawaii and transporting by far the great bulk of freight and most of the passengers, has the islands first in mind, as it had during the war, when Captain Matson consistently refused to entertain proposals for the purchase of his vessels, despite the enormous prices offered for them.

Philippine Trade Open

Another interesting possibility presents itself. The Matson Line, as stated, is closely allied to the sugar interests of Hawaii, and those interests are expanding their holdings in Philippine plantations rapidly. In view of these facts, some move by the company toward extending its service to the Philippines is anticipated when those islands are brought under the coastwise laws February 1, 1922. The rapid and vigorous growth of the Matson Line under the protection of the coastwise laws demonstrates the wisdom of those laws, for the company had one of the few American fleets of any consequence prior to the recent renaisance of the American merchant marine.

Pacific-Mississippi Service

An all-water freight service with through rates and through bills of lading, between St. Louis, East St. Louis, Granite City and Memphis and Los Angeles, San Francisco, Portland, Seattle and Tacoma, has been arranged by the Pacific-Caribbean-Gulf Line of Swayne & Hoyt, San Francisco, in conjunction with the War Department's Mississippi-Warrior barge line. Westbound rates went into effect October 25. Eastbound rates were not published at the same time as the others, but are expected to become effective soon. As a result o fthe closer working together of the intercoastal line of Swayne & Hoyt and the Mississippi barge service, shippers will be benefited in several respects.

Some New Rates.

Some of the new westbound rates are: Aluminum, $2.53½ carloads; baking powders, $1.47½ carloads; beverages, $1.40½ carloads; light drinks, $1.12 carloads; boot and shoe findings, less than carloads, $2.94½; boots and shoes, boxed, $4.08 LCL; canned goods, $1.19 carloads; drugs, etc., $2.18 carloads, $2.94½ LCL; clothing, $2.39½ carloads, $2.95½ LCL; dry goods, etc., $1.40½ carloads, $2.70½ LCL; hardware and tools, $1.61½ carloads, $2.39½ to $2.94½ LCL; iron and steel, $1.12 to $1.97 carloads, $2.04 to $3.33 LCL; musical instruments except pianos $3.10½ carloads, pianos, $2.89 carloads; pickles, etc., $1.47½ carloads; plumbers' supplies, $1.47½ to $1.97 carloads; pottery, etc., $1.68½ carloads, $2.39½ to $2.94½ LCL; tin, etc., $1.12 to $1.61½ carloads; tinware and stamped ware, $1.75½ carloads, $2.68 to $2.94½ LCL; tobacco, cigarettes, etc., $1.83 to $2.89 carloads, $3.24½ to $8.84 LCL; toys, etc., $2.18 carloads, $2.25½ LCL; woodenware or fiberware, $2.18 carloads, $2.94½ LCL; sandpaper, emorypaper and other abrasive papers, $1.61½ carloads, $2.39½ LCL.

The Mississippi-Warrior Service, which thus for the first time is made a factor in Pacific Coast shipping, has resulted from the taking over of the railroads by the Government in 1917 and the appointment by Director General McAdoo of a committee to study inland, canal and coastwise waterways. In April, 1918, the committee recommended a fleet for use on the lower Mississippi to cost $8,200,000, and this project and one for the Black Warrior and Tombigbee rivers, were authorized in June. Barges and vessels were purchased and chartered, and, although the fleet was not nearly so large as planned, managed to carry during the first year 63,698 tons downstream, or 87.8 per cent of deadweight capacity, and 28,482 tons upstream, or 52.7 per cent. Inasmuch as these percentage figures are based on deadweight, the actual loading to cubic capacity was on the whole higher. During the first year average earnings were $3.71 a ton.

Steel Barges Built.

From that relatively small beginning the service has grown steadily through the construction of substantial steel barges and towboats. The barges may be loaded with 2000 tons to a draft of eight feet, one foot less than the maintained nine-foot channel between New Orleans and St. Louis. Although the shortage of powered vessels slowed the voyages between New Orleans and St. Louis to eight days downstream and eighteen days upstream during the first year of operation, the War Department officials believe that the new tugs will permit of a schedule being maintained of five days downstream and twelve days upstream.

Reduced freight costs have been one immediate result of the service, especially in that joint rates have been made effective between different inland territories. The extension of the system to the Pacific-Caribbean-Gulf Line is another interesting phase of the increasing co-operation between water lines, which is the outstanding feature of the intercoastal business at the present time. A few weeks ago, it will be recalled, the companies of the Pacific Coast-North Atlantic Eastbound Conference decided to draw up a schedule of import and export water rates, to apply to imports destined to or exports originating in the Eastern States and moving via the Pacific overseas.

One noteworthy phase of the co-operation of the water lines is that the railroads will be relieved of much business, for which their equipment is inadequate, and the steamship lines and commercial houses of the Atlantic and Pacific will be more independent of the transcontinental carriers.

New U. S. S. B. Schedules

A revised sailing schedule for Los Angeles, San Francisco and Portland has been announced by the San Francisco office, Shipping Board. Due to the shortage of cargo, decision was made to limit the number of sailings from Los Angeles to one a month, the Los Angeles Pacific Navigation Company dispatching a vessel to the Orient about the last of November. From San Francisco Struthers & Dixon and the Pacific Mail will alternate with sailings on the 5th, 15th and 25th, three sailings a month being provided. From the Columbia River the Admiral Line will dispatch a vessel on the 18th of the month, and one will be sent out by the Columbia Pacific Shipping Company, day not fixed.

A revised schedule for the Puget Sound service of the Pacific Steamship Company was put into effect the middle of November; five vessels will be employed in the Oriental trade, with sailings every twenty-one days.

Five Vessels Idle

Five vessels had been tied up by the San Francisco office on November 12. They were the Janelew and Mursa, new freighters; the Mohinkis and Eastern Gale, formerly operated by the Matson Line to Hawaii; and the West Harts, formerly under the management of the Dollar Line. The Dollar Line has Shipping Board vessels under its charge now, but they are in the Orient and have not been worked into the San Francisco schedule up to this time.

A. F. Haines, vice-president of the Pacific Steamship Company, the Admiral Line, urged that no reduction be made in the Shipping Board fleets engaged in trans-Pacific trade, because the slump of business was only temporary and would be over by spring. A distinction should be observed, he said, between tramp and liner service; shippers were able to rely on the latter because of its regularly scheduled sailings, and to disrupt these schedules by the withdrawal of vessels would be to handicap American trade. At the very time the Shipping Board was planning to cut down its fleets, said Mr. Haines, the British and Japanese were strengthening their services, with the result that foreign shippers would lose confidence in American companies. Admiral Benson had promised that the Seattle trans-Pacific services would be maintained whether the vessels had "full cargoes, half cargoes or no cargoes."

Not Sufficient Cargo

The view of Shipping Board officials is that cargo is not offering in sufficient quantities to justify the number of sailings heretofore maintained and that proper management and economy demand that the services be reduced. Fifty-six Shipping Board vessels were engaged in trade out of Seattle the first of November; twenty-three were plying to the Orient; ten to Europe; seven to the Atlantic Coast; and the others were scattering.

Officials of the Shipping Board report that the slump in rates and traffic has hurt American shipping less than foreign, according to recent figures. Statistics for the week of October 23 show that American ships entering United States ports brought a larger proportion of cargo than foreign ships and also a smaller percentage arrived in ballast. Admiral Benson says that the comparison is "very satisfactory." It is said that the Shipping Board has less than twenty-ocean-going steel vessels tied up and about sixty-five coal burning Lakers, while the proportion of foreign ships idle is reported to be considerably greater.

World Agreement Suggested

The recent drop in ocean freight rates, bringing the income of vessels close to the cost of operation, has led Admiral Benson, however, to believe that the only solution of the situation is a world-wide agreement on shipping rates and regulations, tending towards uniformity of action and against rate wars. No steps have been taken by the Shipping Board to bring about this result, which is believed to be a matter for diplomatic action, but the admiral has stated that he would consider such a development favorably.

Because of the necessity of reducing trans-Pacific services and of tying up vessels, the probable action of the Shipping Board as to Section 28 of the Merchant Marine Act again is being discussed. A suspension of the section had been requested of the Interstate Commerce Commission, the Shipping Board holding that there was not adequate American tonnage; but this suspension expires January 1. Asked regarding the enforcement of the section, which denies import and export rail rates to goods moving in foreign bottoms, Admiral Benson advised the Tacoma Chamber of Commerce: "As the matter now stands it is possible that Clause 28 of the Shipping Act will be put in operation on January 1, 1921." An effort is being made by Puget Sound interests to have a hearing on Section 28 in the Northwest in December. Another interesting light is cast upon Section 28 by the report, contained in the bulletin of the National Merchant Marine Association, that the Canadian government railroads and British steamship lines have arrived at an understanding upon a similar policy. This report, the bulletin adds, is not confirmed.

Board's New Agreement

Official copies of the managers' new agreement, MO4, drawn up by the Shipping Board and the general committee, were received by shipping associations in November. In its essentials the agreement is that drawn up several months ago, which provided for payment of fees on percentage bases. Some few changes were made from the first draft as published in the newspapers. One illuminating change was made after the first official copies had been circulated, the board striking out the word outward in sub-paragraph (d), paragraph 11, which formerly read: "(d) Between ports other than United States ports. Two and one-half per cent on gross outward freight, . . ." What "outward" freight between ports other than American might be was puzzling. Provision is made in paragraph 17 for the abrogation of MO3. Some criticism has been made of this section on the ground that MO3 cannot be abrogated without the consent of the operator, but the operator consents to the abrogation by signing the new contract, and the board would have power to end operation under MO3, if the operator held back from signing the new agreement, merely by withdrawing vessels from his charge.

Plan Arose in Northwest

MO4 may be traced to the activity of the Northwest Steamship Managers' Association. This organization, founded in 1918 under the name of the Puget Sound Steamship Managers' and Operators' Association, was convinced from the beginning that MO3 would not be satisfactory and began to prepare another plan of operation. From its work in this connection arose the new agreement; the principle as suggested by the Northwest Steamship Managers' Association has been adopted with modifications as to rates and special terms. W. C. Dawson, of W. C. Dawson & Company, Seattle, is president of the association, and R. E. Borchgrevink is secretary-treasurer.

Indications are that the Shipping Board will continue the new agreement for an indefinite period, instead of immediately supplanting it with a bare-boat charter form.

There follows an outline of the new agreement, paragraph titles only being given for most sections, but important portions being quoted in full:

1. Appointment of agent. 2. Agent's acceptance of appointment. 3. Manning, equipping, etc., vessels and paying disbursements. 4. Maintenance and repairs. 5. Agent must use care to avoid all damage and loss. 6. Trades, bills of lading, etc. 7. Sub-agents subject to corporation's disapproval. 8. Collection of moneys. 9. Handling of moneys. 10. Accounting and auditing.

Provisions for Compensation

11. Compensation. The corporation shall pay to the agent as full compensation for the agent's services hereunder as follows:

(a) From United States ports. Five per cent on gross outward freight, dead freight, demurrage, express, and mail revenue; provided that 2½ per cent only shall be paid on full cargoes of coal, grain, sulphur, and phosphate, regardless of the number of ports of loading or discharge and regardless of th number of bills of lading, or consignees; and, provided further, that 2½ per cent only shall be paid on full cargoes of other commodities shipped from one shipper to one consignee, from one port of loading to one port of discharge, to be accepted by the ship and delivered without count or marks.

(b) Into United States ports. Two and one-half per cent on gross inward freight, dead freight, demurrage, express, and mail revenue, the minimum inward fee at each port where cargo is discharged to be $250.

(c) Between United States ports. The provisions of (a) and (b) above shall govern except as to the full cargoes mentioned in (a) as to which the agent shall receive only 2½ per cent on the gross freight, dead freight, and demurrage, and no fixed minimum inward fee.

Between Foreign Ports

(d) Between ports other than United States ports. Two and one-half per cent on gross freight, dead freight, demurrage, express and mail revenue.

(e) Ballast voyages. Five dollars per day on ballast voyages, minimum fee $50, except in New England coal trade between United States ports north of Cape Hatteras, minimum shall be $25; days to be counted from clearance to entry of vessel; when a vessel calls en route for orders, fuel, repairs, or any other cause, the time between entry and clearance at such ports of call en route not to count.

(f) Compensation while under repairs, etc. For each period the vessel is laid up for repairs, inspection, or survey, the agent shall receive $25 per vessel per day for each day beyond the first ten days of that period. Where repairs, inspection, or surveys are made while the vessel is loading or discharging cargo, ballast, or bunkers, the time so spent shall not count as lay days.

Actual traveling expenses incurred by the agent shall be paid him and shall be charegable to the voyage account if the vessel is laid up elsewhere than at the home port of the agent.

In Passenger Business

(g) Passenger revenue. Ten per cent on gross passenger and excess-baggage revenue, provided, however, that 5 per cent only shall be paid on gross passenger and excess-baggage revenue derived from carrying passengers on cargo vessels, as provided in section 26 of the Merchant Marine Act of 1920.

(h) Salvage. Five per cent of all salvage earned for account of the vessel for salvage services rendered to vessels not owned or controlled by the United States Shipping Board, or the corporation, and 2½ per cent on all salvage earned for account of the vessel for salvage services rendered to vessels of the United States Shipping Board or the corporation. The amount of salvage awards for such last-named services shall be determined by the corporation, and all negotiations for settlements of other salvage claims shall be in the control of the corporation.

(i) Branch houses of the agent. Compensation for agency services of agent's branch houses is provided for below in paragraph 12, sub-division (b).

Outlying Ports Excluded

(j) United States ports, as used above, means United States continental ports, not including Alaska or the Panama Canal zone.

(k) The commissions provided for above upon the gross freight, dead freight, demurrage, express, mail, passenger, and excess baggage revenue, and salvage shall be paid only on revenue actually collected, except where the agent at the corporation's request carries governmental cargo on which no freight is to be collected; final control over the compromise, settlement, or waiver of disputed claims for gross freight, dead freight, demurrage, etc., to be with the corporation.

12. Brokerage commissions, etc. There shall be charged against the voyage account:

(a) Freight, passenger, and charter brokerage in cases where it is necessarily and properly incurred to secure cargoes, passengers, or charters in accordance with the usages of the trade.

Fees in Foreign Ports

(b) The customary fees and commissions for all ports in the vessel's itinerary where these charges are necessarily and properly incurred. For agency services rendered by branch houses of the agent, in foreign and dependency ports, the agent shall be paid and there shall be charged against the voyage account the customary fees and commissions for those ports, as specified in the schedule of fees and commissions for foreign and dependency ports adopted by the corporation March 1, 1920, as the same may be revised from time to time. Revisions shall not be made without fifteen days' notice to the agent. For agency services rendered by branch houses of the agent in United States ports the agent shall be paid and there shall be charged against the voyage account the customary fees for such services in those ports until such time as the corporation shall adopt a schedule for such fees, and when said schedule is adopted it shall govern, as adopted and revised from time to time.

But unless said schedule expressly so provides, fees shall not be paid for agency services in United States ports where the vessel enters to load or discharge cargo, ballast, or passengers, or undergo repairs, inspection, or survey, in addition to the compensation in those cases already provided for in subdivisions (a), (b), (c), (e), (f) and (g), under section 11 above headed "Compensation."

Supersedes MO3

13. Use of each other's contracts by the corporation and agent. 14. General average; particular average. 15. Bond. 16. Termination of agency. (Corporation may terminate at any time; agent on thirty days' notice, but not effective as to any vessel until arrival at American port).

17. Retroactive to March 1. This agreement is in substitution of, and hereby abrogates, the agreement made effective March 1, 1920, and known as form MO3, and all rights and obligations of the parties under said Form MO3 are hereby cancelled and this present agreement is made retroactive to March 1, 1920, except as may be otherwise mutually agreed upon. . . .

18. Interpretation of this agreement. Any question arising under this agreement may, at the option of either party hereto, be referred for recommendation to a committee known as the Standing Committee on Managing Agents' Agreement, consisting of, first, duly appointed representatives of the corporation; second, duly appointed representatives of the American Steamship Owners' Association, the United States Ship Operators' Association, Northwest Steamship Managers' Association, the Pacific American Steamship Association, the Gulg Shipping Conference (Inc.), the South Atlantic Conference. The determinaations of this committee shall be only in the form of recommendations to the corporation, the final decision to be left to the corporation.

Holland-America Sailings

On November 17 the steamship Kinderdyk of the Holland-America Line passed through the Panama Canal on her way to Europe, with a full cargo taken on at Pacific Coast ports. Her cargo consisted of wheat, flour, salmon, lard and general merchandise, including her full refrigerating capacity of apples from Washington and California.

E. F. R. De Lanoy, in charge of Pacific Coast business for the Holland-America Line, announces the appointment of C. J. Lehman as agent at Los Angeles. Los Angeles offices are in the Pacific Electric Building.

The Holland-America steamship Moerdyk arrived from Europe late November, and she is booked for full cargo of 10,000 tons for Europe. The steamship Moerdyk is booked for sailing early December.

The steamship Eemdyk of the Holland-America Line leaves Rotterdam during December, and is scheduled to load cargo on the Pacific Coast during late January.

New Ocean Services

The first American passenger line between Puget Sound and ports of the Orient will be inaugurated with the sailing of the 535-foot type Shipping Board liner Wenatchee from Seattle for Yokohama, Hongkong, Shanghai, Manila and other Far Eastern points, between February 20 and March 1, says an announcement by the Seattle Chamber of Commerce. Since the allocation of the passenger liners to the Pacific Steamship Company by the Shipping Board there has been considerable delay and uncertainty regarding the exact date of completion of the first two vessels, the Wenatchee and the Keystone State. However, the Admiral line has been assured that the Wenatchee will be delivered to it early in January and a tentative schedule is now being drawn up listing the sailing of the first steamship.

Three of the five passenger liners assigned to the Admiral line for the Oriental run have already been named. They are the Wenatchee, Keystone State and the Bay State. The Keystone State will follow the Wenatchee on the Oriental route in April and the Bay State will probably steam from Seattle for Yokohama sometime in May. It is anticipated that the entire fleet of five liners will be in service before the end of 1921.

The Seattle Chamber of Commerce plans to hold a trade excursion to the Orient in connection with the sailing of the Wenatchee.

Line to Australasia

The H. R. James Company, Seattle, Puget Sound agent of the newly-organized corporation of Geritsen, Curtis & Company, has announced that a steamship line would be established between Pacific Coast ports and Australia and New Zealand, the first sailing to be early in December. The service will be known as the Curtis Line.

J. P. Jaeger, president of the Alaska Coke & Coal Company, Portland, said that a line of steamships to ply between Portland and Alaska would be established next year to transport coal from Controller Bay, whither it would be moved from the Cunningham mine by rail. Temporary pier facilities at Controller Bay will be replaced by a permanent wharf.

O. S. K. Calls

Cargo is being accepted at San Francisco for westbound vessels of the New York and New Orleans services of the Osaka Shosen Kaisha, represented by McCormick & McPherson. Although the steamships had been calling at San Francisco for bunkers, cargo had not been loaded until recently. Calls are being made once a month or oftener.

To meet the growing demand of the coast trade of India, as well as to engage in cargo service between India and foreign ports, the All-India Steamship Company has been registered in Bombay, it is announced in Commerce.

The public press of Venezuela contains the announcement that W. R. Grace & Co. will establish immediately a fixed freight and passenger service between New Orleans and Venezuelan ports. Although trips will be made every twenty days at first, it is expected that within a very short time a weekly schedule will be inaugurated. According to the announcement, two ships possessing all the comforts of modern travel are to be placed in use at once. It is believed that the new service will prove especially helpful in relieving the congestion in passenger traffic which has existed in Venezuelan ports for some time.

Discuss Uniform Bill

Although the Pacific American Steamship Association was represented at the Interstate Commerce Commission's hearing on a uniform bill of lading, held in San Francisco October 25 and 26, no representations were made to the examiner, as the association decided to present the case of the steamship companies at the hearing in Washington in November.

Port-to-Port Bill

Seth Mann, attorney and manager of the traffic department, San Francisco Chamber of Commerce, acting as counsel of the shippers' committee, said that the Canners' League, the Dried Fruit Association and Foreign Commerce Association, with a view to protecting shipments by water, had drawn up a tentative form of port-to-port bill of lading, the provisions of which they desired to have incorporated in the uniform export bill. Examiner C. R. Seal replied that the commission was without authority to consider a port-to-port bill, but that such portions of the proposed bill as were pertinent to a through export bill might be filed. In the discussion, Mr. Seal pointed out that the Interstate Commerce Commission, in considering the liability of the water carrier, would be restricted to paragraph 4, section 25, of the Transportation Act, in part as follows: "The commission shall, in such manner as will preserve for the carrier by water the protection of limited liability provided by law, make such rules . . ." Because of this, the commission would not have power to prohibit the insertion of any exceptions to which a carrier formerly was entitled to include under the statutes.

Can't Give Receipt

Upon this statement being made by the examiner, the discussion took another turn and the remainder of the hearing was largely devoted to other phases, such as the handling of negotiable bills of lading through the banks. Shippers indicated that they desired the uniform bill to include a receipt for cargo aboard ship; such a provision was out of the question, Mr. Seal said, because a through export bill of lading issued at interior points could not carry with it such a receipt, inasmuch as the carrier could not give it for cargo that had not been received at that time at the port of exit. The shippers said that the provisions of the California bill of lading were more desirable than those of the Western carriers' proposed bill, submitted at the Chicago hearing, and a brief was filed supporting this view. The shippers announced that they would not be represented at the hearing in Washington.

India Vessels Recalled

Two steamships, Santa Cruz and the Colusa, which have been under charter to the Pacific Mail and used in the San Francisco-India service, will be returned to the owners, W. R. Grace & Company, after January 1, and the India service will be discontinued unless the Shipping Board can allot vessels, preferably some of the 502 class. Both the Santa Cruz and the Colusa had been engaged in the India trade since 1917, giving the Pacific Coast a new service and assisting greatly in building up American trade. The Santa Cruz and Colusa will be used by the W. R. Grace Company in the South American trade.

Motorships Bought

Announcement has been made that the wooden motorships Cethana, Culburra, Coolcha and Challamba would be turned over by the Australian government, for which they were built, to the Pacific Motorship Company, owned by W. L. Comyn & Company, San Francisco. The Pacific Motorship Company had bought the wooden motorships Benowa, Balcatta, Boobyalla and Babinda, so that it now possesses all the wooden vessels built on Puget Sound for the Australian government during the war. The mortgages held by the government on the last four vessels have been canceled and payment for the eight has been made in ten-year bonds. The motorships are operating on the West Coast.

Grain Charges Cut

Arrivals of deep-sea vessels at Seattle during September, 1920, were 422 of an aggregate of 380,582 net tons, as compared with 335 of 312,874 net tons in September, 1919. Arrivals of local vessels were: September, 1920, 1998 vessels, 549,205 net tons; September, 1919, 1943 vessels, 507,837 net tons. In order to place Seattle on a parity with Portland in handling grain, the Seattle Port Commission has made reductions of from 25 to 50 per cent in handling and storage charges for bulk and sacked grain.

O. S. K. Report

According to the report of the Osaka Shosen Kaisha for the half-year ending June 30, the company made a net profit of yen 5,840,570.89, after yen 6,420,000 had been set aside for depreciation and reserves. Total income was yen 50,448,570.89, of which yen 41,138,905.44 was from freight transportation and only yen 5,157,361.77 from passenger. On June 30 the company's paid-up capital was yen 62,500,000, of a total of yen 100,000,000, and debentures aggregated yen 3,500,000, the same total as obtained since 1917. During the first half of the year the fleet increased by two vessels to 140, of an aggregate gross tonnage of 432,574. The dividend rate for the period was 25 per cent, as compared with 40 for 1919; 60 for 1918; 45 for 1917; 24 for 1916, and 11 for 1915; so that, although dividends have decreased greatly from the high mark of the war, they still remain greatly in excess of pre-war returns. American competition and the dispatch to the States of Shipping Board vessels built in Japan affected the North American services adversely; the Russian line business was unsatisfactory; the European business was fair; and other services generally made good returns. Summing up, the report says:

"Freight rates showed a further decline during the term under review owing to the recovery and increase of foreign steamers while the shipments decreased on account of the uneasiness of exchange movement and the financial unrest in Japan, thus making it impossible for this company to obtain desired earnings. On the other hand, increase in the operating cost to some extent could not be avoided in spite of the special efforts made for its curtailment, so that the results realized were not so fine as anticipated."

Flour Differential Cut

The action of the Shipping Board in reducing the differential between wheat and flour to 5 cents a hundred pounds from November 1 has been received with mixed feelings by the public. Shipping conferences have protested to the board, but American milling interests are represented as being quite pleased.

Manufacturers of corn and oats products have applied to the Shipping Board for a reduction in the export differential of the manufactured product over raw grain similar to that on flour. A hearing was held November 10 at which about forty representatives of all interests appeared. Officials of steamship companies opposed the reduction. The board allowed one week for the filing of briefs and promised a speedy decision.

Regarding the flour reduction, the foreign commerce department of the Chamber of Commerce of the United States has this to say:

"The exports of wheat in September of this year were thirty and three-fourths million bushels against seventeen million bushels for September, 1919. At the same time exports of flour this September were only nine hundred and thirty-eight thousand barrels, compared with one million, seven hundred and sixty-four thousand barrels in September a year ago.

Flour Exports Decline

"The flour millers of the United States have been attributing the falling off of export orders for flour and the stimulation of the export of wheat to the high differential that has been maintained during the past several months in the ocean freight rates on flour above the rates on wheat. The United States Shipping Board heard from various individual shippers and organizations protests against the maintenance of the high differential.

"The foreign commerce department

committee of the Chamber of Commerce of the United States went on record as being opposed to the maintenance of any unwarranted discrimination in the ocean freight rates. This recommendation, approved by the board of directors of the National Chamber, was communicated to the United States Shipping Board. It was pointed out that the maintenance of an unwarranted differential against a manufactured product as compared with the raw material is likely to have a very adverse effect on the manufacturing industry and the various tributary and allied industries.

"Toward the end of October the Shipping Board released an announcement to the effect that on Shipping Board steamers from November 1, 1920, the base differential on flour above the rate on wheat would be 5 cents per 100 pounds. Before the operation of this new base differential, the rate on flour has for months been above the rate on wheat by 25 cents or more per 100 pounds. Under date of October 26 the foreign commerce department of the National Chamber received from an official of the Shipping Board a letter commenting on the new differential and concluding as follows: 'I understand this adjustment is entirely satisfactory to the milling interests and hope that it may accomplish what they say: that is, a great increased sale of American manufactured flour in foreign countries.'

"The effect of the reduction of the differential on Shipping Board vessels remains to be seen. As the matter now stands, the millers contend that the rate on wheat and the rate on flour should be on a parity if the American export trade in flour is to continue."

Conferences Potest

A protest has been filed by the North Atlantic United Kingdom Freight Conference with the Shipping Board against the reduction, which, the foreign lines asserted, "constituted a grave injustice," inasmuch as flour could not be carried at the Shipping Board rate without a loss; and the U. K. section of the Gulf Shipping Conference protested for several reasons, among which were: the action violated the conference agreements of Shipping Board and outside lines; 5 cents a hundred would not cover extra stevedoring costs; and 1200 tons of wheat could be stored in the space occupied by 1000 tons of flour. Without the reduction, on the other hand, American millers said that wheat could be shipped overseas and milled in foreign lands and the flour sold for less than American flour could be marketed abroad.

A British View

E. H. Mundy, director of E. H. Mundy & Company, Ltd., shipbrokers of London, Liverpool, Manchester and Glasgow and agents of the European-Pacific Line of Williams, Dimond & Company, San Francisco, was on the Pacific Coast during November. Mr. Mundy expressed a belief that the European-Pacific Line had been placed upon a firm basis in the United Kingdom; although during the early days of operation vessels were compelled to depart without sufficient cargo to hold them down, which necessitated the purchase of ballast, now the situation has changed; by "keeping the berth warm" the European-Pacific Line has been able to command business to the exclusion of some of the British companies; and despite the still unsettled condition of Great Britain, enough outward cargo is being obtained to hold the propellers in the water. Mr. Mundy said that no discrimination was made by British shippers as against American steamship lines and that good-will existed toward the new merchant marine of the States. He has been impressed, he said, by the intense anti-British propaganda going forward in America, to which no parallel existed in the United Kingdom. British sentiment was friendly to America, he said, and he regretted the anti-British feeling engendered by some of the American newspapers.

T. K. K. Appoints Braga

According to announcement by K. Doi, manager of the Toyo Kisen Kaisha, John Vincent Braga has been appointed general passenger agent, effective Oct. 30, with headquarters in San Francisco. Mr. Braga has been connected with the company for ten years, having served in the passenger department at Kobe and as passenger agent at Hongkong. Prior to the war he was assistant to Mr. Doi in San Francisco, but he left that berth for service with the Royal Flying Corps, doing patrol duty over the North Sea for more than a year.

On his return he made a trip to Hongkong for six months, whence he returned to San Francisco. As acting general passenger agent he completed an extended tour of the principal cities of this country, where he formed valuable connections for his company.

Mr. Braga is one of the most widely traveled men in transportation circles of San Francisco. He has been around the world five times, has crossed the Atlantic twenty times, the South Atlantic six times, the North Pacific twelve times, and the South Pacific, to Australia and New Zealand, four times. He was born in Hongkong and educated in England.

Asked concerning the plans of increasing the passenger services on the North American run of the Toyo Kisen Kaisha, Mr. Braga said: "Some time ago plans were completed in our drafting rooms for two splendid steamers, larger and finer than anything that has yet appeared in San Francisco. These ships were to be of approximately 35,000 tons displacement and, according to the first specifications, were to have geared turbines with electric drive, which has been so successfully developed in the operation of American battleships. Work on these vessels, however, has been postponed for the time being and until conditions adjust themselves we will continue to operate only our eight large passenger vessels from San Francisco. Three new combination passenger and freight vessels for the South American run are on the ways and these are to be ready for service early next year."

Shipping Briefs

According to a cablegram received from the American consul at Newcastle, New South Wales, the total amount of coal mined in New South Wales, Australia, during the month of September was 468,000 tons; 117,600 tons, valued at £100,868, were exported overseas, excluding 3217 tons for bunkers to oversea vessels; the remainder was for Australian consumption.

There is a great shortage of all kinds of building material in New Zealand, and especially is this true of lumber. It seems clear that large quantities must be procured from the West Coast of the United States and Canada if building and other improvements are to be carried out as contemplated within the next few years. There is a great shortage of homes for the working people, as well as of office and other business structures, warehouses and schools.

Henry G. Seaborn, Seattle, has purchased the schooners Gamble, Spokane and Sophie Christenson of the Fife Shipping Company, which is managed by Balfour, Guthrie & Company. Prior to the purchase Mr. Seaborn owned the schooners Camano, Meteor and Mindano.

Operations on Atlantic

Admiral Benson Speaks

The following paragraphs are excerpts from a speech delivered by Admiral W. S. Benson at the La Salle Hotel, Chicago, on October 15, 1920: A resume of the activities of Shipping Board vessels shows that during the fiscal year ended June 30, 1920, these vessels carried exports of 13,379,234 tons and imports of 7,236,168 tons, a total of 20,615,402 tons, through 49 United States ports. In this connection it is noted that 24 per cent (1,720,733 tons) of the imports consisted of crude petroleum. Exports were forwarded from 44 ports and imports were received at 31 ports. Twenty-six of these ports handled over 97 per cent (20,079,574 tons, made up of exports 12,959,802 tons, and imports 7,119,772 tons) of the entire tonnage moved.

Wireless Required

Vessels of the United States on arriving on and after December 1, 1920, at ports of the United Kingdom will be subject to the provisions of the British wireless act of 1919, so far as applicable. This act requires every seagoing passenger steamer or ship of 1600 tons gross tonnage or upwards shall be provided with a wireless telegraph installation.

Large Ships Unsold

Although Lord Inchcape has sold for the British government several passenger and cargo vessels built in Germany, he has not succeeded in finding purchasers for the larger liners, such as the Bismarck (reported burned), Imperator, Kaiserin Auguste Victoria, Prinz Friedrich Wilhelm, Graf Waldersee, Pretoria, Patricia. Of these the largest is the Bismarck, 56,000 gross tons, and the second is the Imperator, 51,960. At the end of October four passenger vessels exceeding 10,000 tons gross, the Berlin, Mobile, Zeppelin and Konigin Luise, had been sold.

Steamer Market Slow

The steamer market continues slow, and further declines were recorded in rates on coal carriers to European and South American ports, said Sudden & Christenson's New York freight report of November 13. There is no improvement in the general demand for tonnage, and the freights offering are mostly for coal and grain carriers for November and December loading. Tonnage continues to offer freely for prompt loading, and charterers are asking further reductions in rates on coal to all European and South American ports.

A limited amount of chartering was reported in the sailing vessel market in the foreign trades, but very little was done in any of the coastwise trades. The general demand continues light and is confined largely to the West India and South American trades. Rates are favorable to charterers, as sufficient tonnage offers for all prevailing necessities.

Naming Plan Adopted

The American Ship & Commerce Navigation Corporation announces that it has adopted for its present fleet, and for any other vessels that it may acquire, names with the prefix "Mount." Eleven vessels of the company will have the following names: Mount Clay, Mount Bliss, Mount Brace, Mount Bowdoin, Mount Seward, Mount Sheridan, Mount Sherman, Mount Sherrill, Mount Sidney, Mount Sterling, Mount Summit. The only one of these definitely assigned to any vessel is the Mount Clay, which will be the new name of the former German steamship De Kalb; other names will be assigned later.

Agreement Renewed

An extension to May 1 of the agreement of the Marine Engineers' Beneficial Association with the Shipping Board and shipowners has been agreed upon by representatives of the three interests concerned. Winthrop L. Marvin, vice-president and manager of the American Steamship Owners' Association, issued the following statement:

"Since the failure of previous conferences, the officials of the National Marine Engineers' Beneficial Association have become convinced more clearly that to press for increased compensation at this time of intensifying competition with foreign ships might prejudice the interests of the American merchant marine. Therefore the officials of the M. E. B. A. came forward with a proposition that the previous wage and working agreement, already extended from August 1 to November 1, be extended six months further, to May 1, 1921. This proposition of the marine engineers was accepted at today's meeting by the representatives of the Shipping Board and the American Steamship Owners' Association. The only change in the agreement as further extended is that the marine engineers be granted the subsistence allowance already received by deck officers on American ships, of $4.50 a day to chief engineers and $3 a day to assistant engineers and of $2.50 per night for room hire when they are compelled to eat and sleep ashore."

Charter Filing Opposed

A resolution of the Chamber of Commerce of the State of New York opposes the regulation of the Shipping Board requiring the filing of ship charters. The report of the chamber's committee on the harbor and shipping said in part: "Your committee on the harbor and shipping is opposed to this interference in times of peace with private business matters. Contracts and charters are of a private character, and the requirement that they be filed with a Federal body is contrary to the foundation of our government, which is based on the principles of individualism and not those of socialism. Ocean shipping is not a monopoly or to be compared with our public service corporations like railway, telegraph and telephone systems. Ocean shipping is open to everyone and to all nations. The United States is aiming to maintain its position in foreign trade and to create a permanent merchant marine. Government regulations which impede or delay Americans in competition with other nations for foreign trade should be avoided."

Coal Exports Lead

The United States is now the world's largest coal exporter. Prior to the war, says a statement by the National City Bank of New York, we ranked third among the coal exporters of the world, our exports in the year immediately preceding the war having been slightly less than 20,000,000 tons against 76,000,000 tons exported by Great Britain and approximately 30,000,000 tons by Germany. In the eight months ending with August, 1920, the latest date for which detailed figures are available, our exports of coal were, in round terms, 23,000,000 tons, while those of Great Britain were, in the same period, but 18,375,000 tons and those of Germany far less than those of either the United States or Great Britain.

France Restores Shipping

France has made rapid progress toward restoration of its merchant marine. According to the Rapport Generale sur l'Industrie Francaise, the total French merchant tonnage on December 31, 1919, was 2,400,896 tons, or approximately the same tonnage as previous to the war, about 342,497 tons being under the government's control. To this must be added the tonnage of the German ships provisionally under the French flag, and eventually to be permanently allotted to the several shipping companies by the government. Up to January 1, 1920, orders had been placed with French shipyards for the construction of 513,119 tons of ships. Since then 30,000 tons have been purchased from outside sources. In his report to the Chamber of Deputies, Admiral Bienaime, deputy, asked whether or not the private French shipyards would be able to deliver, by July 1, 1922, the 669,000 tons, the order of which was contemplated. He answered the question by quoting a statement on the subject furnished him by the Minister of Merchant Marine. This statement was to the effect that the private yards would be able to deliver the following tonnage: 1919-20, 310,000 tons; 1920-21, 445,000 tons; 1921-22, 500,000 tons; or a total of 1,255,000 tons; and, further, that at that time, orders had already been placed for 729,000 tons, 215,000 tons of which were for government account and the remainder for shipowners, leaving a construction capacity of 526,000 tons available for new orders.

American Line's Plans

The new passenger liners, for which the American Line of the International Mercantile Marine had drawn plans, probably will not be built at this time. P. A. S. Franklin, president of I. M. M., said regarding the proposed liners: "It is true that we have prepared plans for such ships and probably would have ordered them from the builders before now had conditions been less chaotic in the American merchant marine. The nation has not yet digested its war-built fleet of merchant ships. Until it does, and until the new merchant marine is privately owned and can stand on its own feet against the competition of ships under other flags by operation on a sound business basis, any established American steamship company must proceed with caution in ordering the construction of passenger liners."

Retirement of the American Line ships from trans-Atlantic passenger business between New York, Cherbourg and Southampton is temporary, according to a statement by Mr. Franklin.

"Although the St. Paul, New York and Philadelphia are to be withdrawn for the winter, the two former being scheduled to make cruises to the West Indies," said Mr. Franklin's statement, "their business on the New York-Cherbourg-Southampton run will be taken over for the winter months by two other American flag ships, the Kroonland and Finland, which will make stops at Cherbourg and Southampton for this purpose when en route between New York and Antwerp both eastbound and westbound.

"The withdrawal of these steamers was prompted by exceedingly heavy operating expenses, particularly the high cost of coal in England, making their operation unprofitable during the winter months, when the passenger business is expected to be light." A discussion of the report that the American Line's vessels were to be withdrawn because of the termination of the mail contract appears on page 69 in this issue.

The International Mercantile Marine has transferred to American registry the 17,000-ton British-built freighter Minnekahda and has awarded a contract to the Fore River yard of the Bethlehem Shipbuilding Corporation for converting her into a passenger vessel with accommodations in the steerage for 2150 persons. About three months will be required for the work, on the completion of which the Minnekahda will be placed in the New York-Hamburg service with the Mongolia and Manchuria. The Minnekahda was built in Belfast in 1917 for the Atlantic Transport Line, and since the armistice had been operated between New York and London. Anticipations of heavy emigrant travel from and through Germany led the American Line to buy her for the Hamburg service. According to the announcement of the I. M. M., the Minnekahda is the largest vessel ever transferred from British to American registry, and is the first steamer of more than 10,000 tons transferred since the City of New York and the City of Paris, now the New York and Philadelphia, came under the American flag in 1893. The Minnekahda is 620.5 feet long, 66.4 broad, of 17,221 tons gross, has triple screws, with two reciprocating engines and one low-pressure turbine; and is a coal-burner.

Pacific Building and Repairs

STEEL merchant ships under construction or contract in American and Canadian Pacific Coast yards November 1 totaled 83, of 822,740 deadweight tons, according to statistics prepared by Pacific Marine Review. Of these vessels, 73, aggregating 746,040 tons, were building in American yards, and 10, of 76,700 tons, were building in Canada. A noteworthy feature of the building in American yards is the large average size of the ships, slightly more than 10,000 tons.

These figures compare with 87 vessels of 897,670 deadweight tons listed as of October 1; but the difference between the two reports does not indicate October deliveries, inasmuch as returns from all yards were not received for the October 1 report. In the figures for November 1, no construction other than steel merchant shipping is included; all naval work, Coast Guard and wooden and miscellaneous building, of which there is a large aggregate, has been excluded.

Except for the confirmation of the report that the Standard Oil Company of California had placed contracts with Bethlehem for three 15,000-ton tankers, no new contracts have been made public.

A tabular statement of Pacific Coast building on November 1 follows:

Steel Construction, American and Canadian Pacific Coast Yards, November 1

	No. Vessels	Total D. W.
American yards:		
Tankers for U. S. S. B.	7	†67,800
Freighters for U. S. S. B.	19	180,900
Tankers for private acct.	35	380,560
Tankers for private acct. (foreign)	9	82,280
Freighters for private account	3	34,500
Total	73	746,040
Canadian yards:		
Freighters for gov't acct.	8	67,300
Freighters for pri'te acct.	2	*9,400
Total	10	76,700

† Includes a 7500-ton concrete tanker.
Includes a passenger steamship.

Grand total, American and Canadian yards, 83 vessels of 822,740 deadweight tons.

On October 1, 1920, private American shipyards were building, or under contract to build for private shipowners, 331 steel vessels of 1,236,277 gross tons, compared with 345 vessels of 1,236,547 gross tons on September 1, 1920. These figures do not include government shipbuilding or contracted for by the United States Shipping Board out of money voted by Congress. During September, for the first month since the armistice, according to returns of the bureau of navigation, the increase in seagoing vessels owned by American shipowners has equaled and exceeded the increase in government-owned ships. During September the fleet of seagoing ships of 500 gross tons or over of American shipowners rose to 1829, of 4,625,324 gross tons, an increase during the month of 25 ships of 116,335 gross tons, while the government-owned tonnage during the month increased only 20 ships of 88,855 gross tons, giving a Shipping Board total of 1698 ships of 7,288,208 gross tons on October 1. Since January 1, 1920, however, the government-owned tonnage has increased by 233 ships, of 1,347,466 gross tons, while the commercial marine of American shipowners has increased only 129 ships, of 536,926 gross tons.

Shipbuilding

B. C. MARINE ENGINEERS & SHIPBUILDERS, LTD., VANCOUVER, B. C.

Auxiliary power schr. for Hudson Bay Co.; delivery Nov./20, estimated.

BETHLEHEM SHIPBUILDING CORP'N, LTD.
Potrero Works
Purchasing Agent: O. W. Street

Hannawa, hull 5277, freighter for USSB; keel laying June 26/19; launching May 11/20; delivery Nov. 9; 440 LBP; 56 beam; 28-6 loaded draft; 10½ loaded speed; 11,800 DWT; rec. engines, 2600 IHP; three Scotch boilers, 15 x 11-9.

Hanley, hull 5276, freighter for USSB; keel laid June 26/19; launching Oct./20; delivery Dec. 15/20, estimated; dim., etc., same as Hannawa.

William H. Doheny, hull 5301, tanker for Pan Amer. Pet. Co.; keel laying Feb. 24/20; launching Aug. 30/20; delivery Nov. 8; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

Hammac, hull 5274, tanker for USSB; keel Dec. 1/20, estimated; launch Apr. 1/21, estimated; delivery June 15/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2600 IHP; three Scotch marine boilers, 15 x 11-9.

Alameda Works

Hambro, hull 5272, tanker for USSB; keel laying Sept. 8/20; launching Jan. 15/21, estimated; delivery Apr. 15/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

Hamer, hull 5273, tanker for USSB; keel laying Nov. 1/20, estimated; launching Feb. 15/21, estimated; delivery May 15/21, estimated; dim., etc., same as Hambro.

Franklin K. Lane, hull 5302, tanker for Pan Amer. Pet. Co.; keel laid Apr. 5/20; launched Aug. 31/20; delivery Nov. 25/20; estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

Crampton Anderson, hull 5303, tanker for Pan Amer. Pet. Co.; keel laid June 11/20; launching Nov. 20/20, estimated; delivery Dec. 30/20, estimated; dim., etc., same as Franklin K. Lane.

Algonquin, hull 5304, tanker for Stand. Trans. of Del.; keel laid Dec. 24/19; launched Aug. 23/20; delivery Nov. 2/20; dim., etc., same as Franklin K. Lane.

W. S. Miller, hull 5305, tanker for Stand. Oil Co. of Cal.; keel laid Apr. 26/20; launching Oct. 28/20, estimated; delivery Dec. 28/20, estimated; dim., etc., same as Franklin K. Lane.

E. R. Kingsbury, hull 5306, tanker for Stand. Oil Co. of Cal.; keel laid July 2/20; launching Jan. 15/21, estimated delivery Mar. 20/21, estimated; 440 LBP; 58 beam; 28 loaded draft; 11 loaded speed; 11,600 DWT; rec. engines, 3200 IHP; three Scotch boilers, 15-6 x 12-1.

Yorba Linda, hull 5307, tanker for Gen. Pet. Co.; keel laid May 17/20; launching Nov. 22/20, estimated; delivery Jan. 20/21, estimated; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,100 DWT; rec. engines, 2700 IHP; three Scotch boilers, 15 x 11-9.

Frank G. Drum, hull 5308, tanker for Ass'd Oil Co.; keel laid Nov. 5/20; launching Feb. 15/21, estimated; delivery Apr. 1/21, estimated; sister to Yorba Linda.

No name, hull 5311, tanker for Standard Oil of Calif.; keel laid Jan. 5/21, estimated; launching May 5/21, estimated; delivery Aug. 15/21, estimated; 500 LBP; 68 beam; 25-11 loaded draft; 11 loaded speed; 15,000 DWT; rec. engines, 4000 IHP; three Scotch marine boilers, 16-4 x 12-9.

No name, hull 5312, tanker for Standard Oil of Calif.; keel laid Jan. 15/21, estimated; launching June 1/21, estimated; delivery Sept. 1/21, estimated; sister to hull 5311.

No name, hull 5313, tanker for Standard Oil of Calif.; keel laid Feb. 1/21, estimated; launching June 15/21, estimated; delivery Sept. 15/21, estimated; sister to hull 5311.

BETHLEHEM SHIPBUILDING CORPORATION
Potrero Works
Naval Work

Destroyers for U. S. Navy; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1308 tons; turbine engines, 27,000 IHP; four Yarrows boilers, as follows: Nicholas, hull 311, keel Jan. 11/19, launch May 1/19; Young, hull 312, keel Jan. 28/19, launch May 8/19; Zeilin, hull 313, keel laying Feb. 20/19, launching May 28/19; Yarborough, hull 314, keel laying Feb. 27/19, launching June 20/19; La Vallette, hull 315, keel laying Apr. 14/19, launching July 15/19; Sloat, hull 316, keel laying Jan. 18/19, launching May 14/19; Wood, hull 317, keel laying Jan. 23/19, launching May 28/19; Shirk, hull 318, keel laying Feb. 13/19, launching June 20/19; Kidder, hull 319, keel laying May 15/19, launching July 10/19; Selfridge, hull 320, keel laying Apr. 28/19, launching July 25/19; Marcus, hull 321, keel laying May 20/19, launching Aug. 22/19; Mervine, hull 322, keel laying Apr. 28/19, launching Aug. 11/19; Chase, hull 323, keel laying May 5/19, launching Sept. 2/19; Robert Smith, hull 324, keel laying May 13/19, launching Sept. 19/19; Mullany, hull 325, keel laying June 3/19, launching July 9/20; Coghlan, hull 326, keel laying June 25/19 launching June 16/20; Preston, hull 327, keel laying July 18/19, launching Aug. 7/20; Lamson, hull 328, keel laying Aug. 13/19, launching Sept. 1/20; Hull, hull 330, keel laying Sept. 13/20; MacDonough, hull 331, keel laying May 24/20; Farenholt, hull 332, keel laying Sept. 13/20; Sumner, hull 333, keel laying Aug. 27/19; no name, hull 334, keel laying Sept. 15/20; no name, hull 335, keel laying Sept. 15/20.

Submarines for U. S. Navy: S-31, hull 136; S-32, hull 137; S-33, hull 138; S-34, hull 139; S-35, hull 140; S-36, hull 141; S-37, hull 142; S-38, hull 143; S-39, hull 144; S-40, hull 145; S-41, hull 146.

RALPH J. CHANDLER COMPANY, WILMINGTON
Purchasing Agent: G. R. Crofut.

Building sixth and last section floating drydock for Los Angeles Shipbuilding & Drydock Company.

CHOLBERG SHIPYARD, VANCOUVER, B. C.
Purchasing Agent: W. Meed.

S. F. Tolmie, hull 4, four-masted barkentine for Victoria (B. C.) Shipowners, Ltd.; keel laying May 1/20; launching Dec. 15/20, estimated; delivery Jan. 15/21, estimated; 250 OA; 45-6 beam; 21-10 loaded draft; 2400 DWT; sailing vessel, shaft logs fitted for auxiliary but no machinery installed.

Sir Henry Drayton, hull 5, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying May 15/20; launching Jan. 15/21, estimated; delivery Feb. 15/21, estimated; sister to S. F. Tolmie.

No name, hull 6, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying June 4/20; launching Feb. 25/21, estimated; delivery Mar. 25/21, estimated; sister to S. F. Tolmie.

No name, hull 7, four-masted barkentine for Victoria Shipowners, Ltd.; keel laying Dec. 20/20, estimated; launching Apr. 30/21, estimated; delivery May 30/21, estimated; sister to S. F. Tolmie.

J. COUGHLAN & SONS, LTD., VANCOUVER, BRITISH COLUMBIA
Purchasing Agent: J. Joseph.

City of Victoria, hull 19, steel freighter for own account; keel laying Aug./20; launching Oct./20; delivery Nov./20, estimated; 410-5½ LBP; 54 beam; 24-2 loaded draft; 11½ loaded speed; 8800 DWT; TE engine, 3000 IHP; three Scotch boilers, 15-6 x 11-6.

Canadian Transporter, hull 20, steel freighter for Canadian government; keel laying Dec./20, estimated; 400 LBP; 52 beam; 25-3 loaded draft; 11¾ loaded speed; 8350 DWT; triple expansion engine, 3000 IHP; three Scotch boilers, 15-6 x 11-6.

Canadian Freighter, hull 21, steel freighter for Canadian government; keel laying Dec./20, estimated; dim., etc., same as Canadian Transporter.

CROWLEY LAUNCH & TUGBOAT COMPANY, SAN FRANCISCO EAST OAKLAND
Purchasing Agent: John L. Crowley.

Four launches, 36 LBP; one equipped with 30 HP Frisco Standard engine; one, 25 HP Acme; one, 20 HP Acme; one, 25 HP Frisco Standard.

HANLON DRYDOCK & SHIPBUILDING COMPANY, OAKLAND
Purchasing Agent: C. H. Brown.

Medon, hull 87, freighter for USSB; delivery Nov./20; 305 LBP; 46 beam; 22-5 loaded draft; 10½ loaded speed; 5350 DWT; 1800 IHP engines.

Memnon, hull 88, freighter for USSB; launching Sept. 28/20; delivery Jan. 15/21, estimated; dim., etc., same as Medon.

HARBOR MARINE COMPANY, VICTORIA
Purchasing Agent: B. L. Robertson

Canadian Winner, steel freighter for Canadian government merchant marine; keel July 4/19 launch June 29/20; 400 LBP; 52 beam; 25-2 loaded draft; 11½ loaded speed; 8100 DWT; TE eng., 3000 IHP; three Scotch boilers, 15-6 x 11-6; two deck, poop, bridge, forecastle.

Canadian Traveller, steel freighter for Canadian government merchant marine; keel Aug. 9/19; launch Sept. 29/20; sister to Canadian Winner.

Car ferry for Canadian Pacific; Nov. launching.

LONG BEACH SHIPBUILDING COMPANY, LONG BEACH

West Kebar, hull 136, for USSB; launching Oct./20; 410-5 LBP: 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; triple expansion engines, 2800 IHP; three Scotch boilers, 14-9.

Edythe, hull 142, motor yacht for J. F. Craig; 105-3 LBP; 21 beam; 8-10 loaded draft; 12 loaded speed; New London engines, 360 BHP.

LOS ANGELES SHIPBUILDING & DRYDOCK COMPANY, SAN PEDRO
Purchasing Agent: L. R. McFie.

West Honaker, hull 28, steel cargo for USSB; keel laid Mar. 21/20; launching Sept. 25/20; delivery Nov. 25/20, estimated; 410 LBP; 54 beam; 24-2 loaded draft; 10½ loaded speed; 8800 DWT; TE eng., 3500 IHP; three WT boilers.

West Cusseta, hull 29, steel cargo for USSB; keel laid April 19/20; launching Nov. 10/20; dim., etc., same as West Honaker.

West O'Rowa, hull 30, steel cargo for USSB; keel laid June 14/20, dim., etc., same as West Honaker.

West Lewark, hull 31, steel cargo for USSB; keel laid July 30/20; 430 LBP; 54 beam; 2802 loaded draft; 10½ loaded speed; 11,000 DWT; TE engines, 3500 IHP; three Scotch single end, 15-9.

West Faralon, hull 32, steel cargo for USSB; keel laying Sept. 27/20; dim., etc., same as West Lewark.

West Greylock, hull 33, steel cargo for USSB;

keel laying Nov. 10/20; dim., etc., same as West Lewark.

West Prospect, steel cargo for USSB; keel laying Nov./20, estimated; dim., etc., same as West Lewark.

West Chopaka, steel cargo for USSB; keel laying Jan./21, estimated; dim., etc., same as West Lewark.

G. F. MATTHEWS, PORTLAND

Quinault, hull 1, steam schr. for Hart-Wood Lumber Co.; launch Nov. 10/20; delivery Jan. 1/21, est.; 210 LBP; 43 beam; 20 loaded draft; 9 loaded speed; 1500 DWT; triple-expansion engines; 650 IHP; Babcock & Wilcox WT boilers.

Undaunted, hull 2, 5-mast schr. for Hart-Wood Lumber Co.; launch Jan. 15/21, est.; delivery Feb. 15/21 est.; 264 LBP; 46 beam; 24 loaded draft; 3800 DWT.

MOORE SHIPBUILDING COMPANY, OAKLAND

Purchasing Agent: M. G. Waites.

Narbo, hull 2237, freighter for USSB; keel laid Aug. 12/19; launching Apr. 16/20; 402-6 LBP; 53 beam; 26-4 loaded draft; 9400 DWT; Parson comp. engines; three Scotch boilers, 15-2 x 11.

Narcissus, hull 2238, freighter for USSB; keel laid Dec. 31/19; launching Aug. 28/20; dim., etc., same as Narbo.

Three tankers, no names, hulls 2862, 2863, 2864, for USSB; keel laying, 2862, Oct./20; others not laid; 425 LBP; 57 beam; 26 loaded draft; 10,000 DWT; rec. engines; three Scotch marine boilers, 15-2 x 11.

Manulani, hull 158, freighter for Matson Nav. Co.; keel laid Aug. 5/20; 480 LBP; 62 beam; 30 loaded draft; 14,000 DWT; Parson engines; five Scotch marine boilers, 15-6 x 12-3½.

Manukai, hull 159, freighter for Matson Nav. Co.; keel laid Aug. 17/20; dim., etc., same as hull 158.

S. C. T. Dodd, hull 160, tanker for Stand. Oil Co. of N. J.; keel laid April 27/20; launching Oct./20; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2 x 12.

M. F. Elliott, hull 161, tanker for Stand. Oil Co. of N. J.; keel laid July 2/20; dim., etc., same as S. C. T. Dodd; launching Nov. 13; delivery Jan./21, estimated.

Tho. H. Wheeler, hull 162, tanker for Stand. Oil Co. of N. J.; keel laid July 28/20; dim., etc., same as S. C. T. Dodd.

F. H. Hillman, hull 163, tanker for Stand. Oil Co. of Calif.; keel laying Oct./20, estimated; 330 LBP; 46 beam; 21-6 loaded draft; 4750 DWT; Skandia Diesel engines.

No name, hull 164, tanker for Vacuum Oil Co.; keel laid Sept. 13/20; 425 LBP; 57 beam; 2603 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2 x 12.

Tamihua, hull 165, tanker for S. P.-Atlantic S. S. Co.; 520 LBP; 71 beam; 28 loaded draft; 16,340 DWT; rec. engines; three Scotch boilers, 15-9 x 12.

No name, hull 166, tanker for Vacuum Oil Co.; 425 LBP; 57 beam; 26-3 loaded draft; 10,100 DWT; rec. engines; three Scotch marine boilers, 15-2 x 12.

NAVY YARD, PUGET SOUND

Nitro, ammunition carrier for government; keel laying Mar. 19/19; launching Dec. 16/19; 460 LBP; 61 beam; 21 loaded draft; 16 loaded speed; 10,600 tons disp.; turbine engines, 5300 IHP; four Babcock & Wilcox WT boilers; vessel 95 per cent complete Nov. 1.

Medusa, repair ship for government; keel laying Jan. 2/20; 460 LBP; 70 beam; about 19 loaded draft; 17-5 loaded speed; turbine engine, 7000 IHP; two watertube express type boilers; 10,000 tons disp.; vessel 30 per cent complete Nov. 1.

Holland, submarine tender for government; date for keel laying not set; 460 LBP; 61 beam; about 20 loaded draft; 16 K. loaded speed; turbine engine, 7000 IHP; two watertube express type boilers; 10,000 tons disp.

NAVY YARD, MARE ISLAND

California, battleship for U. S. Navy; keel laying Oct. 25/16; launching Nov. 20/19; 600 LBP; 97-3½ beam; 30-3 loaded draft; 21 loaded speed; 32,300 displacement; turbo-electric engines, 26,800 SHP; eight Bu's express boilers, 50,984 sq. ft.

Montana, battleship for U. S. Navy; keel laying Sept. 1/20; 660 LBP; 105 beam; 33 loaded draft; 23 loaded speed; 42,200 displacement; turbo-electric engines, 60,000 SHP; twelve Bu's express boilers, 74,040 sq. ft.

Zane, destroyer for U. S. Navy; keel laying Jan. 15/19; launching Aug. 12/19; 310 LBP; 30-11½ beam; 9-4 loaded draft; 35 loaded speed; 1215 displacement; geared turbine engine, 26,000 SHP; four Normand boilers, 27,000 sq. ft.

Wasmuth, destroyer for U. S. Navy; keel laying Aug. 12/19; launching Sept. 15/20; dim., etc., same as Zane.

Trever, destroyer for U. S. Navy; keel laying Aug. 12/19; launching Sept. 15/20; dim., etc., same as Zane.

Perry, destroyer for U. S. Navy; keel laying Sept. 15/20; dim., etc., same as Zane.

Decatur, destroyer for U. S. Navy; keel laying Sept. 15/20; dim., etc., same as Zane.

NORTHWEST BRIDGE & IRON COMPANY, PORTLAND

Purchasing Agent: W. C. Smith.

Seven 12,000-ton oil tankers for Swiftsure Oil Trans. Co. (France & Canada S. S. Corp.); deliveries from Feb. to Aug./21, estimated; 465-7 LBP; 60 beam; 26-3 loaded draft; 10½ loaded speed; TE engines, 3150 IHP; three Scotch boilers, [illegible] x 11-6.

PACIFIC COAST SHIPBUILDING COMPANY, BAY POINT

Purchasing Agent: L. A. Smiley.

Cuprum, hull 947, steel cargo for USSB; keel laying May 7/19; launching Feb. 18/20; 402-6 LBP; 53 beam; 26-6 loaded draft; 9400 DWT; 2800 IHP engines; three Scotch marine boilers, 11x15-6; del. Nov./20, est.

Namasket, hull 948, steel cargo for USSB; keel laying June 18/19; launching Aug. 2/20; dim., etc., same as Cuprum; del. Jan./21, est.

Meanticut, hull 949, steel cargo for USSB; keel laying July 18/19; dim., etc., same as Cuprum; del. Mar./21, est.

Nashaba, hull 950, steel cargo for USSB; keel laying Aug. 25/19; dim., etc., same as Cuprum; del. June/21, est.

Midway, hull 12, steel tanker for Associated Oil Co.; keel laying Mar. 17/20; 200 LBP; 38 beam; 15-6 loaded draft; 10,000 bbls.; rec. engine, 520 IHP; Scotch marine boilers, 12-6 x 10-10.

PACIFIC MARINE & CONSTRUCTION COMPANY, SAN DIEGO

Building ended with delivery of San Pasqual, October, 1920.

PRINCE RUPERT SHIPBUILDING & DRYDOCK COMPANY, PRINCE RUPERT

Two 8800-ton steel freighters for Canadian government merchant marine.

JAMES ROBERTSON SHIPYARD, ALAMEDA

Purchasing Agent: James Robertson.

Aven J. Hanford, hull 101, propeller ferryboat for Rodeo-Vallejo Ferry Co.; keel Apr./20; launch Oct. 10/20; delivery Nov. 15/20; 170 LBP; 31 beam; 10-6 loaded draft; 13 loaded speed; TE eng., 1000 IHP; two gunboat boilers, 8 x 19.

No name, hull 102, side-wheel ferryboat for Richmond-San Rafael Ferry Co.; keel Nov. 15/20; 190 LBP; 34 beam; 17 loaded draft; 10 loaded speed; digaonal cross comp. eng., 500 IHP; two marine dry back boilers, 9 x 17.

ST. HELENS SHIPBUILDING COMPANY ST. HELENS

Purchasing Agent: A. F. Barnett

No name, hull 52, fuel barge for Swift & Co.; keel laying Sept. 1/20; 130 LBP; 34 beam; 7 loaded draft.

No name, hull 53, fuel barge for Swift & Co.; keel laying Sept. 1/20; dim., etc., same as hull 52.

SAN FRANCISCO SHIPBUILDING COMPANY, OAKLAND

Peralta, hull 1662, tanker for USSB; keel laid Oct. 10/18; launching Oct. 25/20, estimated; delivery Dec. /20; 420 LBP; 56 beam; 26 loaded draft; 10½ loaded speed; 7500 DWT; rec. engines, 2800 IHP; three watertube boilers, 21,000 sq. ft.

SCHAW-BATCHER SHIPWORKS, SOUTH SAN FRANCISCO

Ship construction ended with delivery of West Carmona in October.

SEACRAFT CORPORATION OF CALIFORNIA WILMINGTON

Purchasing Agent: C. D. Callahan.

Recently took over yard of Marine Equipment Co.; overhauling equipment preparatory to construction of pleasure craft.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

No name, hull 23, Isherwood tanker for Union Oil Co.; keel laying Dec./20, estimated; delivery July /21, estimated; 392 LBP; 51 beam; 23-11 loaded draft; 11½ loaded speed; 7500 DWT; TE engines; 2800 IHP; three Scotch boilers, 14 x 12

No name, hull 24, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Nov./20, estimated; delivery Mar./21, estimated; 412 LBP; 53 beam; 24-7 loaded draft; 11 loaded speed; 8400 DWT; TE engines, 2800 IHP; three Scotch boilers, 15-6 x 11-7.

No name, hull 25, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Dec./20, estimated; delivery Apr./21, estimated; dim., etc., same as hull 24.

No name, hull 26, Isherwood tanker for Anglo-Saxon Pet. Co.; keel laying Jan./21, estimated; delivery May/21, estimated; dim., etc., same as hull 24.

Mary Luckenbach, hull 19, transverse tanker for Luckenbach Co.; keel laid Feb. 24/20; launching Nov. 1/20; del. Dec. 1/20, est.; 410-5½ LBP; 54 beam; 23-11 loaded draft; 10¾ loaded speed; 8450 DWT; TE engines, 2800 IHP; three Scotch boilers, 14-9 x 11.

Montebello, hull 21, Isherwood tanker for Union Oil Co.; keel laid Apr. 20/20; launching Dec./20, estimated; delivery Jan./21, estimated; 440 LBP; [illegible] beam; 29-2 loaded draft; 11 loaded speed; [illegible] DWT; QE engines, 3300 IHP; three Schotch boilers, 15-6 x 12-1.

La Placentia, hull 22, Isherwood tanker for Union Oil Co.; keel laid May 20/20; launching Jan./21, estimated; delivery Feb./21, estimated; dim., etc., same as Montebello.

G. M. STANDIFER CONSTRUCTION CORPORATION, VANCOUVER, WASH.

John Worthington, hull 16, shelterdeck oil-tanker for Standard Oil Co. of N. J.; 11,740 DWT; VQM engines, 2800 IHP; three Scotch boilers, 14-4 [illegible]; Isherwood framing.

W. H. Libby, hull 17, shelterdeck oil-tanker for Standard Oil Co. of N. J.; dim., etc., same as John Worthington.

Livingston Roe, hull 18, shelterdeck oil-tanker for Standard Oil Co. of N. J.; dim., etc., same as John Worthington

Calgarolite, hull 19, shelterdeck oil-tanker for Imperial Oil, Ltd.; dim., etc., same as John Worthington, except boilers, which are [illegible] diam.

Albertolite, hull 20, shelterdeck oil-tanker for Imperial Oil, Ltd.; dim., etc., same as Calgarolite.

W. F. STONE & SON, OAKLAND

Purchasing Officer: Lester J. Stone.

Sea Lion, tug for S. O. & M. Tug Boat Co.; delivery Dec. 1/20, estimated; [illegible] LBP; [illegible] beam; [illegible] loaded draft; 12 loaded speed.

Sea Monarch, tug for S. O. & M. Tug Boat Co.; delivery Jan. 1/21, estimated; dim., etc., same as Sea Lion.

Sea Ranger, tug for S. O. & M. Tug Boat Co.; delivery Feb. 1/21, estimated; dim., etc., same as Sea Lion.

Sea Scout, tug for S. O. & M. Tug Boat Co.; delivery Mar. 1/21, estimated; dim., etc., same as Sea Lion.

Doris Crane, aux. schr. for Fanning Island Trading Co.; keel laid June 28/20; launching Nov. [illegible], estimated; delivery Nov. 29, estimated; [illegible] LBP; 32 beam; 12½ loaded draft; 6 loaded speed; [illegible] DWT; gas engine, 150 IHP.

TODD DRYDOCK & CONSTRUCTION CORPORATION, TACOMA

No name, Isherwood steel motorship for Alaska S. S. Co.; 360 OA; 29-6 beam; 22 loaded draft; 6500 DWT; McIntosh & Seymour four-cycle Diesel engines; 1200 IHP, 140 RPM.

Three scout cruisers for U. S. Navy.

UNION CONSTRUCTION COMPANY, OAKLAND

Charlie Watson, hull 11, oil-tanker for Standard Oil Co. of Calif.; 250 LBP; 37 beam; [illegible] loaded draft; 11 loaded speed; 2000 DWT; two [illegible] BHP Diesel engines; del. Nov./20, est.

Liebre, hull 12, oil-tanker for General Pet. Co.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 2700 IHP; three Scotch marine boilers, 15-3x11-9.

R. J. Hanna, hull 14, oil-tanker for Standard Oil Co. of Calif.; 435 LBP; 56 beam; 26 loaded draft; 11 loaded speed; 10,200 DWT; rec. engines, 2700 IHP; three Scotch marine boilers, 15-2 x 11-6.

No name, hull 15, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; 412 LBP; 53-5 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2800 IHP; three Scotch marine boilers, 15-6 x 11-7.

No name, hull 16, cutter for USCG; 240 LOA; 39 beam; 14 loaded draft; 16 loaded speed; 1600 DWT; turbo-electric engines, 2600 IHP; two watertube boilers.

No name, hull 17, cutter for USCG; dim., etc., same as hull 16.

No name, hull 18, cutter for USCG; dim., etc., same as hull 16.

No name, hull 19, cutter for USCG; dim., etc., same as hull 16.

No name, hull 20, cutter for USCG; 150 LOA; 30 beam; 13-6 loaded draft; 12½ loaded speed; 1000 DWT; rec. engines, 1000 IHP; two watertube boilers.

No name, hull 21, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; 412 LBP; 53-6 beam; 24-9 loaded draft; 11 loaded speed; 8400 DWT; rec. engines, 2800 IHP; three Scotch marine boilers, 15-6 C x 11-7.

No name, hull 22, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as hull 21.

No name, hull 23, oil-tanker for Anglo-Saxon Pet. Corp., Ltd.; same dim., etc., as hull 21.

WALLACE SHIPYARDS, NORTH VANCOUVER, BRITISH COLUMBIA

Canadian Highlander, cargo for Canadian government; launching Oct. 13/20; 8400 DWT; 413 long; 52 beam; 31 deep; 11½ loaded speed.

Canadian Skirmisher, cargo for Canadian government; keel laying Oct./20; sister to Canadian Highlander.

Coastwise steamship for Canadian Pacific: 317 LBP; 48 beam; 18½ deep; 16 knots; single-screw; 600 tons cargo space; accommodations for 200 passengers; keel laid Oct./20.

J. G. WILLIAMS CONSTRUCTION COMPANY, SAN FRANCISCO

Two steel barges for Standard Coal Co.; 138 ft. in length; 35 ft. in width; 12 ft. [illegible]; coal capacity of 900 tons.

Miscellaneous Construction

ALBINA ENGINE & MACHINE WORKS, PORTLAND

Building pontoon for Portland Dock Commission; two sections completed, [illegible]; probably launch these late November, [illegible] section to lay down.

BABCOCK & WILCOX COMPANY, CHARLES C. MOORE, SAN FRANCISCO, PACIFIC COAST MANAGER

Steamer Quinault, Hart-Wood Lumber Co., installation of two Babcock & Wilcox [illegible].

Steamer Pacific, Pacific Marine Iron Works, installation of two Babcock & Wilcox [illegible] boilers.

COLUMBIA STEEL COMPANY, PITTSBURG, CALIFORNIA

Steel castings for many steel vessels under construction on the Pacific Coast, [illegible] Montana and [illegible]; also for Coast Guard cutters [illegible] the Union Const. Co. yard.

ALLAN CUNNINGHAM COMPANY, SEATTLE

[illegible] draulic telemotors.

DOW PUMP AND DIESEL ENGINE COMPANY, ALAMEDA

Charlie Watson, motorship for [illegible]; two Diesel [illegible] HP.

F. H. Hillman, motorship for [illegible]; [illegible] HP, two [illegible] HP [illegible] drive engines.

FORD & GEIRRINE, AGENTS, SAN FRANCISCO

McNab direction indicators, [illegible] Co., for hulls 11, 12, 14 at Union Const. Co. [illegible] at Moore's. [illegible] by the McNab Co., for hull 14 at Union Const. Co., hull 5305 at Bethlehem; Todd-White fuel-oil system, Todd Drydocks, Inc., hull 19 at Southwestern; Brown steam tiller, Hyde Windlass Co., for hull 5308 at Bethlehem; National stockless anchors, Upson Walton Co., for hull 165 at Moore's; Dean feed pumps, Dean Bros. Steam Pump Works, for 166 at Moore's; Reliance forced draft equipment, John Reid & Co., for hulls 165, 166, at Moore's.

LIDGERWOOD MANUFACTURING COMPANY, NEW YORK, SAN FRANCISCO, LOS ANGELES

One 10x10 inch screw gear steering engine for U. S. S. Holland building at Puget Sound Navy Yard.

One 13x13 inch automatic tension towing engine for Merrill-Ring Lumber Co.'s tug Wanderer.

LLEWELLYN IRON WORKS, LOS ANGELES

Five marine engines for G. M. Standifer Construction Corporation, 24½ x 41½ x 72, 48 stroke, TE, 2800 IHP.

One, same dimensions, for Mary Luckenbach, Southwestern Shipbuilding Company.

One for steamship Montebello, Southwestern Shipbuilding Company, 24 x 34 x 51 x 74, 54 stroke, OE, 3300 IHP.

One for tanker Liebre, Union Construction Co., 27 x 47 x 78, 48 stroke, TE, 3200 IHP.

One for tanker Hanna, Union Construction Co., same dimensions as above.

MAIN IRON WORKS, SAN FRANCISCO

Purchasing Officer: B. W. Bengston.

Outfitting four tugs for Shipowners' & Merchants' Tug Boat Co.; 150 over-all; 30 beam; 16 loaded draft; TE engines, 1000 IHP; two Scotch marine boilers, 11-6.

MARINE IRON WORKS, CHICAGO

For Atlantic fishing companies, boats building at East Booth Bay, Maine: four 500 HP triple-expansion condensing engines.

For oil company, Barranquilla, Rep. de Colombia, S. A.; 60 ft. light draft steel stern wheel steamer with machinery, for shipment in K. D. shape.

For transportation company, Barranquilla, Rep. de Colombia, S. A.: 350 HP stern wheel engines.

For transportation company, Cuba; 150 HP propeller engine.

For towing company, Michigan: 195 HP fore and aft compound engine.

SKANDIA PACIFIC OIL ENGINE COMPANY, OAKLAND

Purchasing Agent: A. Bolander.

Two 850 BHP Werkspoor Diesel engines building for Standard Oil Co.'s MS. Hillman; 6 cyl., 135 RPM; delivery Oct., 1920.

Ten 850 BHP Werkspoor Diesel engines building for USSB; 6 cyl., 135 RPM; delivery Nov. 1 to April 1/21.

STEWARD DAVIT & EQUIPMENT CORPORATION, NEW YORK, SAN FRANCISCO, SEATTLE

Steward davits are being installed in the following: At Alameda works, Beth. S. B. Corp.: Algonquin, hull 5304, for Standard Trans. Co. of Del.; W. S. Miller, hull 5305, for Standard Oil of Calif.; Yerba Linda, hull 5307, for Gen. Pet. Co. At Union Const. Co.: Charlie Watson, hull 11, for Standard Oil Co. of Cal.; Coast Guard cutters, hulls 16, 17, 18, 19, for U.S.; Liebre, hull 12, for Gen. Pet. Co.

At Todd's: SS. Edmore.

At Southwestern: SS. Hollywood.

At Long Beach: SS. Mazatlan.

At Moore's: Vacuum, hull 157, for Vacuum Oil Co.; hull 164, for Vacuum Oil Co.; S. C. T. Dodd, hull 160, for Standard Oil Co. of N. J.; M. F. Elliott, hull 161, for Standard Oil Co. of N. J.; Thos. H. Wheeler, hull 162, for Standard Oil Co. of N. J.

For Pacific SS. Co.: Admiral Schley.

UNION GAS ENGINE COMPANY, OAKLAND

Purchasing Agent: E. H. Cole

Doris Crane, hull 390, aux. schr. for Fanning Islands [illegible] Co.; installation gas and kerosene engines as follows: Union gas type 150 IHP propelling; 9 HP Union hoist; 8 HP Union electric light and pump outfit; 5 HP Union refrigerating set.

Drydocking and Repairs

ALBINA ENGINE & MACHINE WORKS, PORTLAND, ORE.

Painting, cleaning, annual inspection and overhaul: Lightship Columbia, lightship tender Rose; U. S. Lighthouse Dept.

B. C. MARINE ENGINEERS & SHIPBUILDERS, LTD., VANCOUVER, CANADA.

Docking, cleaning, painting and repairs: SS Queen City, Kingsley Nav. Co.; SS Capilano, U. S. S. Co.; SS Jessie Mac, L. J. Coyle & Co.; [illegible] scows, Pac. Coast Co.; dredge Max; Dredge No. [illegible], Pac. Coast Co.; tug Beatrice, Capt. Goodwin. Docking and repairs: derrick scow, Grant & MacDonald. Cleaning, painting and repairs: drill boat, Pac. Coast Co. Docking, cleaning and painting: scow, Victoria-Vancouver Stevedoring Co. [illegible] SS Queen City, Kingsley Nav. Co. Repairs to [illegible] SS [illegible]. Repairs to rails: SS [illegible]. Supplying propeller gauges: dredge [illegible]ling, Dept. Public Works. Engine and deck repairs: SS. Tahiti, SS. Waikawa. Siphoning out and standing by scow: Massett Timber Co. Electric welding furnaces: SS. Chilliwack, U. S. S. Co. Deck repairs: SS Grace Dollar, MS. Dollar, MS. Teco. [illegible] steering gear: Empress of Japan. [illegible] tug Faith, Beaver Cove Lbr. Co. [illegible] SS. Chilliwack, U. S. S. Co. [illegible] and deck repairs: SS Cascade. [illegible] for [illegible], falling and splitting wedges, as well as usual run of C. P. R., C. P. O. S., G. T. P., and Union S. S. Co. work.

BARNES & TIBBITTS SHIPBUILDING & DRY DOCK CO., ALAMEDA, CALIF.

General repairs, caulking and new wheel and tail shaft: Str. Willamette, Chas. R. McCormick & Co. Clean, paint and examine shaft: General Frisbie, Monticello S. S. Co. Clean, paint, remove and examine propellers and new blades: Asbury Park, Monticello S. S. Co. Clean, paint, new shaft and propeller: Issaquah, Rodeo Ferry Co. Clean, paint, new propeller: Port Saunders, Cal. Sea Products Co. Clean, paint, minor repairs: Traveller, Hercules, Cal. Sea Products Co.; MS. Sierra, E. K. Wood Lbr. Co. Clean, paint, minor repairs, new wheels: MS. Lassen, E. K. Wood Lbr. Co. Clean, paint, full Diesel installation, 300 H. P. engine: MS. Carolyn Frances, Western Whaling & Trading Co. Caulk and sheath: barge S. O. No. 1, Standard Oil Co.; barge Shell No. 2, Shell Co.

BETHLEHEM SHIPBUILDING CORP'N, LTD.

Potrero Works

Purchasing Agent: O. W. Street

Miscellaneous repairs, drydocking, painting: SS. West Neris; F. S. Loop; bkt. Echo; SS. West Kasson (also install telemotor); sch. Annie Campbell; SS. Pallas; West Carmona; West Caddoa (also install new hand pump); sch. Bertie Minor (also make new mast and gaff); sch. C. S. Holmes; SS. Wallingford; Barge Santa Paula; SS. Hayden; bark General de Sonis; SS. Sylvan Arrow (also damage repairs); Celilo; Cuprum; ship Rene Kerviler; SS. Bradford; Astral (also work in connection with survey); West Iship. Engine and boiler repairs, hull repairs, drydocking, painting: SS. City of Para; Santa Cruz (also damage repairs); West Keene; Newport; Admiral Farragut. Make and install circulating pump: SS. Shabonee. Electric welding on scuppers: SS. West Harts. Make new anchor shackles: SS. Ardmore. Make new 4-inch globe valve: SS. Maui. Alterations to furnace fronts: SS. Makura. Rebrick furnace fronts: stm. sch. Santa Barbara. Make new propeller: SS. Wallingford; Santa Fe tug. Miscellaneous repairs: MS. Peru; SS. Washtanaw; Lavada; barge Olinda; MS. Kern; Two 7-in. x 10 in. winches: SS. San Juan. Miscellaneous repairs, drydocking, painting, engine, boiler, hull repairs: SS. Governor. Engine, boiler, hull and repairs: SS. Marama. Make new tail shafts: SS. Oleum. Caulk decks and overhaul dynamo: stm. yacht Venetia.

Alameda Works

Propeller blades, miscellaneous repairs, drydocking, painting, new propeller, propeller installation: Stm. sch. Henry T. Scott. Make and install hawse pipe: stm. sch. Caspar. Miscellaneous repairs: yacht Viva. Miscellaneous repairs, drydocking, painting: yacht Gloriana; SS. Port Saunders (also electric welding on shaft); S. W. S. Gold; bkt. Aurora; sch. Esther Buhne; stm. sch. Stanwood; stm. sch. Tiverton (also electric welding). New tailshaft: SS. Cricket.

RALPH J. CHANDLER COMPANY, WILMINGTON, CALIF.

Purchasing Agent: G. R. Crofut.

Reconditioning: SS. Harvard, Los Angeles Steamship Co.

CROWLEY LAUNCH & TUGBOAT COMPANY, EAST OAKLAND

Purchasing Agent: John L. Crowley.

Annual overhauling: Grace; str. Violet; following steam tugs of Shipowners & Merchants' Tugboat Co.: Sea Prince, Sea Queen, Sea Lark, Sea Fox, Sea Witch, Restless, Reliance, Eleu; Palladini tugs Iolanda and Henrietta; Crowley No. 9.

LOS ANGELES SHIPBUILDING & DRYDOCK CO., SAN PEDRO, CALIF.

Cleaning, painting, minor repairs: SS. Avalon, Wilmington Trans. Co.; stm. yacht Vaquero, Vail & Co.; Submarine L-8, U. S. Navy; Wastenaw, Union Oil Co.; San Pasqual, Culberson, Emergency Fleet Corp. Clean, replace sheathing: barge Van Camp Cannery. Clean, paint, temporary repairs to bottom: Progresso, Mexican government. Clean, paint, renew bottom, general overhaul: West Eldara, Emergency Fleet Corp.

MOORE SHIPBUILDING COMPANY, OAKLAND, CALIF.

Purchasing Agent: M. G. Waites.

Drydocking, cleaning, painting, miscellaneous repairs: str. West Katan; Orani; Jeptha; C. R. Wilson; Mursa; Siskiyou; South Coast; barge King No. 1; tug W. C. F. No. 1; stm. schr. Wilmington; motorboat Cycol; barge Theobald. Drydocking, cleaning, painting, hull and engine repairs: str. West Niger; Joan of Arc; barge California; barge Hawaiian; str. Point Adams; Haleakala; West Camak; Invincible; Lyman Stewart; Iris; Arakan; Heber; barge King No. 2; barge King No. 3; str. Crockett; tug Biddle; tug Christopher Columbus; tug Pedro Costa; str. San Antonio; San Mateo; Santa Alicia; Lavada; Asuncion; West Eldara; W. S. Porter; Los Vegas; Miskianza; West Cahokia; Janelew; San Juan.

NAVY YARD, MARE ISLAND

Repairs to a large number of naval vessels.

NAVY YARD, PUGET SOUND

Cleaning, painting bottom, miscellaneous repairs: U. S. S. Missoula; Seattle; destroyers Dent, Dorsey, Waters; mine planter Swallow; mine sweeper Ortolan; tug Challange. Miscellaneous repairs: battleships Mississippi, Texas; cruiser Charleston; armored cruiser Charlotte; destroyers Rathburne, Talbot, Roper, Edwards, S. C. 310; fuel ships Neptune, Vulcan; prison ship Philadelphia; destroyer tender Prairie; cargo ship Houston; radio repair ship Saturn; patrol boat Eagle No. 57; tugs Challenge, Iroquois, Mahopac, Pawtucket, Tatnuck, Sotoyomo.

SOUTHWESTERN SHIPBUILDING COMPANY, EAST SAN PEDRO

Purchasing Agent: J. J. Wilson.

General repairs: SS. Quabbin; Derblay (also refrigerator); West Camak; West Canon; Satanta, Uncas, S. O. Co.; West Hika. Repair feed pumps and feed heaters: West Kadron. Main steam pipe: sch. Multnomah.

W. F. STONE & SON, OAKLAND

Purchasing Officer: Lester F. Stone.

Miscellaneous alterations and repairs necessary for cattle trade in Hawaiian Islands: Hawaii Meat Co.'s steamer Bee. General overhauling: submarine chaser No. 297. Miscellaneous repairs: Union Fish Co.'s Golden State.

UNION GAS ENGINE COMPANY, OAKLAND

Purchasing Agent: E. H. Cole.

Installation of 85 HP, 4 cyl. Union kerosene engine in Tagua, Atkins, Kroll & Co.

Overhauling gas engines in ex-subchaser No. 29, E. S. Hough.

Installation of kerosene-burning equipment on Union gas engine, Golden State, Union Fish Co.

UNITED ENGINEERING WORKS, SAN FRANCISCO

New deck, new deck houses, sails, two new masts, new bulwarks, new cylinder for engines, and general overhauling of machinery: MS. Annie Johnson, Matson Nav. Co. Rebuilt topsides: str. Centralia. Three new cylinders (steam): str. Willie A. Higgins. General repairs: str. Hayden, Paraiso.

In Pacific Coast Yards

Three for Standard

Reports that the Bethlehem Shipbuilding Corporation, Alameda Works, had closed a contract with the Standard Oil Company of California for the construction of three 15,000-ton tankers, have been confirmed. The keels will be laid at two-week intervals beginning January 5, according to estimates; with launchings at the same intervals beginning May 15, and deliveries August 15, September 1 and September 15. The vessels will be of 500 feet between perpendiculars; 69 in beam; 25-11 loaded draft; have 11 knots' loaded speed; and will be equipped with reciprocating engines and three Scotch marine boilers.

Contracts Rumored

Other reports that still lack direct confirmation assign a good bit of new construction to Pacific Coast yards. The Norway-Pacific Company, Everett, Washington, is represented as having obtained a contract with unnamed Norwegian or Mexican interests for the construction of six 12,000-ton tankers, deliveries to begin in August, 1921, and to continue into 1922. The Prince Rupert Shipbuilding & Drydock Company, according to reports, has a contract for five 5000-ton tankers for the interests variously represented as French, Mexican and South American; and still other contracts on behalf of the Mexican government are being discussed, thirty-seven and fifty-three vessels being variously given as the total number to be placed by Newman Erb, all with Canadian builders. Reports from Prince Rupert state, however, that the company has suspended construction of two 8800 ton freighters for the Canadian government and that the government probably will step in and complete them.

Todd Lays Keel

The Todd Drydock & Construction Corporation, Tacoma, has laid the keel of a 6500-ton motorship for the Alaska Steamship Company, delivery of which will be made in the spring. She will be driven by McIntosh & Seymour Diesels. The Todd Drydocks, Seattle, have completed the conversion of the Japanese-built steamer Eastern Sword from a coal-burner to an oil-burner.

At the Moore Yard

Moore Shipbuilding Company's hull 160, the tanker S. C. T. Dodd, being built for the Standard Oil Company of New Jersey, was launched October 16 and was christened by Mrs. Frederick G. Dodd, daughter-in-law of the former counsel of the Standard Oil, for whom the vessel was named. She was followed by the M. F. Elliott, hull 161, also for the Standard Oil Company of New Jersey, which was launched November 13. The Elliott probably will be delivered in January. Hull 2236, the freighter Mursa, built for the Shipping Board, was delivered October 15, and hull 2235, the freighter Janelew, October 30. Two more cargo vessels for the Shipping Board remain under construction at the Moore yard, hulls 2237 and 2238, the Narbo and the Narcissus, both of which are scheduled for late November or early December delivery. Names of the two 14,000-ton Matson freighters have been assigned as Manulani and Manukai, both Hawaiian words, and, following the Matson policy of naming vessels, both have the initial letter M.

In Hanlon Yard

Following upon the delivery of the 5350-ton freighter Medon, built by the Hanlon Drydock & Shipbuilding Company for the Shipping Board, one other sister ship, the Memnon, remains. The Memnon probably will be delivered in January.

D. J. Hanlon, president of the Hanlon Drydock & Shipbuilding Company, Oakland, has libeled the Dutch steamship Arakan for $250,000 for work done in pulling her from the sand at Point Reyes, where she stranded in August.

90 Per Cent Complete

Hull 19, J. Coughlan & Sons, Victoria, an 8800-ton freighter laid down for the firm's account, was launched October 28 and christened City of Victoria. Delivery was scheduled for late November. At time of launching, the City of Victoria was about 90 per cent complete, having engines and boilers in, superstructure finished and painted and boats slung from her davits.

Standifer Launches

The G. M. Standifer Construction Corporation, Vancouver, Washington, has launched the tanker John Worthington, the first of five 12,000-ton steel vessels being built for the Standard Oil Company of New Jersey. She was christened by Mrs. W. T. Johnson, daughter of Mr. Worthington. The John Worthington is the largest vessel to be launched on the Willamette or Columbia river.

Los Angeles Progress

Another Shipping Board freighter has been launched by the Los Angeles Shipbuilding & Drydock Company, which sent the 8800-ton West Cusseta into the water November 10, and laid the keel of the 11,000-tonner West Greylock the same day.

To Build Ferries

Three ferryboats of the type used by the Key Route, San Francisco Bay, will be constructed by the Six-Minute Ferry Company, recently granted privileges in San Francisco and Oakland, according to an announcement by officials of the company. The company's capitalization is $3,000,000.

Articles of incorporation have been filed by the Golden Gate Ferry Company, which plans to operate vessels between San Francisco and Sausalito. Two ferryboats probably will be constructed.

A propeller ferryboat for the Rodeo-Vallejo Ferry Company, named the Aven J. Hanford, was delivered by the James Robertson Shipyard November 15. She is 170 feet between perpendiculars; has a beam of 31 feet and a loaded speed of 13 knots. Another ferry is building at the Robertson Shipyard, this being for the Richmond - San Rafael Ferry Company. Her keel was laid November 15. She will be larger than the Aven J. Hanford, 190 feet between perpendiculars as compared with 170, and 34 in beam as compared with 31, but will have a loaded speed of 10 knots as against 13.

Bethlehem Deliveries

During November the Potrero Works of the Bethlehem corporation delivered the 11,800-ton freighter Hannawa to the Shipping Board; the tanker William H. Doheny to the Pan-American Petroleum Transportation Company; the tanker Algonquin to the Standard Transportation Company of Delaware; and expected also to deliver the tanker Franklin K. Lane to the Pan-American. The Pan-American tanker Crampton Anderson probably will be delivered about January 1. The tanker Hammac for the Shipping Board will be built at the Potrero Works instead of at Alameda. Her keel probably will be laid December 1. A tanker for the Associated Oil Company, heretofore unnamed, will be christened Frank G. Drum. Her keel was laid November 5. Bethlehem, Potrero Works, also has delivered destroyers Woodbury and S. P. Lee and submarine S-30 to the United States Navy.

Union Construction Work

The motorship Charlie Watson, built by the Union Construction Company for the Standard Oil Company of California, had her trial run in November and was delivered in the same month. She was designed for a speed of 11 knots, loaded, and the trial was successful. Early in December the 10,200-ton tanker Liebre, hull 12, will be launched, with delivery probably in January. Hull 14, the tanker R. J. Hanna, Standard Oil of California, probably will be launched early in January and delivered in February; and hulls 16 and 17, cutters for the Coast Guard, both of which are building on the same slip, will be launched about the middle of January and delivered the middle of February. Immediately after the launching of hulls 16 and 17 the keels of hulls 18 and 19, Coast Guard cutters, will be laid.

Two for Hart-Wood

Two vessels for the Hart-Wood Lumber Company are being built by G. F. Matthews, Portland. Hull 1, the steam schooner Quinault, was launched November 10, and probably will be delivered January 1; she is 210 L. B. P.; 43 beam; will have a speed loaded of 9 knots and will carry 1500 tons deadweight. The second vessel is hull 2, the five-masted schooner Undaunted, which will be launched early in the year.

Pontoon for Portland

A pontoon for the Portland Dock Commission is being built by the Albina Engine & Machine Works of Portland. Two sections have been completed; two are about 45 per cent completed, to be launched the end of November; and one section remains to lay down.

Fanning Schooner Done

W. F. Stone & Son, Oakland, expect to deliver the auxiliary schooner Doris Crane in late November, soon after the launching, set for November 23. The Doris Crane is being built for the Fanning Island copra plantation. Her Union engines will burn either gasoline or kerosene.

Coal Barge Launched

A 900-ton steel barge, the second of two built by the J. G. Williams Construction Company for the Standard Coal Company, San Francisco, was launched November 6.

Last for U. S. S. B.

The Long Beach Shipbuilding Company launched the 8800-ton Shipping Board freighter West Kebar October 29. She was the last of eight vessels built by the Long Beach company for the government. She was more than 85 per cent completed at the time of the launching, and delivery is expected about the middle of December.

Skandia Diesels Tested

The first test of Werkspoor Diesel engines, being built by the Skandia Pacific Oil Engine Company for the Shipping Board, was held in November. Ten of these engines, each of 850 brake horsepower, are under construction, in addition to two of the same size for the Standard Oil of California tanker F. H. Hillman, which have been delivered. The ten Shipping Board engines are for sale.

Mary Luckenbach Launched

The 8450-ton tanker Mary Luckenbach, being built by the Southwestern Shipbuilding Company, Los Angeles, for the Luckenbach Terminals, was launched November 1. She was christened by Mrs. A. P. Hammond, wife of the Pacific Coast manager of the Luckenbach Line.

Navy Yard Building

The naval repair ship Medusa, being built at the Puget Sound Navy Yard, was 30 per cent complete November 1. The ammunition-carrier Nitro, a sister to the Pyro, which was delivered in August, was 95 per cent complete November 1, but no date has been set for delivery.

Work at Hongkong

According to the shipbuilding and engineering returns of the Hongkong & Whampoa Dock Company, Hongkong, for 1920, work on hand in October aggregated 37,935 gross tons of shipping and 27,500 indicated horsepower of engines. The two-deck, three-island steel freighter Stathis, 5138 gross, 3100 net, has been built and engined by the dock company. Her home port is Piraeus, Greece. Another engine of 3100 horsepower was built for the steamship Trialos, and one of 1200 horsepower for the tug St. Broeck. Work on hand was: steel twin-screw tug, 165x34x17, 675 gross, 1700 I.H.P., coal or oil; two steel single-screw cargo steamers, 400x52x31, 5205 gross, 3100 I.H.P.; four steel single-screw oil-tankers, 412x53x31, 5600 gross, 3100 I.H.P.; one steel twin-screw river steamer, 350x48-6x25-6, 4350 gross, 3600 I.H.P.; sundry small tonnage, steam launches.

ferries, motor launches, totaling approximately 100 gross tons.

Engines under construction were: two sets triple-expansion, 1700 I.H.P., for tug; two sets triple-expansion, 3100 each, for two cargo steamers; two sets of four-crank triple-expansion, 3600, for river steamer; four sets triple-expansion, 3100 each, for four oil-tankers.

A number of vessels, lighters, etc., have been reconstructed. The Hongkong & Whampoa Company raised during the year the spar-deck steamship Dagmar, which had been sunk more than eight years ago.

Equipment for Sale

The Ames Shipbuilding & Drydock Company, Seattle, advertised for sale all the remaining buildings, machinery, equipment and improvements of the plant, bids to be received until November 26.

Casco in Service

The motorship Casco, built by the Long Beach Shipbuilding Company, Long Beach, California, for the California & Mexico Steamship Company, has been placed in the West Coast trade with the steamship Mazatlan. Light-draft vessels are needed for this service, and the Casco answers this requirement. She is 118 ft. 8 ins. between perpendiculars; 24 feet molded beam; 12 feet molded depth; carries 400 tons deadweight and 272 barrels of fuel oil, and has accommodations for sixteen passengers. Her propelling machinery consists of two 100 B. H. P. C-O Fairbanks-Morse engines; a kerosene engine supplies auxiliary power for an air-compressor and a fire and bilge pump; and the deck machinery is a direct-connected combined anchor windlass and winch for No. 1 hold a silent hoist winch for No. 2.

U. S. S. B. Construction

Vessels under construction for the Shipping Board in Pacific Coast shipyards November 1 aggregated twenty-six of 248,700 deadweight tons, as compared with thirty-two of 316,750 tons October 1. All the new work is going forward in California yards, Washington and Oregon having finished their construction several months ago. Twenty-five of the vessels were steel, the other, the Peralta, a 7500-ton tanker, being the last of four concrete ships. More than half of the aggregate tonnage and considerably more than half the number of vessels were freighters, the figures being: freighters 19, aggregate deadweight 180,900; tankers 7, aggregate deadweight 67,800. Shipping Board freighters comprise virtually all the cargo construction on the Pacific Coast, Canada excepted, inasmuch as the two 14,000-ton carriers of the Matson Navigation Company, building at the Moore Shipbuilding Company's yard, Oakland, are the only important freighters for private account.

In the following list, showing construction by yards November 1, T indicates tanker and C cargo vessel; the tonnage figures are in deadweight, and the dates are those of actual or probable delivery:

Bethelehem Shipbuilding Corporation, San Francisco — Hambro, T, 10,100, April; Hamer, T, 10,100, May; Hammac, T, 10,100, June; Hanley, C, 11,800, December; Hannawa, C, 11,800, November.

Moore Shipbuilding Company, Oakland —Narbo, C, 9400, November; Narcissus, C, 9400, November; West Bohemian, T, 10,000, June; West Tustem, T, 10,000, June; West Lubrico, T, 10,000, July. (Names of the three tankers were assigned recently.)

Hanlon Drydock & Shipbuilding Company, Oakland—Medon, C, 5350, November; Memnon, C, 5350, January.

Pacific Coast Shipbuilding Company, Bay Point—Cuprum, C, 9400, November; Namasket, C, 9400, January; Meanticut, C, 9400, March; Nashaba, C, 9400, June. (Nashaba heretofore has been listed as "delivery doubtful; construction discontinued.")

Long Beach Shipbuilding Company, Long Beach—West Kebar, C, 8800, December.

Los Angeles Shipbuilding & Drydock Company, San Pedro—West Honaker, C, 8800, November; West Cusseta, C, 8800, January; West O'Rowa, C, 8800, February; West Lewark, C, 11,000, May; West Faralon, C, 11,000, June; West Greylock, C, 11,000, August; West Prospect, C, 11,000, September; West Chopaka, C, 11,000, November, 1921.

San Francisco Shipbuilding Company, Oakland — Peralta, concrete tanker, 7500, January.

Construction therefore will continue for about a year, the last vessel of the Los Angeles Shipbuilding & Drydock Company not being scheduled for delivery until November, 1921. That company is building by far the greatest portion of Shipping Board tonnage, having eight vessels of an aggregate of 81,400 deadweight tons.

New Building Ventures

The Seacraft Corporation of California has taken over the plant of the Marine Equipment Company, Wilmington, with a view to building pleasure craft. To the four ways of the old yards will be added new ways and other equipment. Since the war, said William LaPlante, secretary, the demand for craft of the type to be built by the Seacraft Corporation has increased 400 per cent, so that new construction and also repair work are anticipated in large volume. Officials of the new corporation are: E. A. Featherstone, president; Dustin Farnum, first vice-president; Thomas H. Ince, second vice-president; William LaPlante, secretary and counsel; Marco H. Hellman, treasurer; R. R. Thomas, assistant secretary; Hal E. Roach, assistant treasurer. The board of directors consists of E. A. Featherstone, Dustin Farnum, Marco H. Hellman, Harry Keefe and J. A. Talbot. C. D. Callahan will be works superintendent. Capitalization of the company is $250,000.

The B. C. Marine, Limited, has announced the transference of its business to a new company known as the B. C. Marine Engineers & Shipbuilders, Limited, which on November 1 assumed all engagements of the B. C. Marine, Limited. The new company is under the same management as the B. C. Marine, Limited.

Leased by the new Elliott Bay Marine Construction Company, with option of purchase, the south half of the Duwamish Waterway plant of the Elliott Bay Shipbuilding Company, Seattle, has resumed operations as a repair yard. A new marine railway of three tracks, capable of handling vessels up to 800 tons, has been built in No. 1 slip. Two smaller railways, each of 150 tons, are being laid down in No. 2 slip; No. 4 will become a marine railway for storing vessels; and No. 3 will be used for other purposes.

Matson Alterations

Extensive repairs and alterations will be made to the Matson steamship Enterprise. Her old compound engine, which was "steepled" to a triple-expansion, will be changed for a new triple-expansion engine, purchased of the Shipping Board; and her passenger accommodations will be rebuilt and improved. All cabins will be enlarged, as will the dining saloon, which will run the full breadth of the vessel, and will be fitted with small tables. Four rooms on the main deck will be fitted with beds. The galley and pantry also will be changed. Approximately two months will be required for the work, after which the Enterprise will be replaced in service to fill the requirements of the service.

A contract has been awarded by the Matson company to the United Engineering Company for extensive repairs to the motor schooner Annie Johnson. Her propellers, driven by Bolinder engines, will be replaced and the vessel again will have auxiliary power. Due to what the Matson company regarded as attempted domination by the engineers, the propellers had been removed and the vessel was used altogether as a sailer. Other work will include laying new decks, fitting new masts, deckhouse and bulwarks and removing the old mahogany figurehead, the whole costing between $45,000 and $50,000.

Employes Given Shares

Many new shareholders have been added to the lists of the Todd Shipyards Corporation as a result of the action of William H. Todd, president, in giving shares of stock as follows: one share to every man employed in a yard from January 1, 1920, to July 15, 1920, if applied for before September 20, 1920; the share to become the property of the employe upon the completion of five years' service on January 1, 1925. In the Tacoma yard 1020 employes qualified for the award. The Tacoma yard has organized the Todd Relief Association to give assistance to workmen in need, the funds to be raised by entertainments, etc.

To Decrease Injuries

Public hearings were held during November by the Industrial Accident Commission of California on shipyard safety standards. During 1918 the following was the casualty list: Deaths, 59; permanent injuries, 262; temporary injuries, 8506. Of these, 48 deaths, 233 permanent injuries and 7152 temporary injuries were listed under "boat building, iron or steel, where staging or scaffolding is used, not otherwise classified (including ship and yard work)." The 1919 list was: Deaths, 38; permanent injuries, 213; temporary injuries, 5144. Much of the apparent reduction was due to a new system of classification, under which injuries that do not cause loss of working time are omitted.

Pneumatic Steering Gear

Peter A. Johnson, maintenance work foreman of the G. M. Standifer Construction Corporation, Vancouver, Washington, has invented a pneumatic steering gear, which was tried out on the river steamer Henderson November 11. A party headed by Captain John K. Bulger, supervising inspector of Steamboat Inspection Service, and A. H. Bryant of the American Bureau of Shipping, witnessed the tests. The gear consists of air compressor, pipe lines and steel cylinders connected with a transverse arm fixed to the rudder stock. A small hand lever in the pilot house admits compressed air to the cylinders, both of which are involved, the air being applied to the front of one piston and to the back of the other at the same time. At full speed ahead the Henderson's rudder was moved from hard aport to hard astarboard in nine seconds. The Johnson - Fries Marine Construction Company has been formed to market the device.

To Arbitrate Claims

Frank E. Burns and Frank Walker of Seattle have been appointed two members of an arbitration committee of three to settle claims for extras of $470,000, made against the Australian government by the Patterson-McDonald Shipbuilding Company. The shipbuilding company, now bankrupt, had a contract for five wooden motorships and five wooden steamships, all of which except one were delivered. That one, the Borrika, still is on the ways, in skeleton form.

Heavy Lifts by Barge

An interesting lifting job was recently performed by the Crowley derrick barge No. 53, when a 48-ton triple-expansion engine cylinder was lifted from the midship hatch of the steamship Point Adams. This heavy piece of equipment was consigned to to the Bethlehem Shipbuilding Company from manufacturers in Boston, and the ease and rapidity with which the handling was done demonstrates how well equipped the Port of San Francisco is to handle heavy, bulky pieces on the water front. Another example of the usefulness of the Crowley derrick barge may be seen in a recent piece of work at Petaluma, when Captain J. Martin Sivertson, in charge of the Crowley equipment, lifted the steamship Gold bodily from her slip, out of the water and moved her down the canal to a point where the ship was lowered to the beach. The Gold recently caught fire and was scuttled in her slip at Petaluma, and it was decided to save her machinery, boilers and other equipment, and to clear the stream for navigation.

By Isherwood System

Without exception, the twenty vessels built or being built by the G. M. Standifer Construction Corporation, Vancouver, Washington, beginning with the Cokesit and ending with hull 20, the tanker Albertolite, have been framed after the Isherwood system. The other Isherwood vessels built by the Standifer yard have been: Coaxet, Waban, Wawalona, Nishmaha, Olockson, Montague, Abercos, Pawlet, Bearport, Arcturus, Aquarius, Argus, Antinous, Apus, John Worthington, W. H. Libby, Livingstone Roe and Calgarolite. All were freighters except for the five vessels, John Worthington to Albertolite, inclusive, which are tankers still under construction. With the exception of destroyers for the Navy and three small freighters, all vessels built at the Potrero and Alameda works of the Bethlehem Shipbuilding Corporation since 1911 have been Isherwood-framed.

With Atlantic Shipbuilders

Staten Island Work

The Staten Island Shipbuilding Company has secured several large jobs that will furnish considerable work for its yard. One contract is for the installation of eight compound engines, sizes 16x32x24, in four ships of the Mexican Petroleum Company, which were propelled formerly by electricity. The engines will be built by the Staten Island Shipbuilding Company. The contract calls for the first engine to be installed in February, 1921, and an installation to be effected every month thereafter. At the same time two new boilers are to go on one of these ships. The company is proceeding with the conversion of two bulk freight carriers, Twilight and Sunlight, belonging to the Standard Oil Company of New Jersey, by installing two longitudinal bulkheads and five athwart bulkheads in each ship, says the bulletin of the Atlantic Coast Shipbuilders' Association.

Old North State Trial

Old North State, the second of a series of seven ocean liners being built by the New York Shipbuilding Company, made its trial trip down the Delaware River October 19, with a distinguished passenger list. More than 20,000 persons visited the shipyards to inspect the vessel. Built for the United States Shipping Board, the liner has a gross tonnage of 10,533 tons, a deadweight displacement of 13,100 tons and a service speed of fourteen knots, and is more than 522 feet long. No art of the interior decorator has been spared on the vessel. With its white mahogany finish, soft tinted, artistic hangings, its open fireplaces and comfortable wicker furniture, the interior presents the aspect of a clubhouse rather than a ship.

Maine Sets Record

The Texas Steamship Company, Bath, Maine, launched October 30 the tank steamship Reaper, the largest commercial ship ever built in Maine. The Reaper is 430 feet long, 56 feet beam, 32 feet 9 inches deep, and will carry over 3,000,000 gallons of oil. This is the fifth large ship launched at this yard during 1920. The vessel was sponsored by Mrs. L. H. Lapham, New York City.

Two Refrigerator Ships

On October 14 the Moore Plant of the Bethlehem Shipbuilding Corporation launched the steamship Itorore, the first of two steel refrigerating ships building for the International Products Steamship Company, a subsidiary of the International Products Company. The vessels are 250 feet long, 8 feet 6 inches draft and 1400 deadweight tons capacity, propelled by two sets of triple-expansion reciprocating engines of 400 horsepower each. The ships are the first of their type to be built in the United States and will be operated between the River Plate and the packing houses of the Company in Paraguay.

Electric Drive Used

Contracts have been placed by the Shipping Board with the General Electric Company for ten sets of motors and generators, which will be installed in cargo vessels, making them electric-drive. The first vessel so equipped, the Eclipse, had her trial October 19.

Surveyors Appointed

Surveyors of the American Bureau of Shipping have been appointed for Havana, Rio de Janeiro, San Juan, Antwerp and Havre, in pursuance of the policy of having direct and exclusive representation where conditions justify. Where not represented by its own surveyors, the bureau has the services of the British Corporation, Registro Navale Italiano and the Imperial Japanese Marine Corporation.

Launching by Sun

The second October launching at the Sun shipyard took place when the 16,600 ton steel tanker W. J. Hanna was sent into the river. The sponsor was Miss Kathryn Hanna, of New York, and members of her party included officials of the Standard Oil Company and the Sun Shipbuilding Company.

Last Destroyer

The last of the fleet of thirty torpedo boat destroyers contracted for by the United States Navy to be built by the New York Shipbuilding Corporation, Camden, was launched October 28, when the destroyer Barry, named after Commander John Barry, left the ways fully completed. The Barry is 314 feet 4 inches in length and has a beam of 30 feet 11 inches, and depth of 9 feet 4 inches. She will burn oil for fuel and will make 35 knots.

535 at New York Yard

The government liner Hoosier State was launched at the south yard of the New York shipyard October 22. She is the third ship of a series of seven being built for the United States Shipping Board by the New York Shipbuilding Corporation; is a sister ship of the Keystone State and Empire State, launched at the South Yard, and also of the American Legion, Wenatchee and Sea Girt, launched at the North Yard. She will make 17 knots, is 535 feet in length, has a beam of 72 feet, depth of 30 feet 6 inches, and a deadweight tonnage of 12,250, and will burn oil for fuel.

Emergency Aid Launched

In the presence of eleven officers of the Emergency Aid of Pennsylvania, the 8000-ton cargo ship, the Emergency Aid, which was named after the organization, was launched October 21 at the Harriman Yard of the Merchant Shipbuilding Corporation.

Todd Builds Fruiter

The fruit steamer Oratani, built by the Todd Shipyards Corporation for the Oriental Navigation Company, was launched November 6 by the Tebo Yacht Basin Company, Brooklyn. She is a vessel of 12,000 tons deadweight, 227 feet long, 33 feet broad and 16 deep, and is equipped with the Todd mechanical oil-burning system.

11 Transports Building

The Shipping Board is building eleven transports for the War Department at an expense of $80,000,000, upon which only $39,000,000 has been paid. A number of tankers are also being built for the Navy, and [illegible] board also is engaged in the construction of twenty-six combination cargo and passenger vessels, which will cost $138,000,000. It is estimated that the board will spend $200,000,000 this year, the payment of which must be adjusted by the next Congress.

In Bethlehem Plants

The China Arrow is the first of four bulk oil steamers to be constructed for the Standard Transportation Company of New York at the Fore River Plant of the Bethlehem Shipbuilding Corporation, and embodies the highest grade of material and workmanship that the shipbuilding world has thus far produced in this type of ship. The China Arrow is 485 feet long, 62 feet 6 inches beam, 39 feet 6 inches deep and about 27 feet draft, with triple-expansion, four-cylinder, direct acting reciprocating engine, surface-condensing type, having one high-pressure cylinder 24 inches diameter, one first intermediate cylinder 35 inches diameter, one second intermediate cylinder 51 inches diameter, and one low pressure cylinder 75 inches diameter, all with a common stroke of 51 inches. There are three Scotch boilers 15 feet 3 inches diameter, 11 feet 6 inches length, with 220-pound pressure. The ship is of the shelter type, built on the Isherwood system with straight stem and elliptical stern, bridge houses amidships and aft around the engine and boiler casings. There are three steel pole masts and ten double main cargo tanks with a combined capacity of 3,665,700 United States gallons.

Record progress is being made by the Bethlehem Shipbuilding Corporation (Sparrows Point) on the assembling of Hulls 4208 and 4209, which are the 8400-ton tankers contracted for by the Lux Navigation Company of London.

The Bethlehem Shipbuilding Corporation has announced that its Sparrows Point plant will build two 20,000-ton combination oil and ore carriers in addition to the two vessels of the same type announced some time ago. The total cost of the new contract will be approximately $10,000,000. It is contemplated that with the five large vessels to be built for the United States Shipping Board of a passenger type, together with the contracts referred to above and other work, the Sparrows Point shipyard will be busy well into the year 1922.

The combination ore and oil carriers will be driven by the new Bethlehem type of Diesel engine. These engines will be similar to those propelling the motorship Cubore, recently finished at the Fore River Plant of the Bethlehem Shipbuilding Corporation, but will have twin-screw installation, giving double the horsepower of the Cubore.

Aircraft Tender

The U. S. S. Wright, built at Hog Island, has completed her trial run. In the navy register she will appear as a naval aircraft tender, which means a mother-ship to a fleet of seaplanes and observation balloons. She has machine and carpenter shops; carries 250 expert mechanics, and has room in the stern for inflating and carrying large observation balloons.

Motorship for A.-H.

The steamship George E. Weed, an 8800-ton freighter, launched September 30 by the Merchant Shipbuilding Corporation, had her dock trial October 15 and trial trip October 19. Following the last launching of a Shipping Board vessel in November, the yard will lay the keel of an 11,000-ton deadweight Diesel freighter for the American-Hawaiian Line.

Tankers for British

The 9600-ton cargo steamship Syros, launched September 18 by the George A. Fuller Company (Carolina Shipyard), completed her trial October 28. This vessel ended the contract held by the yard with the Emergency Fleet Corporation. The two 9200 deadweight tankers, building for a British concern for delivery in January and February, 1921, are well ahead of their schedules, thanks to the splendid working weather that this section has enjoyed and the entire absence of labor troubles. So far the rate of work required for these delivery dates has been maintained with only a small extra shift.

Three for S. P.

El Estero, the first of three sister ships built by the Downey yard for the Southern Pacific Atlantic Steamship Line, has been delivered; El Isleo, a sister, was launched October 7; and El Lago was launched later. The vessels are of the following dimensions: length over all, 352 feet; length, forward side of stem to after side of rudder post, 334 feet; beam, moulded, 47 feet; depth, molded to hurricane deck, 32 feet 6 inches; depth molded to main deck, 27 feet 10 inches; mean draft, loaded in salt water, 23 feet; deadweight capacity in long tons, 5250; horsepower, 2500; speed, 12 knots. These three vessels have all been constructed in accordance with the requirements of the American Bureau of Shipping.

Protest Navy Yard Work

Several members of the Atlantic Coast Shipbuilders' Association have reported that the Emergency Fleet Corporation is using the facilities of the navy yards to repair its own ships in competition with the private repair yards. A protest will be made to the Shipping Board and Navy Department directing their attention to the provision that navy yard facilities are open for merchant ships only in the event that private local facilities are unavailable.

At Newport News

The operative departments of the Newport News Shipbuilding and Dry Dock Company are showing an excellent percentage of attendance at work, as witness the following table: yard tugs, 97.4; power house, 96.9; foundry, 95.6; patternmakers, 94.8; storekeepers, porters, 95.6; coppersmiths, 94.1; erecting, 94.0; lumber, 93.8; transportation, 93.4; sheet iron, 93.4; plumbers, 93.4; iron machinists, 93.3; boilermakers, 93.3; hull fitting and plant, 93.2; teamsters, 92.9; civil engineers, 92.9; auxiliary machinists, 92.4; machinists, brass, 92.3; joiners, 92.2; blacksmiths, 92.1; fitters, 92.1; welding, 92.8; ship shed, 91.7; watchmen, 91.5; steam engineers, 91.4; electrical, 91.2; yard riggers, 91.2; toolmakers, 90.9; anglesmiths, 90.1; painters, 90.0; drillers, 88.3; yard labor, 85.8; riveters, 85.6; ship riggers, 85.2; ship carpenters, 83.9.

Port Improvement Work

Vancouver's Great Pier

A report from Consul Frederick M. Ryder, Vancouver, B. C., says: Although no formal announcement has been made it is generally understood that the contract for the steel and concrete work on the proposed Ballantyne Pier on Burrard Inlet, Vancouver Harbor, has been let at a figure in the neighborhood of $4,500,000. Accepted specifications indicate that the pier will be equal in construction and equipment to any on the continent and will cost practically $3,000,000 without the sheds. The cost of the sheds may reach another $2,000,000, and the equipment is estimated at $200,000 to $300,000. In addition are the excavation and fill, already commenced, calling for an expenditure of some $600,000 or $700,000. Work on the steel and concrete construction can commence long before the excavation and fill are completed.

This pier, which probably will be completed within two years, is to be 1206 feet long and 341 feet wide, with double tracks at the outer sides of the pier and four tracks through the center. The two-story sheds, four in number, are to be 500 feet long by 110 feet wide. The entire structure is to be of reinforced concrete, built upon 7-foot cylindrical columns, which will be sunk to rock-bottom, in three rows around the entire pier.

Customs offices will be located at the entrance to the pier, inside the first shed. Only the latest improved handling devices will be used, such as unloading cranes, cargo chutes, elevators, and escalators. All the doors and sash will be of steel, and wire-ribbed glass will be used for all windows. The pier will be 35 feet in height at the land end, and 45 feet high at the extreme end. These figures refer to the height of the pier at low tide, the average rise and fall being 13 feet. The pier will have ample dockage, storage space, and equipment to load or discharge four large vessels at one time.

Washington Improvements

A proposal has been made by the Pacific Steamship Company to the Shipping Board that Skinner & Eddy yard No. 2, comprising 26 acres, be converted into an ocean terminal at a cost of probably $6,000,000, the completed plant to be purchased by the shipping corporation. Plans as tentatively proposed call for the construction of three 1000-foot piers and a concrete and steel warehouse ten stories high in the center and five stories high on the sides, the warehouse and pier sheds to have a total capacity of 325,000 tons of cargo. Twelve ocean-going vessels could be berthed at one time. Two years would be required to complete the work, and the Shipping Board would be reimbursed by the Pacific Steamship Company on the deferred payments plan. According to latest reports from Seattle, the project has been taken under advisement by the board.

A bill has been prepared by counsel for the Port District of Seattle for introduction in the Legislature of Washington to permit the transfer of the Duwamish Waterway improvement from Commercial Waterway District No. 1 to the Port District of Seattle. Federal appropriations for the waterway are being sought, in support of which Seattle cites that the cost of improvements has been in excess of $2,000,000, all of which has been paid by the South End except for $650,000 appropriated by the city; the whole expenditure of Seattle for harbor work being $6,000,000 as against $80,000 given by the United States. Pier 10 and a four-story warehouse at Seattle have been sold by the Holdens to the United Warehouse Company for $250,000.

Navy Yard Plans

At the inspection of the Puget Sound Navy Yard at Bremerton by the joint congressional committee on naval affairs, Rear Admiral Robert E. Coontz, chief of operations, and Rear Admiral H. A. Field, commandant, pointed out the following needs of the yard: extensions of 700 feet to Piers 4 and 5; one new industrial pier; one fitting-out pier large enough to accommodate a dreadnought on each side and equipped with heavy machinery; one 1000-foot drydock; extensions to the woodworking shop; a marine railway for docking light vessels.

Work has been begun by L. C. Gillespie & Sons on a 500,000-gallon oil tank at Tacoma. The tank will be used to store Chinese nut oil. The St. Paul & Tacoma Lumber Company will extend its dock facilities at Tacoma, according to Everett G. Griggs, president. Water alongside the piers will be deepened and electric cranes will be installed.

Tentative plans are being drawn by the Grays Harbor port commission for a 22-inch electric dredge, which will be built if construction would be cheaper than purchase. The estimated cost is $250,000.

In Oregon Harbors

Despite a vigorous campaign in its behalf, a proposal to consolidate the Port of Portland and the city commission of public docks was defeated at the November general election. Proponents of consolidation urged that a satisfactory river channel, ample harbor and dock facilities, proper railroad terminal facilities and rail and water interchange of freight demanded coordination. Portland, the Port of Portland district and Multnomah county favored the consolidation, but the outside counties opposed the measure in sufficient strength to defeat it. A bill looking toward the same ends as the defeated measure probably will be introduced in the legislature.

Bids Are Rejected

All bids for the construction of the outer half of Pier 2, Municipal Terminal 4, Portland, were rejected after the successful bidders, Stebbinger Brothers, had pleaded for release on the ground that an error had been made in the bid of $11,900. The Stebbinger bid was $174,532; that of Tranchell & Parelius, the next lowest, was $184,296.

Announcement has been made in Astoria that Tongue Point would be developed as a submarine and destroyer base and naval station as soon as the attorney general of the United States approves the deed. An appropriation of $250,000 is available for the work.

After spending two months in Grays Harbor, the dredge P. A. Mitchie has been sent to Coos Bay. The channel over the bar at Grays Harbor has been dredged from depths of 26 feet at high tide and 18 at low to 31 feet at high and 22 at low.

Astoria Mechanical Equipment

The advantages of specialized mechanical equipment for the handling of cargo was clearly demonstrated at the Port of Astoria Terminals at the mouth of the Columbia river, the week ending October 21, during the loading of the Danish motorship Peru, a vessel of 11,000 deadweight tons. There were six gangs loading into the six hatches of the ship, four of the gangs using portable electric belt conveyors and two of the gangs using ship gear. The records show that a gang using one of the belt conveyors loaded more than twice the amount that a crew using ship gear could load. These conveyors, eight of which are in use on Pier 1, win the praise of every ship captain, by giving him quick dispatch.

Issuance of $91,000 in bonds, to complete the issue of $500,000 recently sold to the Anglo & London Paris National Bank, San Francisco, has been authorized by the Port of Astoria commission.

Surveys of dock work for Coos Bay have been completed and lumber for a 900-foot pier is being received.

California Port Work

An appropriation of $2,100,000, to be obtained from the proceeds of a bond issue of $4,500,000, has been made by the harbor commissioners of Los Angeles for the purchase from the Salt Lake Railroad of a 250-foot strip of land behind the new pier-head line on Terminal Island and for the construction of a paved highway and drawbridge, the latter connecting the island and the mainland. Lack of funds probably will halt all harbor work except that provided for in the Salt Lake agreement, which permits the widening of the main channel.

The State Board of Harbor Commissioners, San Francisco, has requested the Army Engineers to dredge the bay at the mouth of Islais Creek. Dredging the creek proper has been done by the board, but the mouth remains blocked with mud.

Seventy-two acres of waterfront land, occupied for the last two years by the plant of the Pacific Marine & Construction Company, San Diego, will be turned over to the United States Navy January 1 to be used as a repair base. Six concrete docks for berthing destroyers and mine sweepers, a 2500-marine railway and shops are being planned. Business between the Shipping Board and the Pacific Marine & Construction Company was closed with the delivery of the concrete tanker San Pasqual in October. The United Dredging Company of Los Angeles has been awarded a contract for the removal of 2,700,000 cubic yards near Dutch Flats, San Diego, the matter removed to be used in reclaiming the shore line in front of the marine post and naval training station.

Across the Pacific

The commercial organizations of Honolulu and Hilo have requested Delegate Kalanianaole to endeavor to obtain from Congress at the short session an appropriation of $389,000 for Honolulu harbor improvement and $374,000 for the Hilo breakwater. Two years ago 1400 feet of sub-base for the Hilo breakwater was constructed, but the work has remained unfinished. A quarantine station for Hilo also is desired. Honolulu is interested in a large plan for extension of the harbor.

Recent improvements to Sourabaya Harbor, Java, according to Eastern Engineering, are to be supplemented by further deepening which will permit ships of 29 feet 6 inches draft, when fully loaded, to enter and leave at high water. Present facilities include a quay 4000 feet long and 656 feet wide, dredging an inner harbor of 247 acres. The roadstead is one of the best in the islands, and approximately 3,000,000 register tons of cargo are dealt with annually.

Experiments in wireless-telephone communications in Kobe having proven very satisfactory, according to the Japan Advertiser, several Japanese shipping companies have contributed 20,000 yen ($10,000) for the establishment by the government of a station in Yokohama. Though at present this will permit an exchange of messages within the harbor only, it is proposed to establish a station operating within a radius of twenty-five miles of the port.

On the Atlantic

Permanent extension of the pier head line in the North River, New York, between Perry and Seventy-second streets, so as to permit the berthing of such liners as the Mauretania and Olympic, has been requested of Secretary of War Baker by Murray Hurlbert, commissioner of docks, and F. H. La Guardia, member of the Sinking Fund Commission. The pier head lines of several piers were extended temporarily in 1911, since when permits for extensions have been renewed; the desire of New York now is that the extensions be made permanent.

One of the 55,000-barrel oil tanks previously used by the Panama Canal for the storage of crude fuel oil at the Atlantic terminus has been emptied of fuel oil and will be devoted to the storage of Diesel oil for sale to shipping. A supply of 50,000 barrels of Diesel oil will be available for sale there approximately October 15, at $4.50 per barrel. Sales will be made under the restrictions now in force on all sales of fuel to ships, which allow to each vessel only the quantity to enable her to reach the next bunkering station, without, however, diverting from regular routing; or in the case of ships bound for the west coast and returning, enough to make the voyage there and back to the Canal, when no bunkers are available at the West Coast ports. Heretofore the sale of Diesel oil at the Canal has been confined to Balboa, the Pacific terminus, except as occasionally a supply for a ship would be transported to Cristobal in tank cars.

Cuban shipping facilities will be further augmented by the construction of a $1,000,000 wharf in the bay of Havana by the Cuban government, extensions to the San Jose wharves of the Ward Line and the erection of three large docks at Havana by the Litoral de Bahia, S. A., says the Guaranty Trust Company. Warehouses are to be constructed for merchandise, sugar, etc., by Henry Ford, the Havana Marine Terminal Company and the Litoral de Bahia, S. A., a $4,500,000 stock company which was organized recently in Havana for the construction of harbor, dock and warehouses.

Personals

Deaths of a Month

Mrs. Margaret J. Tynan, wife of Joseph J. Tynan, general manager of the Bethlehem Shipbuilding Corporation of San Francisco, died in that city November 15, after an illness of several months. Funeral services were held November 17 in the church of St. Vincent de Paul. Besides her husband, Mrs. Tynan is survived by three children, Margot E. Tynan, Josephine N. Tynan and Joseph J. Tynan, Jr. Mrs. Tynan had been a resident of San Francisco for several years, and had endeared herself to many friends through her unselfish work in various charitable organizations.

Joseph Brent Banning, Sr., died at his home in Los Angeles November 4 after an illness of a few days. He was born at Wilmington in 1861, the son of General Phineas Banning and Mrs. Rebecca Banning. As a young man Mr. Banning was associated with his father in developing Wilmington and what has become Los Angeles harbor, and in later years became vice-president of the Banning Company, vice - president and treasurer of the Wilmington Transportation Company and of the Santa Catalina Island Company, retiring from business upon the sale of the Banning Company's harbor business and of Santa Catalina to William Wrigley, Jr. Mr. Banning is survived by his widow; two sons, J. B. Banning, Jr., secretary of the Pacific American Steamship Association, and William P. Banning; a daughter, Miss Katherine Banning; and two brothers, Captain William Banning and Hancock Banning.

Captain Bernard Hibbing, formerly of Oakland, in Mazatlan, Mexico.

Captain John Johannsen, master of the Shipowners' & Merchants' tugboat Restless, in San Francisco, October 24.

Herbert D. Broderick, formerly engineer of the steamship Harvard and Shipping Board vessels, naval reserve lieutenant during the war, in San Francisco, October 20.

George F. Moreno, agent of the Pacific Mail Steamship Company, in Guatemala City, September 30.

Luis A. Santander, consul of Chile for the state of Washington, in Seattle, October 19.

Captain Frank M. White, first president of the Shipmasters' Association of the United States, in Seattle, November 15.

Reginald W. Kaylor, assistant to the port captain, Nippon Yusen Kaisha, Seattle, in Seattle, October 28.

Arthur E. Hauck, president of the Hauck Manufacturing Company, Brooklyn, died at his home in Brooklyn October 30 at the age of 41. Mr. Hauck became a coppersmith in Germany; after learning his trade he went to Belgium, France and England, where he worked in shipwards; and arrived in the United States when 20 years old. On the day after arriving in Philadelphia he went to work in the Philadelphia Navy Yard, and was employed there and in the yards at Norfolk, Baltimore and Brooklyn for three years, after which he opened an oil-burner business in 1902 with a small shop in Brooklyn. This pioneer work was the basis of much of the industrial oil-burner business of today, the developments including more than a score of basic patents, one of the principal of which was the method of vaporizing kerosene in a torch with proportioned heat-resisting nozzle, the form of vaporization reducing carbonization. Another basic patent covers the Hauck method of atomization through proportioned pipes and openings and with composition nozzle and what is termed the internal combustion.

Arrivals and Departures

W. B. Beebe, of the Shipping Board's Seattle office, has been appointed assistant to the manager of the construction division, Philadelphia.

R. S. Moore, chairman of the board of the Moore Shipbuilding, returned in November from a trip to Europe.

Captain T. T. Tollaksen has been appointed a harbor pilot at Los Angeles, increasing the staff to three.

S. L. Kreider, who has been acting as Los Angeles agent of the Atlantic-Gulf & Pacific, will give up the agency, according to an announcement in Los Angeles, and will turn over the business to George W. Blake, now chief clerk of Mr. Kreider's steamship department, who will have charge of the Atlantic-Gulf & Pacific's own offices.

J. King Black, formerly freight agent of the General Steamship Corporation and of A. O. Lindvig, has organized the Acme Shipping Company, San Francisco, with offices at Pier 21. The Acme will act as freight handler and forwarder.

Frank J. O'Connor, Portland agent of the Admiral Line, has been elected president of the Portland Waterfront Employers' Association, succeeding A. C. Stubbe, resigned.

B. L. McMullen has been appointed Portland agent of Sudden & Christenson, agents of the Trans-Marine Corporation, the steamship subsidiary of the Submarine Boat Corporation, which recently announced the opening of a new intercoastal service. The Portland offices will be in the Board of Trade building.

William E. Mahoney, for several years marine reporter of the Portland Oregonian and lately in charge of publicity for the supply and sales division, Shipping Board, has resigned to enter business with F. J. Rosenberg, formerly assistant to the chief of the sales division.

Captain Robert Dollar has been decorated by the Republic of China with the Chia Fo in appreciation of his assistance in obtaining for Chinese shipyards contracts with the Emergency Fleet Corporation.

A. W. Follansbee, Jr., marine secretary of the Fireman's Fund Insurance Company, San Francisco, has returned from a business trip to New York. The Fireman's Fund is making preparations to occupy its new quarters in the building it recently acquired on Sansome Street, San Francisco, adjoining the company's head office building.

Ben C. Daily, vice-president and Pacific Coast manager of the Overseas Shipping Company, has been elected president of the Foreign Trade Club of San Francisco. Other new officers are: first vice-president, E. G. Babbitt, Bureau of Foreign and Domestic Commerce; second vice-president, J. G. Decatur, Western Union Telegraph Company; third vice-president, Arthur R. Bird, Thomas Publishing Company; secretary-treasurer, Aubrey Drury.

M. Leaf has been elected first vice-president of the Los Angeles Shipbuilding & Drydock Company. He had been secretary of the company, and is a director of the Los Angeles Steamship Company.

C. J. Lehman has been appointed Los Angeles agent of the Holland-America Line.

M. J. Mayfield, formerly of New York, has been appointed San Francisco agent of the Pacific Westbound Conference, the new organization that succeeded the Pacific Coast Oriental Tariff Bureau. Mr. Mayfield takes the position vacated by C. O. Burgin, who has become the secretary of the Shipping Board conferences having offices in San Francisco.

Ryozo Asano, son of President Soichiro Asano of the Toyo Kisen Kaisha and himself managaing director of the company and of the Asano shipbuilding yard, arrived in San Francisco on the T. K. K. steamship Korea Maru October 27, en route to New York and Germany. Mr. Asano, in reply to inquiries regarding the proposed merger of the larger Japanese shipping companies, said that he would not have departed from Japan at this time had there been any prospect of the merger being completed in the immediate future. That would not necessarily mean that the plans for the combine were not being pushed, inasmuch as several months doubtless would be required to arrange all details. Mr. Asano said that he would return to Japan via San Francisco.

G. P. Deane, district comptroller, Shipping Board, Seattle, has resigned and his resignation has been accepted.

M. F. Cropley, general agent of the Pacific Steamship Company, San Francisco, has been promoted to assistant manager, in which capacity, however, he retains charge of the San Francisco office.

D. J. Hanlon, president of the Hanlon Drydock & Shipbuilding Company, Oakland, returned in November from a business trip of several weeks to the East.

Captain Cecil M. Brown took the Hanlon salvage steamship Homer to the scene of the stranding of the Rolph steamship Joan of Arc at Port Orford. As representative of the owners, agents and underwriters of the Dutch steamship Arakan, which struck on Point Rayes in August, Captain Brown had much to do with the salvage of that vessel, in collaboration with Captain Louis Langren of the Redstack tug fleet and Captain Richard Seike, then in command of the Homer. The last-named, who died recently, will be greatly missed in operations of this sort, as to his work was due a great part of the success that attended the Arakan operations, and his ability was recognized when Mr. Hanlon made him the master of the Homer.

DRAFTSMEN WANTED FOR THE PANAMA CANAL. 1 Marine Hull Draftsman, $233.48 month, experienced in inclining experiments or general ship calculations; 2 draftsmen (Naval Architects), $181.48 month, graduates class of 1920 or equivalent experience. Must be American citizens (final papers) under 50 years of age, in good health. Free steamship transportation from New York or New Orleans, wages beginning date of sailing. Write, "Chief of Office, The Panama Canal, Washington, D. C."

FELLOWS & STEWART'S SHIPYARD

View showing marine railways and repairing facilities at the Fellows & Stewart Shipyards at Wilmington, California. The vessel in the background is the steamer Falcon, which rested on mud banks for over a year, and was recently overhauled and repaired at this yard.

THE firm of Fellows & Stewart, Inc., of Wilmington, California, have acquired a very enviable reputation in regard to building high class speed boats, express cruisers and other pleasure craft. In addition to light draft boats they have to their credit the construction of work-boats, tugs and barges. Dustin Farnum's Sterling engined Ding is a product of the Fellows & Stewart yard. This boat is twin screw with two 150-horse power engines. The Union Oil Company's oil barge Piru and the Crowley's 65-foot tugs Diamond Queen and Wahelo, as well as the 50-foot Diamond Girl, were built at the Wilmington yard.

Joe Fellows, who is known as the dean of the motor boatmen of Southern California, is president of Fellows & Stewart, and Victor B. Stewart, secretary and treasurer. Emil Aarup is sales manager.

The plant of Fellows & Stewart is one of the most completely equipped boat building plants on the Pacific Coast. With a number of marine railways, a complete woodworking plant, machine shop and other outfitting equipment, this yard is very well able to handle repair work of all classes, as well as new construction on work-boats or pleasure craft.

VEHISOTE

IN these days of prohibitive prices on hard woods and the difficulty of obtaining skilled mechanics for woodworking, it is well to note that there are substitutes for these woods with which beautiful effects can be obtained in interior finishing. Not all of these substitutes are suitable for marine work or are able to withstand the severe usage which is entailed aboard ship, but at least one such has been found which will meet all the requirements of ship practice.

In fact, this material, known as Vehisote, has many advantages over wood in that it is absolutely homogeneous, works more easily under the tool than hard wood, and is more lasting and more impervious to damage by salt water. Vehisote takes a splendid finish, may be grained, if desired, by the painter to imitate any of the finest hard woods and can be manufactured in panels of almost any size. Many of the best ships building in America today are using this material entirely or in part for the interior finish of their passenger accommodations. Among these ships may be included the new freight-passenger liners of the United States Shipping Board and many of the passenger ships being reconditioned in Eastern drydock and repair shops.

We illustrate herewith two views in staterooms finished in Vehisote paneling and can heartily recommend this material as a practical, easily applied finish for all marine interiors where comfort and beauty are desired.

Vehisote is manufactured by the Pantasote Company, 11 Broadway, New York City, who are represented on the Pacific Coast by the Scovel Iron Store Company of San Francisco.

The powerful tug Wahelo built by Fellows & Stewart, Inc., and now in Crowley Launch service on San Francisco Bay

Two interior views of a modern steamship, showing the use of Vehisote paneling on walls and ceilings.

PACIFIC MACHINERY

HEAVY DUTY LATHES

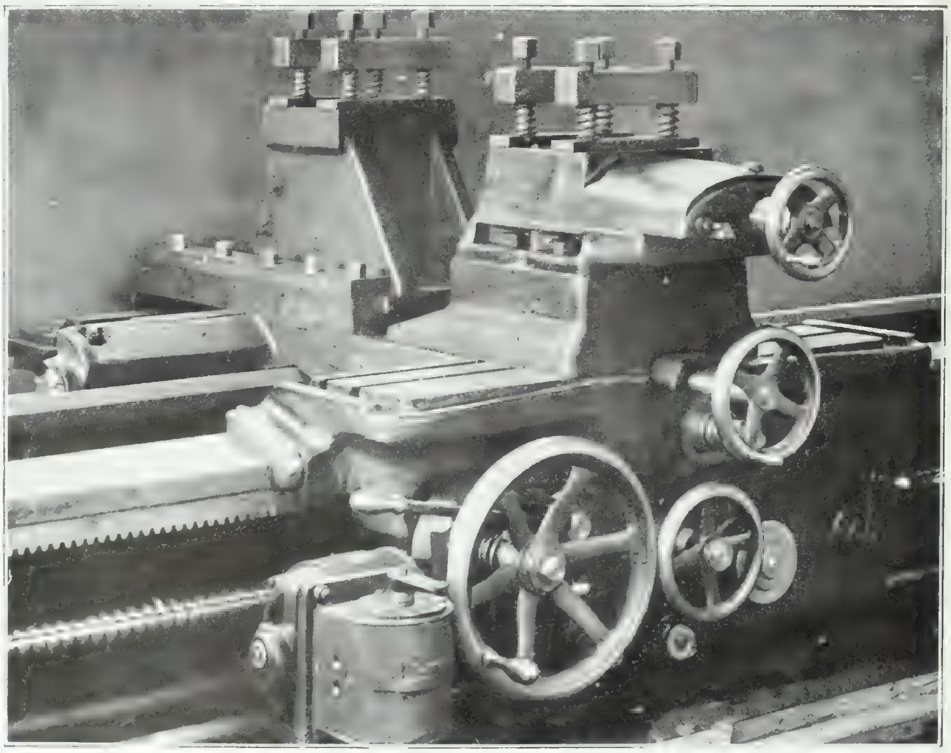
IN proportion to the amount of work done, the Pacific Coast is probably better equipped than any other section of the country with heavy duty, large capacity machine tools. Manufacturing on a production basis has not been done on a wide scale on the Pacific Coast, and machine shops have given more attention to repair work on steamship machinery, railroad work, sugar mill machinery, etc., as well as light repair work.

The heavy duty lathes built by Houston Stanwood & Gamble of Cincinnati have found a very good market in Pacific Coast territory. Louis G. Henes, with sales offices in Los Angeles and San Francisco, represents this splendid line in California. Some of the shops where Houston Stanwood & Gamble lathes have been installed include the Skandia Pacific Oil Engine Company, Edwin Forrest Forge Company, both of Oakland, and the Dunn Manufacturing Company of Oxnard.

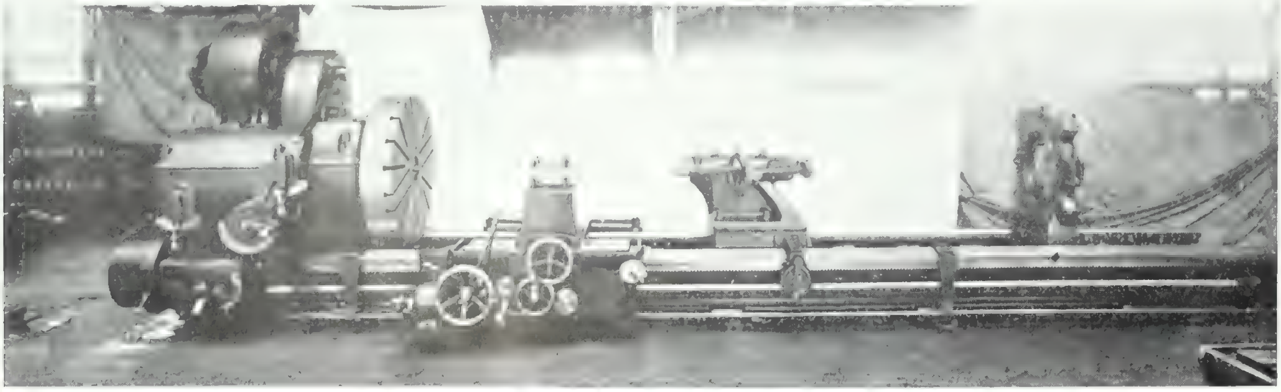
Pacific Coast machine shop executives have been quick to appreciate the high grade characteristics of the Houston Stanwood & Gamble line. Some of the outstanding features of this line are: All gears on these lathes are of steel; the small gears are of forged steel and the larger gears of cast steel. The large internal gear in the face plate is a steel forging pressed into face plate and secured by screws. The selective speed headstock permits four or five speed changes obtainable in the lower element of headstock, and three gear changes obtainable in the upper element by sliding a cone of three gears in relation to three other gears. Thus twelve or fifteen gear changes are obtained. The six gears in the upper element are heat treated and run in a bath of oil, which is made possible by completely enclosing the headstock. There is a pump suitably located to force oil to the upper element of headstock.

The extra strong apron with steel gears on the H. S. & G. lathes is of the double wall type with both the front and rear walls bolted to the carriage as well as to each other, and greatly increases the strength by eliminating overhang.

Our illustration shows a Houston Stanwood & Gamble lathe fitted with single carriage with front and rear tool posts, and equipped with electric controller conveniently placed for starting or stopping the lathe. The double tool post equipment is particularly adapted for turning heavy forgings. One of the posts is tooled for the roughing cut and the opposite post is used for the following cut.



A heavy duty lathe equipped with single carriage with front and rear tool posts. This equipment is particularly adapted to increase production on heavy forgings



A Houston, Stanwood & Gamble heavy duty lathe ready for shipment

THE ENTERPRISE DIESEL ENGINE

By RENWICK Z. DICKIE

THE Enterprise Engine Works have finished a 3-cylinder Diesel engine rated at 80 horsepower at 320 revolutions for marine work, which is believed to be the first Diesel engine built in San Francisco. This engine is of the four-cycle solid-injection full-Diesel type which is creating so much interest in engineering circles at the present time.

There are many arguments given by engineers pro and con for air injection and solid injection. Probably the most used one in favor of the air injection is that the quantity of air can be regulated according to the amount of fuel oil, which is to be burned in the cylinder, while in the solid injection engine the amount of air in the cylinder remains practically constant.

An argument used in favor of the solid injection is that it approaches nearer to the goal of all practical engineers; that is, the elimination of working parts with attendant weight and gives a much simpler engine.

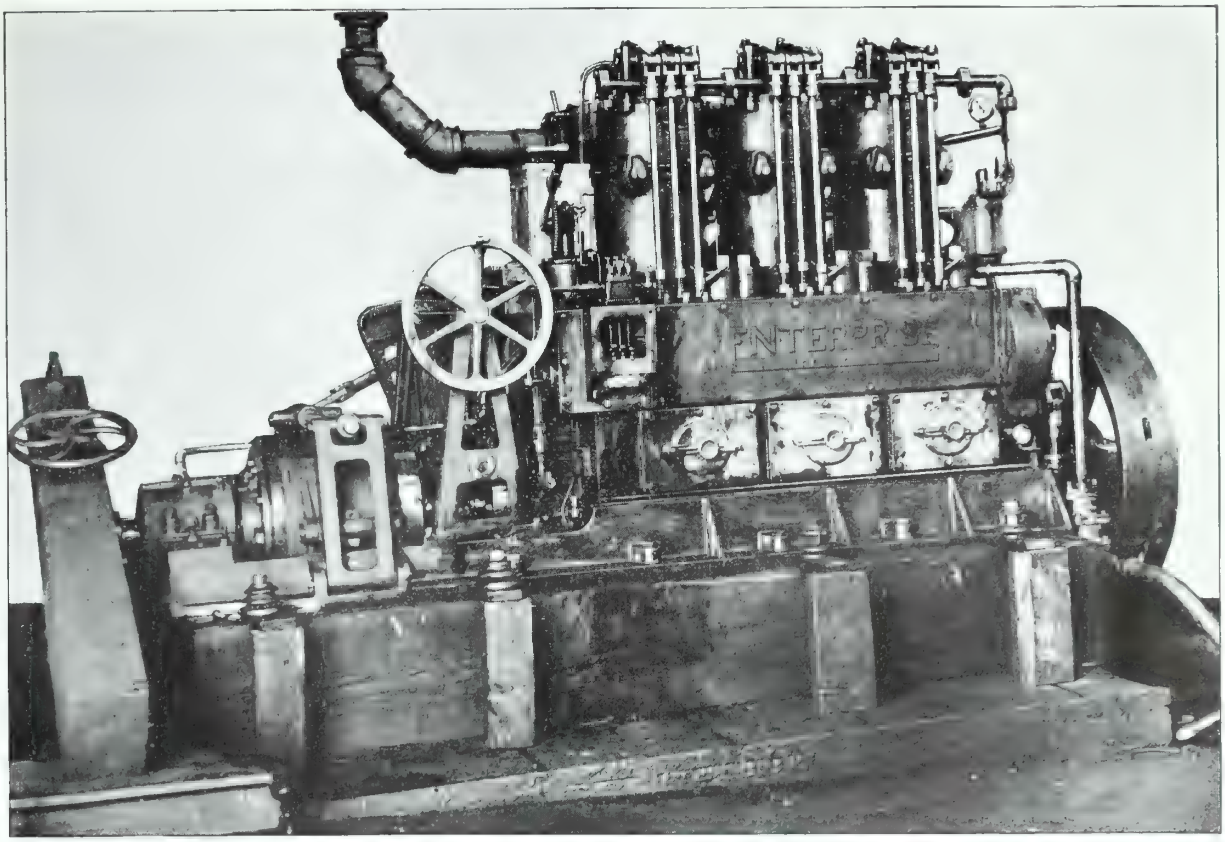
This engine is to be installed in a 65-foot boat and will not get any more attention than the ordinary gas engine; hence simplicity is essential.

The secret of the simplicity of this engine is in the injection chamber. The fuel oil is forced into the chamber of the injection nozzle by the oil pumps, a separate pump being operated for each cylinder, at a pressure not exceeding six pounds and is drawn into the cylinder by the downstroke of the piston through three small holes in the bottom of the nozzle. The bottom of the chamber in the injection nozzle is slightly dished and holds a drop or two of oil which is not discharged by the suction of the downgoing piston. When the piston rises again to the top of the cylinder, on the next compression stroke, the small quantity of oil in the chamber explodes and is forced out against the oil in the cylinder, causing it to explode. The following stroke of the piston is used to scavenge, as in all Diesel engines of the 4-cycle principle.

The governor is very unique in its operation, the speed of the engine being controlled by the length of the stroke of the oil pumps, which can be altered by the simple movement of a lever.

It is interesting to note, from from an engineering standpoint, that there are no high pressures to take off on this engine, the only air being a simple air pump of about 150 pounds' pressure for starting, and also the handling of the whistle.

The Enterprise Diesel engine is operating on 14-degree gravity. A complete analysis of tests on this engine is now being prepared and will be published in the next issue of this magazine.



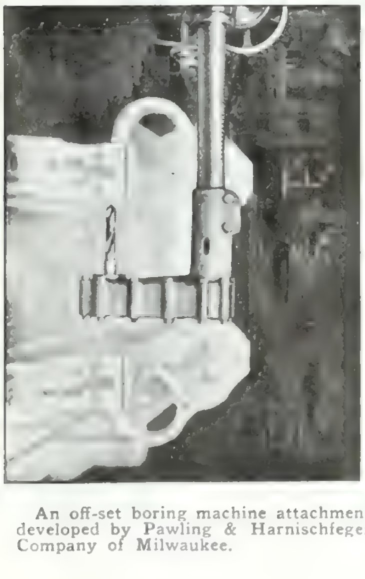
The 80-horsepower Enterprise Diesel engine on test stand

Birdseye view of main plant of the Pawling & Harnischfeger Company at Milwaukee, Wisconsin

Illustrating screw machine products manufactured in Pacific Coast shipyards. The studs, patch bolts, special screws, etc., were manufactured on Warner & Swasey screw machines. This equipment is sold by Smith-Booth-Usher Company of Los Angeles. This machinery house also has sales offices in San Francisco

THE VALUE OF PUBLICITY

A PROMINENT manufacturer of chain hoists recently ran advertisements in the trade papers in which no mention of the location of the plant was made. A mere innovation of its advertising department, to be sure, and of value only in those cases where the product is so well known that the location is always associated with the product. The object of advertising in the case of those products the merits of which, through the medium of judicious publicity, the public is acquainted with, is, of course, to keep the name of the organization before the consuming public. How well this was accomplished in the incident cited above, was manifested by the very gratifying way in which orders continued to come in, and this occurred during a period in which most lines were suffering a slight reaction. Strangely enough, some readers of the advertisement took the trouble to cut it from the paper and, without signing any name, forwarded it to the manufacturer at Lisbon, Ohio, with the inscription, "Puzzle, find the location of the Wright Manufacturing Company."



An off-set boring machine attachment developed by Pawling & Harnischfeger Company of Milwaukee.

Seal your mail with the Stamp of Health
Merry Christmas 1920 Happy New Year
ERNEST HAMLIN BAKER
Buy Christmas Seals
–and fight Tuberculosis

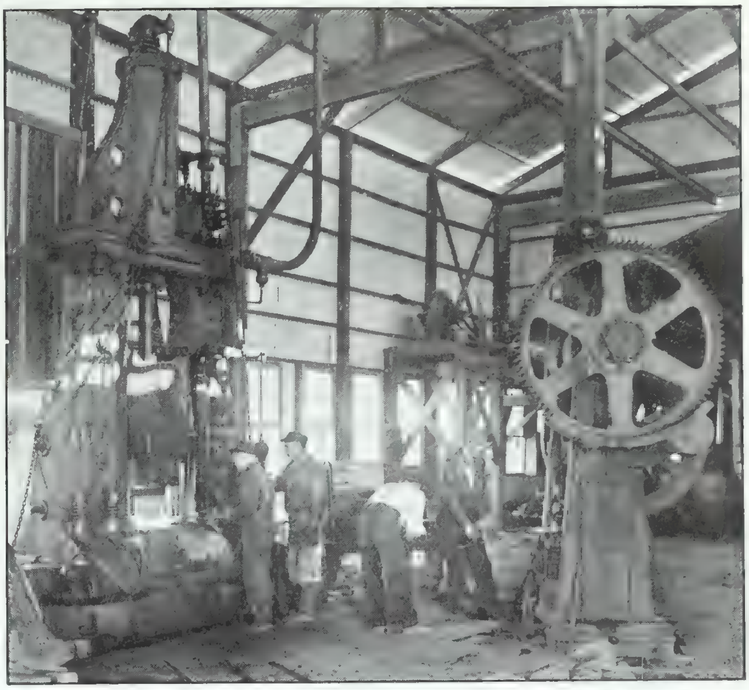
Western Forge & Manufacturing Company

When Mr. G. E. Moreland came from Pittsburgh to Los Angeles five years ago he began a thorough study of Southern California and the requirements of its manufacturers to determine whether there was room for a drop forging industry in that district. He received very little encouragement from the local industries but determined that he would go ahead with the project and formed the Western Forge and Manufacturing Company of Los Angeles, of which he became president.

The plant started with a 1000-lb. drop hammer and the necessary facilities in the way of trimming presses and die-making tools. Business was slow at first, but during the last two years the orders on hand have necessitated the great enlargement of the plant which has added several drop hammers, and very recently a 4000-lb. drop steam hammer.

The plant has built up a splendid business and has now become a very important industry in Southern California. Our illustration shows one corner of the shop with two hammers at work.

The Western Forge and Manufacturing Company is ready to solve any drop forging problem and invites correspondence from interested parties.



The 4000-pound drop steam hammer and trimming press at Western Forge & Manufacturing Company

STURROCK BRIDGE WALLS

The present world situation in the fuel oil supply is causing very much concern to marine operators everywhere, but especially on the Pacific Coast-Orient route, as it has become practically impossible for American steamers to obtain supplies of fuel oil in the Orient. On account of this condition some ship operators went so far as to change their ships' power plants to burn coal instead of oil.

The Jenkins-Miller Company of Seattle and San Francisco claim to have solved this problem for ship owners with their Sturrock bridge walls, the installation of which in the furnace of marine boilers enables the burning of coal simply by changing the oil-burners for ordinary furnace doors.

A recent installation has been made by the Jenkins-Miller Company on six ships of the Robert Dollar Canadian Line, the boilers of which have been equipped with Sturrock bridge walls.

JOHNSON GEAR MOVES

The Johnson Gear Company of San Francisco has erected a modern manufacturing plant at Berkeley. The present unit is 200 by 200 feet. The building has concrete side walls and saw-tooth roof arranged to give ample lighting. For the comfort of the employes modern washrooms, locker space, and cafeteria are provided. The company is manufacturing truck transmissions and gear-sets and requires increased space and tool capacity. The decision to move its plant from San Francisco to Berkeley was made after an exhaustive survey of localities in this district best suited for manufacturing. New automatic machines will be installed in the new plant, which in conjunction with its present special equipment gives promise of making it one of the largest plants on the Pacific Coast, specializing in gears and other manufactured products. Suitable sales offices will be maintained in San Francisco when the plant is moved to Berkeley, on December 15, 1920.

Punches and Other Tools—George F. Marchant Company, Chicago.—An attractive brochure of twenty-five pages, handy pocket size, describing the plant of the George F. Marchant Company and some of their standard punches and dies, rivet sets, pneumatic hammer chisel blanks, shear blades, and other machine tool accessories, all made of the highest grade tool steel alloys especially adapted for the particular service in hand. The George F. Marchant Company claim the distinction of being the first to produce Vanadium rivet sets guaranteed to drive 10,000 rivets.

Gunite Slabs — The Cement Gun Company, Inc., Allentown, Pa.—A 32-page booklet incorporating a report of tests made by the Bureau of Standards and the United States Shipping Board on Gunite and also a series of tests made on Gunite Slabs with various spans and varied percentages of reinforcement, which tests were under the direct supervision of Mr. M. O. Fuller, Adjunct Professor of Civil Engineering at the Fritz Laboratory, Lehigh University. From these tests a series of working and safe load tables have been established and are here presented to the concrete industry. This booklet will be found of great value by all engineers figuring concrete.

The Oxygraph, Nos. 1A and 2, Davis-Bournonville Company, Jersey City, N. J.—A 12-page pamphlet describing the use of the Oxygraph electrically operated Pantograph in guiding a torch for cutting multiple shapes, especially in die making. By the use of this apparatus rough die blocks are preheated and cut before planing, a paper drawing being used to guide the tracer wheel. When the opening has been cut the die, still hot, is placed in an annealing box, covered and left to cool. When cold it is planed and finished in the usual manner. These instruments are useful in the shop for producing a very great variety of forms both in light and heavy metal. They can be used to advantage for making light brass strap hinges or for cutting such heavy forgings as rudder arms, mast bands, thimbles for wire cables or davit collars.

The Merchants' Association's Year Book for 1920.—The Year Book of the Merchants' Association of New York for 1919-20 is now being distributed.

It contains 334 printed pages and it gives a summary of the association's activities for the year ending May 1, 1920.

The names of the officers of the association with alphabetical and classified lists of its members, together with the personnel of its thirty-three standing committees and its staff are included in the book.

The annual reports of the president, Mr. William Fellowes Morgan, the secretary, Mr. S. C. Mead, and of the ten service bureaus, are given.

The book also contains the by-laws of the association and its plan of organization, illustrated by a chart. The report of Mr. William C. Breed, chairman of the members' council of the association, is also found in the book.

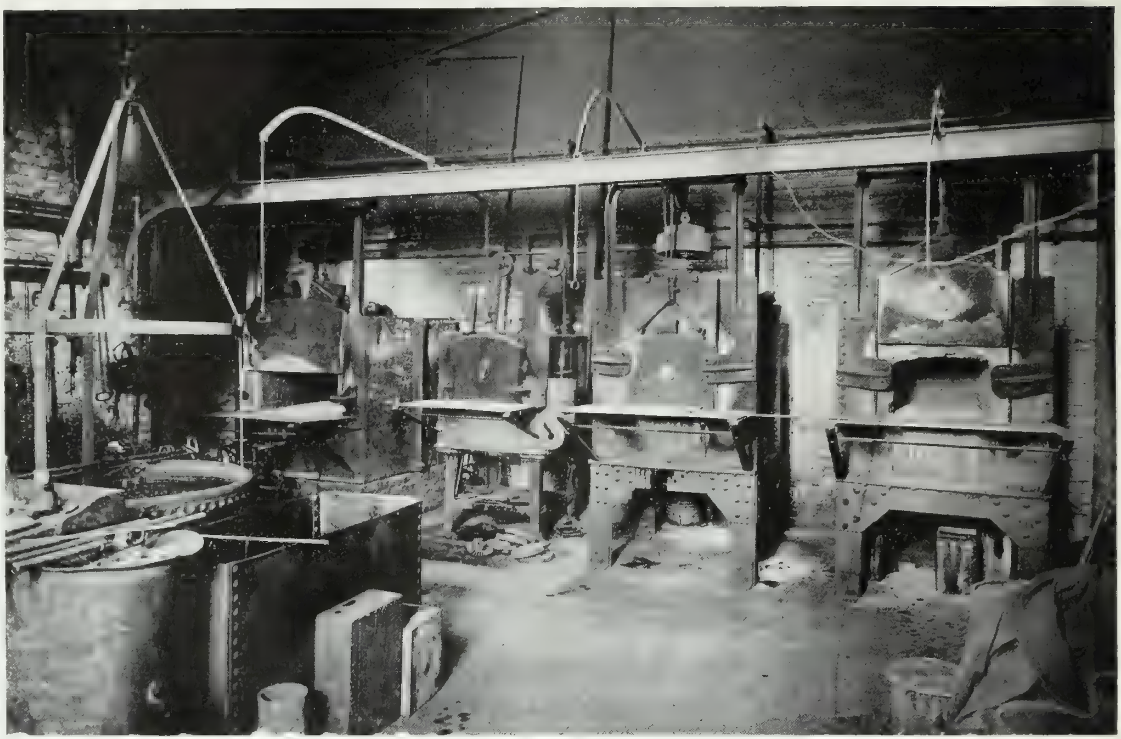
PACIFIC GEAR & TOOL WORKS

THE Pacific Gear and Tool Works are very proud of their heat-treating plant, a picture of a portion of which accompanies this article. There are four Tait-Jones type furnaces ranging in size from 16 inches by 20 inches to 34 inches by 48 inches, all of which use crude oil fuel and are fitted with special burners for accurate and delicate adjustment. One gas furnace 12 inches by 18 inches is used for high speed steel. All the furnaces are fitted with prometers through which the temperature can be kept accurately under control. The furnace for oil tempering is fitted with a bulb thermometer ranging to 750 degrees Fahrenheit.

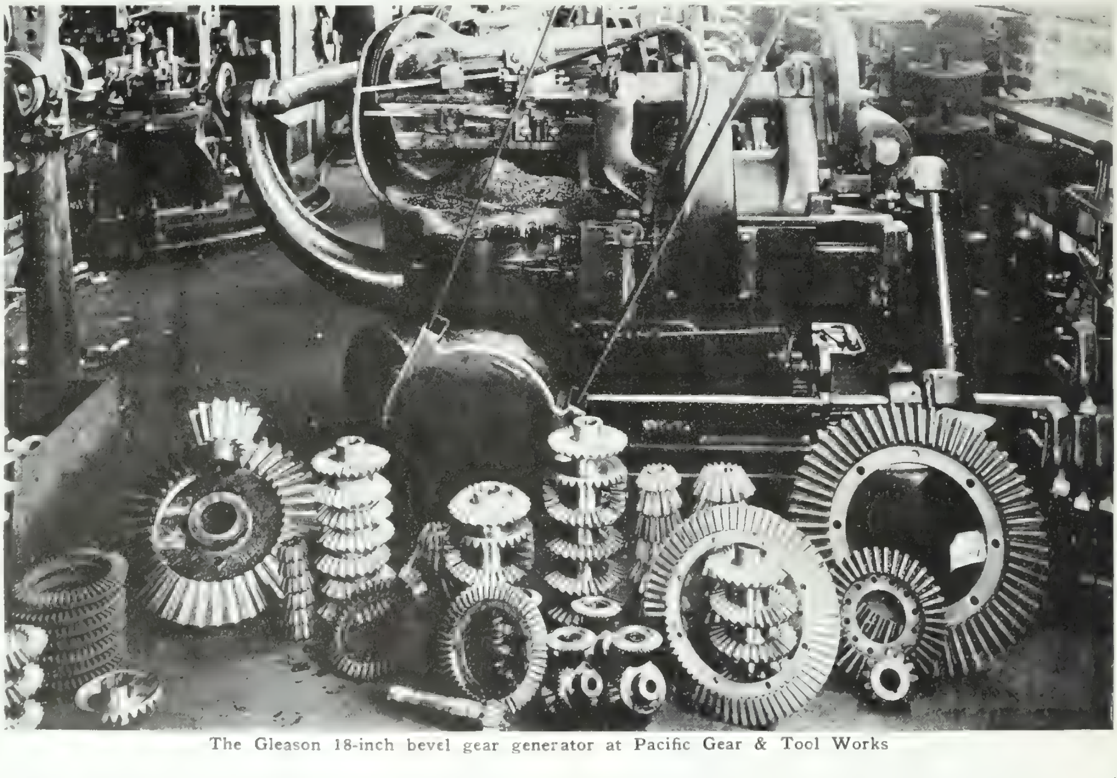
The oil tank for heat treatment of gears is 8 feet by 5 feet by 5 feet, giving ample body for the largest pieces handled at this plant. The water tank for quenching or cooling gears is 8 feet by 12 feet, and the water is kept in circulation by a continuous flow of cold water. The laboratory in connection with this heat treatment department is fitted with all of the latest instruments for determining hardness and for all other necessary tests. A powerful straightening press is maintained to correct any distortions which may occur in furnace work.

The other illustration shows the Gleason 18-inch bevel gear generator in the machine shop of the Pacific Gear and Tool Works, and ranged in front some of the various gears which have been generated thereon, including auto and tractor ring gears and pinions and tractor differential gears and pinions.

The Pacific Gear and Tool Works are ready to take care of any gear problem requiring accuracy in machining and thoroughness in heat treatment. Their machine shop is equipped for all classes of cut gear work.



The heat-treating plant at Pacific Gear & Tool Works, at San Francisco, showing installation of four Tait-Jones heat-treating furnaces



The Gleason 18-inch bevel gear generator at Pacific Gear & Tool Works

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Marine Pumps and Other Auxiliaries—Worthington Pump & Machinery Corporation, New York—Since the time of the Civil War the name "Worthington" has been very prominently identified with practically all of the improvements in marine pumps, and probably the Worthington and Blake pumps manufactured by the associated shops of the Worthington Pump & Machinery Corporation have been more widely used for marine pumps than those of any other maker in America; at least ninety per cent of all naval vessels of American build have been equipped with either Worthington or Blake pumps.

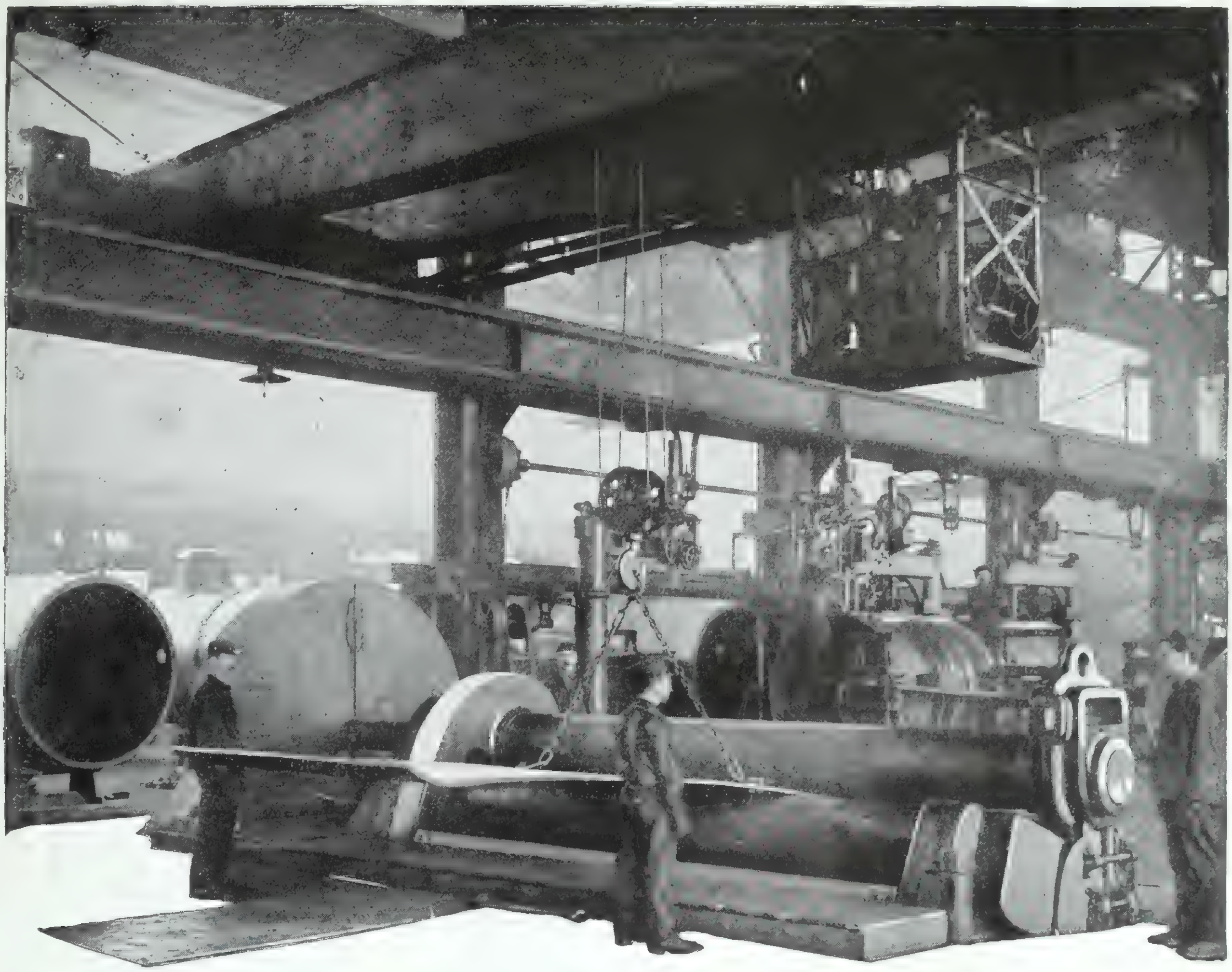
During the emergency shipbuilding program these plants have provided a large amount of the auxiliary pumping machinery necessary to the operation of America's merchant marine.

The book under present discussion is a very attractively bound volume of 125 pages setting forth the various styles of pumps made by these associated companies, including reciprocating pumps, horizontal and vertical, simplex and duplex, for boiler feed, fire and bilge, circulating and other water service. Air pumps and condensers are covered in a separate section; oil pumps and cargo fuel and lubricating oils in another section. The fourth division is devoted to centrifugal pumps, and a fifth to miscellaneous auxiliaries, while one page at the back of the book describes the Worthington direct connected motor-driven, two-stage marine air compressors, and another page is devoted to a suggestion of the benefits to be derived from oil engine propulsion and an announcement that the Worthington marine Diesel engine and its auxiliaries will be fully described in a separate publication to be issued later.

An interesting feature of catalogue is three layouts showing first a modern battleship with its complete equipment of pumps, each illustrated in the layout, which refers to a key list showing the names of various apparatus. The same idea is carried out for a modern tordepo destroyer and for a modern oil-burning turbine-driven steamship.

SHIPBUILDING SHOPS—V

This page is the fifth of a series devoted to the application of NILES-BEMENT-POND MACHINE TOOLS and allied products to marine engineering practice in every department and shop that the modern shipyard comprises.



- Keel Plate Bending Machines
- Straightening Rolls
- Flanging Presses
- Bending Rolls
- Plate Planers
- Multiple Drills
- Radial Drills
- Punches
- Shears
- Jib Cranes
- Wall Cranes
- Traveling Cranes

In the Plate Shop

The plate shop, of all the departments of the yard, handles the biggest tonnage. The many machines that are required for this work are part of the extensive line of machine tools which are manufactured by this company. No matter how large the equipment needed, we have ample capacity to turn it out right. We have built Bending and Straightening Rolls up to 36 feet wide, Armor Plate Planers with 14 feet working width, Boring and Turning Mills with 42 feet swing. Our Bending and Straightening Rolls will handle plates from 3/16 inch to 1¼ inches in thickness. Plates can be bent to complete circles when so desired.

In every department in the yard where heavy parts are handled in numbers, you will find Niles Cranes keeping every machine supplied with work, saving the costly transfer time that characterizes trucking methods.

Our Pacific Coast branches are located in Los Angeles, San Francisco and Seattle

NILES-BEMENT-POND CO.

GENERAL OFFICES, 111 BROADWAY, NEW YORK

BOOK REVIEWS

Applied Naval Architecture, by W. J. Lovett—654 pages with numerous detailed calculations and over 360 tables of diagrams. Published by Longmans Green & Co., New York. Price $12.

Mr. W. J. Lovett is well known to naval architectural students through his "Complete Class Book of Naval Architecture." This later volume in its preface states that it is "primarily intended for the use of those engaged in the design and construction of moderate speed merchant vessels of 350 feet in length and upwards." The work is very conveniently arranged, splendidly indexed, and gives special attention to approximate methods so that results may be rapidly obtained by its use.

Naval architecture, as the author states in his preface, is in its application far from an exact science. A majority of the co-efficients used and the values obtained in strength calculations are comparative only, while all the problems connected with stability and trim assume waves of a given contour and of standard proportions, such waves being seldom met with at sea, so that it would appear that these approximate methods of arriving at quick results are by far the best for the majority of practical men.

It is very evident from the text that the author has had a great deal of practical experience in applying the problems of which he treats. Naval architects, designers and draftsmen will find especially useful the chapters dealing with hull subdivision, freeboard, tonnage, propulsion, skin resistance and steering.

While the author, being extension lecturer at Belfast Municipal Technical Institute, vice-president of the Engineering and Scientific Association of Ireland, and member of the Institute of Naval Architects, has written from the standpoint of the British naval architect and has applied his problems and drawn his conclusions mainly with British rules in view, the problems are of such a nature that the same general formulae and data can be used in American practice, and there is no American book in our knowledge which covers this ground with anything like the thoroughness that is evident in this volume. We have no hesitation in recommending it to American naval architects as a very convenient and efficient handbook for assistance in the application of their specialized theory.

Marine Insurance, by Solomon S. Huebner, Ph.D.—265 pages with numerous tables and forms. Bound in red buckram. Published by D. Appleton & Co., New York.

This is one of a series of volumes "designed to assist students in training for the marine insurance, shipping or exporting business." It was written at the suggestion of the Federal Board for Vocational Education and of the United States Shipping Board. It is especially adapted to the needs of beginners in the study of marine insurance. The matter is brought together very compactly in a classified form and includes all of the essential facts, principles and practices of marine insurance as it is now used in the commercial business of the United States.

The author carried out an investigation of marine insurance for the committee on Merchant Marine and Fisheries of the House of Representatives and for the United States Shipping Board. The result of this investigation was published in his report on "The Status of Marine Insurance in the United States." This present volume presents largely the same material in a classbook form and should prove a very interesting study to beginners in the marine insurance business.

Handbook on Admiralty Law, by Robert L. Hughes, M.A., Ll.D.—Second edition—575 pages bound in buckram with red, blue and gold stamping. Published by West Publishing Company, St. Paul, Minn. Price $4.50.

This volume is one of the Hornbook series of elementary treatises on the principal subjects of the law, and in common with the other books of that series it contains as a special feature "a succinct statement of leading principles in black letter type" followed in paragraph form by "a more extended commentary elucidating the principles" and footnoted with references to authorities.

This second edition modernizes thoroughly both the text and references of the former edition. A great deal of care has been spent in the compilation of the book to include in the cases cited for reference only those decisions which are of value, and in the process of elimination the two or three cases cited in the footnotes on a single paragraph are generally the survivors of dozens of such cases that have been examined or weighed by the author. Cross reference from the first edition to the second is made practicable by retaining the original numbering of the black letter sections. The table of illustrative cases contained in the first edition has been omitted for the reason that this second edition is compiled rather as a reference book for general practitioners than as a textbook for law schools. As a handy reference volume on admiralty law this book should appeal to everyone interested in the American merchant marine.

TRADE LITERATURE

Strength in Union—Ford Bacon & Davis. An 8-page brochure published by this well-known engineering firm, sets forth the advantages of the service to be rendered through the cooperation between their many departments, including technical and commercial investigations, expert testimony, designing and planning, construction, accounting, valuation and reports, purchasing, operation and management, financing and development. The pamphlet is known as No. 27 and deals particularly with the valuation and report department. This department is at the present time expertly valuing businesses of many kinds whose total valuation well exceeds $1,000,000,000.

Capstans—A 24-page brochure published by the American Engineering Company, Philadelphia, Pa. This booklet describes in detail the various types of steam, electric and hand driven capstans for ship and dock use manufactured by the American Ship Windlass Company, now a part of the American Engineering Company. The American Ship Windlass Company has been manufacturing deck machinery for ships for over half a century, and this machinery under the name of "Providence" became famous throughout the maritime world.

The capstan drive employed consists of either a two-clinder steam engine or an electric motor operating through a worm and worm gear onto the capstan shaft. The worm is bronze keyed to the steel crankshaft of the engine or to the jackshaft of the motor. The worm wheel is cast iron. This combination of metals is found to be exceedingly durable under strenuous use.

The capstan as applied for dock use is mounted on a sturdy cast iron box base which encloses the engines, thus making them weatherproof, and in the case of electric drive for this form enclosed weatherproof motors are used mounted on a sturdy cast iron base which supports an oilproof housing for the worm and worm wheel, on top of which the capstan is mounted.

The company also builds a very compact gasoline gypsey with engine and gear and gypsey head all mounted on one bedplate, which has been found very handy for work on sailing vessels and barges where neither steam nor electric current is available. This unit is especially useful in the handling of rigging on sailing ships.

The Oil Engine—Phases, Problems, Possibilities—Catalog No. 38—A 32-page brochure published by the Venn-Severin Machine Company, Chicago. This booklet describes in great detail the Venn-Severin oil engines, described as being "the real oil engine." It runs on a compression pressure of about 100 pounds per square inch.

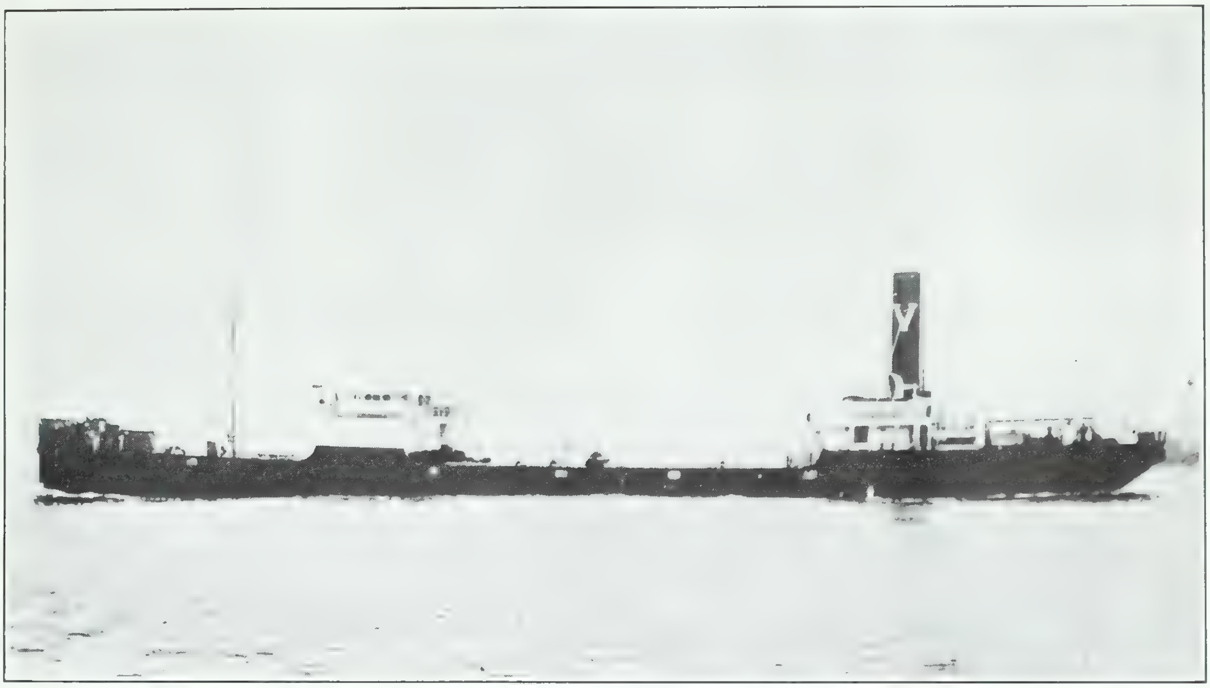
A very peculiar distinction is drawn by the compiler of this catalog and of its accompanying bulletin No. 37 (which describes the same engine in its application to marine work) between this engine, which he calls a two-cycle air compressor type, and the ordinary two-cycle fuel oil engine. This peculiar distinction seems to arise from the writer's belief that all of the other two-cycle engines draw fuel with the air into the base of the engine, compressing it there. This, of course, is far from true, and it is entirely unnecessary for the catalog to condemn other two-cycle oil engines in this way in order to bring out the good points of this particular two-cycle type.

The engine is built in sizes up to 150 h.p.

Foundries, Their Complete Equipment—Catalog No. 154 of the Whiting Foundry Equipment Company, Harvey, Ill.—This very attractive 45-page booklet treats of the general layout and detailed equipment for complete foundries, especially those having to do with the casting of gray iron, steel, brass, and malleable iron. Many valuable hints are given to the designer which should be helpful in preparing special layouts. One section deals especially with car wheel foundries, the most typical of that class which has to do with the casting of multiple pieces from the same molds.

Anyone who is at all interested in foundry work will find much valuable information in this book.

HEAVY DUTY
DIESEL TYPE MARINE ENGINES



Motorship "Bramell Point"

The Motorship "Bramell Point," owned by the Vacuum Oil Company was re-equipped with two 960 I. H. P. McIntosh & Seymour Engines after the successful and efficient operation of the 640 I. H. P. McIntosh & Seymour Engines in their Motorship "Bayonne."

We have furnished Heavy Duty Diesel Marine Engines for the following ships:

Name of Vessel	Dead Weight Tonnage
CETHANA	3300
ISLE DE JAVA	4100
CHALLAMBA	3300
CULBURRA	3300
COCHIN CHINA	2500
BAYONNE	1500
COOLCHA	3300
SOLITARE	5000
BENOWA	4400
BALCATTA	4400

Name of Vessel	Dead Weight Tonnage
BABINDA	4400
BOOBYALLA	4400
BORRIKA	4400
MARYLAND	4500
TEXACO No. 146	1000
TEXACO No. 147	1000
J. F. PENROSE	4500
BRAMELL POINT	5000
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KAMCHATKA	1500
BAKOI	2500
CAROLYN FRANCES	1500
DONNA LEE	3300

LOOK UP THESE VESSELS WHEN THEY ARE IN PORT.

Marine Engine sizes which are now available: 390, 640, 1200, 1550, 2000 and 2700 I. H. P. All six cylinders, four cycle and directly reversible.

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TRADE LITERATURE

Rivets. One hundred and seventy-seven pages, profusely illustrated and attractively bound in red paper. Published by the S. Severance Manufacturing Company, Glassport, Pa.

Established in 1828, the S. Severance Company have been manufacturing rivets for almost a century, Levi Severance, the founder of the company, having invented prior to that time a rivet-making machine. His son, Samuel Severance, continued the business after his father's death, and on his own death in 1900 the business was continued by his sons under the name of S. Severance. The present book was called forth by a need seen by the Severance Manufacturing Company in their dealings with engineers and purchasing agents. They saw that these men were laboring under a disadvantage in not having bound in one volume comprehensive data in relation to the standards for rivets and riveting. They, therefore, compiled this book, which certainly treats very exhaustively of the subject from many different angles.

A summary of the chapters, numbering fifteen, covers the early history of the rivet industry; the composition, manufacture and variations in rivet steel; the various methods of conducting the tests, both chemical and physical, on rivet steel; the standard specifications for rivet steel and for manufactured rivets; the design, calculation and efficiency of various types of riveted joints; the use of rivets in fabricating boilers, in building construction, in building vessels, in constructing bridges, in constructing steel cars and locomotives, in tank and chimney building, in pipe construction, and in many other miscellaneous uses. The furnaces and fuels used in heating rivets and the laying out and make-up of work and the various methods of driving, are all treated exhaustively, and many useful tables of standard heads and weights, important data and facts on the fabrication of steel, together with trade customs which have grown up in ordering rivets, the methods of packing, etc., contribute to make of this book a very useful and comprehensive hand-book for anyone interested in rivets.

G-E Insulating Compound—Bulletin No. 48704-A of the General Electric Company, issued July, 1920, describing various insulating varnishes, japans, oils, stickers and shellacs, paints and sealing compounds produced in the research laboratories of the General Electric Company.

Reading Wrought Iron Pipe. Bulletin No. 1 of the Reading Iron Company.

The Reading Iron Company is the world's oldest and largest producer of pure wrought iron pipe. The original mill and nail factory which grew into this tremendous establishment was erected in the city of Reading, Pennsylvania, in 1836. The catalog gives a very interesting summary of the origin and development of the wrought iron industry, a detailed account of the puddling process of obtaining wrought iron as practiced in the modern puddling furnace, an account of the manufacture of wrought iron skelp and its subsequent reduction to either butt weld or lap weld pipe. The balance of the bulletin is given over to a treatise on the excellence of wrought iron pipe as compared with steel and to an account of Reading wrought iron pipe and its remarkable records in service under very severe conditions. In great refrigerating plants, in coal mines, on oil transportation lines, and in great city buildings and power stations Reading wrought iron pipe has proven its ability to withstand corrosive conditions and vibratory bending and tortional stresses over long periods of service.

Viking Universal Pumps.—Twelve-page, attractive booklet published by the Viking Pump Company, Cedar Falls, Iowa.

This bulletin illustrates and describes the Viking rotary pump. This pump is manufactured in various types, both belt-driven and direct connected. There is also described a sanitary type of a Viking pump especially designed for use in creameries, refineries, canneries, and other food product factories, this type being so designed that it can very easily be taken down and cleaned daily. The Viking rotary pump shows a higher efficiency than the ordinary centrifugal, runs at a much lower speed, and maintains its efficiency over a very much wider range of capacities.

Kitchen's Reversing Rudders. The McNab Company, Bridgeport, Connecticut. A 22-page illustrated booklet describing Kitchen's reversing rudder, its advantages, and some installations.

Some very remarkable results have been obtained in the trials of this rudder on small and medium sized boats, and designs have been prepared and calculations made which show that these advantages would be even more marked on large ocean-going steamers.

Wood and Steel Tackle Blocks—The Marine Decking & Supply Company of Philadelphia, Pa.—This new 60-page catalogue just issued forms a very complete treatise on the subject of standardization in the field of tackle blocks and should prove of very great interest to stevedores, ship operators, ship owners, and ship builders from the marine standpoint.

Data Book for Engineers.—Eighty pages, handy pocket size. Bound in brown buckram. Published by the Locomotive Superheater Company, 30 Church Street, New York.

A very convenient book of tables and miscellaneous notes setting forth useful data in connection with the superheating of steam. In this book the operator of a steam plant, afloat or ashore, will find conveniently indexed and tabulated all of the information which he will require in working out problems. At the back of the book there is inserted a number of blank pages, cross-section lined, for the recording of notes and sketches.

The Jones Standard Underfeed Stoker. An attractive 32-page brochure describing the Jones mechanical stoker of the underfeed type, as manufactured by the Underfeed Stoker Company of America, Detroit, Michigan.

Mechanical stoking under the furnaces of the boilers of our great power stations has been a wonderful and continued success for almost a generation. The present high price of bunker coal has turned the attention of marine engineers to mechanical stoking, and undoubtedly this problem will be satisfactorily worked out with good results in both efficiency and economy.

This catalog describes a few of the thousands of plants that have been equipped with the Jones stoker and narrates in a simple, non-technical way the principles upon which the stoker is built and the details of its operation. The stoker consists briefly of a hopper feeding into a retort, the fuel in the retort being acted upon by a ram and pusher rod driven by a steam cylinder. The engineers of the Underfeed Stoker Company have been studying problems connected with boiler installations and the generation of steam for over twenty years and their engineering department is at the service of those who are wrestling with such problems.

Bulletin No. 41021-A of the General Electric Company—RF Adjustable Speed Motors.

This bulletin gives a detailed description and tabular specifications for the various sizes and forms of direct current type RF General Electric motors for industrial service. These motors are built in open, semi-enclosed, and totally enclosed field frame forms and in sizes from 2 to 50 horsepower.

American Ingot Iron Wire—Page Steel and Wire Company. A very handy pocket booklet describing the physical properties of American ingot iron wire and giving a lot of useful information on electrical units, mensuration factors, metric conversion factors, miscellaneous measures, decimal equivalents and the properties of various elements and metal compositions.

G-R Oil Heater. The Griscom-Russell Company, 90 West Street, New York, manufacturers of the well known Reilly oil heater of the coil type, have recently placed on the market a new oil heater unit of the straight tube type. This is to supplement their coil heater line and is known as the G-R Oil Heater.

The G-R oil heater unit is designed for the pre-heating of fuel oil before it goes to the burner and thus insures complete atomization of the oil and perfect combustion under boilers or in furnaces. The oil is pumped through the tubes and high pressure steam in the shell serves as the heating medium.

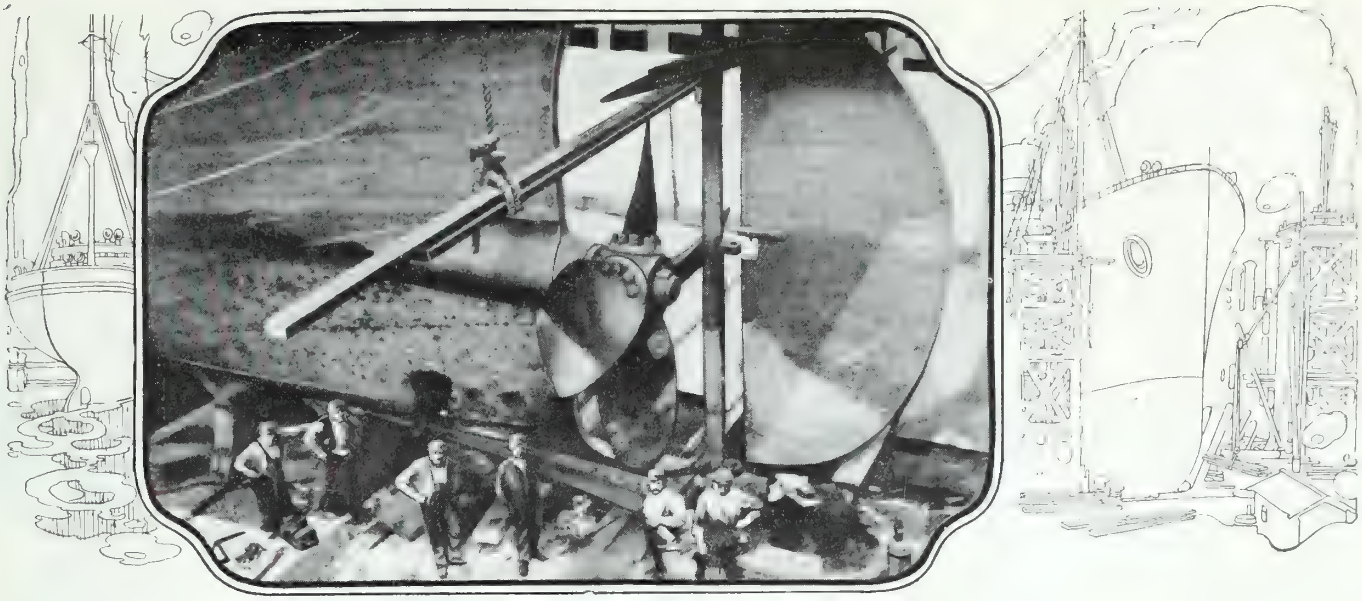
The shell of the heater is constructed of wrought steel welded to steel tube plates. The tubes are of seamless drawn steel expanded into tube sheets at either end.

The G-R oil heater is described in Form Sheet 167, published by the manufacturers.

Catalogue No. 11 of the Independent Pneumatic Tool Company, Chicago—This catalogue describes the Thor line of pneumatic and electric machines and hoists and tools to be used in connection therewith. Thor pneumatic tools are well known in all civilized countries of the world, and it would be hard to find a shop using air appliances of any sort where one or more Thor tools were not in service.

The Independent Pneumatic Tool Company maintains a very elaborate invention department and research laboratory for the development of new ideas for the increase of efficiency and durability of their products. One of the latest developments due to this research department is the use of pressed Vanadium steel connecting rods and pistons in their air engines, one piece of Vanadium steel forming the connecting rod with its crankshaft and wrist pin bearings.

Some of the new additions to the Thor line found in this catalogue are motor-driven air hoists, pneumatic sand rammers, universal vise for pneumatic drills, hose coupling, power screw driver, hose clamp and hose mender.



Launched again in Seven Hours thanks to Prest-O-Lite

BECAUSE of the extreme portability of Prest-O-Lite it was comparatively simple to weld the broken 20-ton stern post of this vessel.

The break was welded in less than seven hours by two operators; the cost was negligible in comparison to the expense of replacing a new stern post.

This is only one example of the way Prest-O-Lite and the oxy-acetylene process accomplishes wonders in the shipyard as well as anywhere else.

Ask us about the Nation-Wide Service of our forty plants and warehouses.

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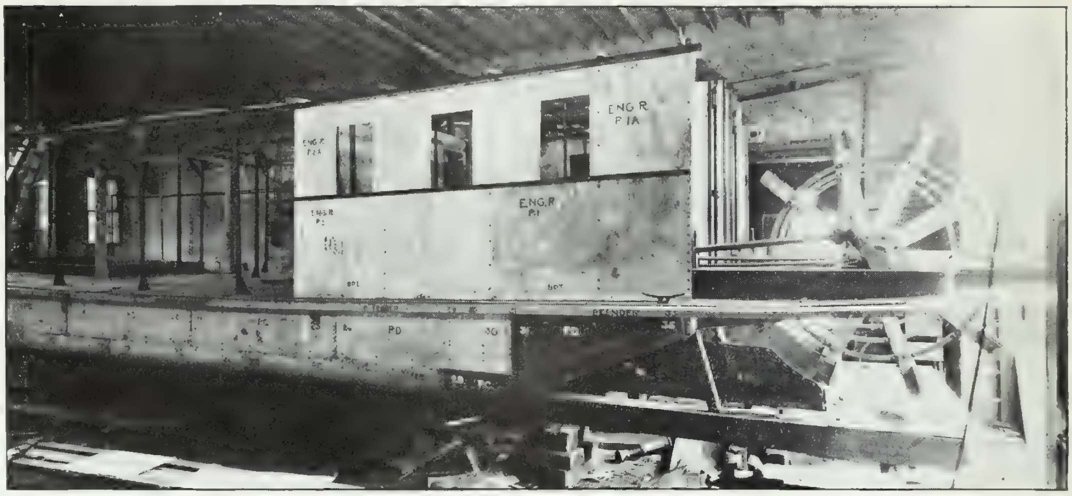
KNOCK DOWN BOATS

A REPRESENTATIVE of Pacific Marine Review recently had the pleasure of a visit to the shops of the Marine Iron Works of Chicago and was there surprised to find a very sizable stern wheel steamer being built for shipment to South America.

This steamer is very carefully designed with the idea in view of being fabricated in Chicago, put together there, marked carefully as regards the location of each piece entering into the construction of the hull, superstructure, and machinery and then knocked down, packed and shipped to South America for erection there. It transpired on inquiry that the Marine Iron Works had been in the business of building such boats for twenty-five years and that their boats were in service in many foreign countries, including China, many of the rivers of Africa, India, Mexico, Honduras, Philippine Islands. British Columbia, Peru, Brazil, Colombia and many others.



Knock Down Steamer for South America in the Erection Shop of the Marine Iron Works, Chicago

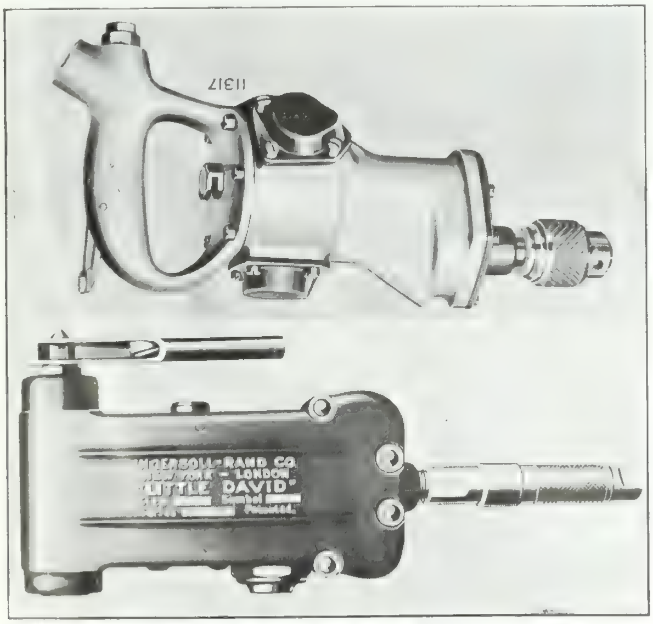
The particular boat under construction at the time of the visit of our representative was 65 feet long by 14-foot beam, with a draft of 12 inches light. The superstructure on this craft houses the boiler and engine rooms and the quarters for the crew, which latter are comfortably fitted up and equipped with modern sanitary plumbing. The entire boat is temporarily erected in the shop, the propelling machinery installed complete, the engines connected up and the steam test made and all adjustments perfected before dismantling for shipment. Each piece is very carefully marked for its position in the structure so that with intelligent supervision the most common labor can put the boat together with no difficulty; in fact, in the twenty-five years that the Marine Iron Works have been building these "KD" boats they have never received a complaint regarding the matter of reassembling at the point of destination.

Boats of this character have been furnished up to 200 feet in length. They are designed both for the paddle wheel type and for screw propulsion. Such boats are an absolute necessity in many places where it would be impossible to deliver a boat in its complete shape on account of the limitations of rail and water connections.

New Sizes of Small Pneumatic Tools

SEVERAL new sizes of small portable pneumatic tools have recently been added to the line of "Little David" pneumatic tools manufactured by the Ingersoll-Rand Company, 11 Broadway, New York. The new tools include a small size of close quarter drill to be known as No. 8, a small high speed pneumatic grinder in two types No. 601 and No. 602, and a lightweight drill furnished in two styles No. 6 and No. 600.

These new tools have been developed to satisfy the demands for a lightweight, high-speed machine for certain classes of work, for which the heavier tools were not entirely adapted. With the addition of these new sizes, the "Little David" line of tools will be exceptionally complete.



New Types of "Little David" Pneumatic Drills Manufactured by the Ingersoll-Rand Company

The No. 8 close quarter drill is as the name indicates, a machine for use in certain classes of work where the ordinary machine is not suitable, as close to a wall or corner. This new machine has a fairly high speed, running at 250 R.P.M. without a load, but will handle drilling, reaming or tapping up to 1¼" diameter. The tool is throughout a special design for close quarter work and has several unique features. The spindle which turns the drill, reamer or tap, is operated by three rocking levers connected directly to the pistons through connecting rods. The motor is of the three-cylinder type with pistons acting at right angles to the levers. A very steady continuous movement of the spindle is obtained as one ratchet pawl is always in contact with a tooth of the spindle. The construction is very simple and sturdy, with least number of parts.

The No. 601 and No. 602 grinders are lightweight, high-speed tools running with a free speed of 4200 R.P.M. and suitable for grinding, buffing or polishing work of a varied nature. Both machines have the same motor, but are equipped with different throttle and handle, the No. 601 having the closed type of inside trigger handle, while the No. 602 is fitted with the rolling type of throttle handle. A special feature of these tools is the three-cylinder motor—(very different from that of the No. 8 drill, described above)—which runs constantly in a bath of oil, insuring lubrication of all the parts. Lack of proper oiling has been one of the reasons for most grinder troubles in the past. The valve is made integral with the crankshaft, simplifying the design, and the piston and connecting rods are also of unique construction; ball and roller bearings are used throughout. The removal of a few screws enables the handle to be lifted off and exposes the entire mechanism to view, making easy inspection of the parts.

The No. 6 and No. 600 drills meet the demand for a light air tool for drilling small holes without breakage of drills. They will handle twist drills from the smallest size to ⅜ inch diameter. The free speed at ninety pounds air pressure is about 2000 r. p. m. The two machines differ essentially in the handle construction, the motors being the same. The No. 6 has the pistol grip type of handle, while No. 600 is furnished with breastplate and rolling throttle handle. Aluminum reinforced with steel bushings, is used wherever possible and results in very light weight.

WORLD WIDE WIRELESS

IN addition to the complete line of Radio Transmitting and Receiving sets sold by the RADIO CORPORATION OF AMERICA, for Ship to Ship and Ship to Shore Communication, the Corporation is in a position to quote upon:

- PORTABLE MULE PACK AND CART RADIO SETS.
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- MILITARY TRACTOR SETS OF THE VACUUM-TUBE TYPE.
- SPECIAL CONTINUOUS WAVE TRANSMITTERS FOR SUBMARINES, DESTROYERS, SEAPLANES AND FOR NAVAL BASES.
- SPECIAL INTER-FLEET RADIO TELEPHONE SYSTEMS FOR BATTLESHIPS AND OTHER NAVAL CRAFT.

The Corporation has in development a new series of Continuous Wave Tube Transmitters for the various fields of commercial usage. This apparatus bears the stamp of The General Electric Co., (U.S.A.) one of the world's largest electrical manufacturers.

TRANS-OCEANIC RADIO

Two hundred kilowatt radio frequency alternators are now in daily use in the Corporation's high-power trans-oceanic stations. The Corporation is in a position to bid on similar equipment for international communication.

SHIP-WIRELESS may be bought outright, may be leased, and may be bought or leased in addition to our service of inspection, maintenance and operation. We provide licensed, skillful and trustworthy operators. Also our service and inspection depots are located at all important seaports of the world.

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SMALL TOOLS AND SUPPLIES
Of All Kinds

Largest Stock on Pacific Coast

HARRON, RICKARD & McCONE
SAN FRANCISCO LOS ANGELES

A NEW PREHEATING FURNACE

Anybody who does welding to any extent realizes that the success of his work depends not alone on his skill as a welder, but also on the manner in which the job is prepared for the welding.

Experience has taught that metal cannot be welded cold, because as the weld cools it contracts and pulls away from the cold metal in the casting—thus rendering the job useless.

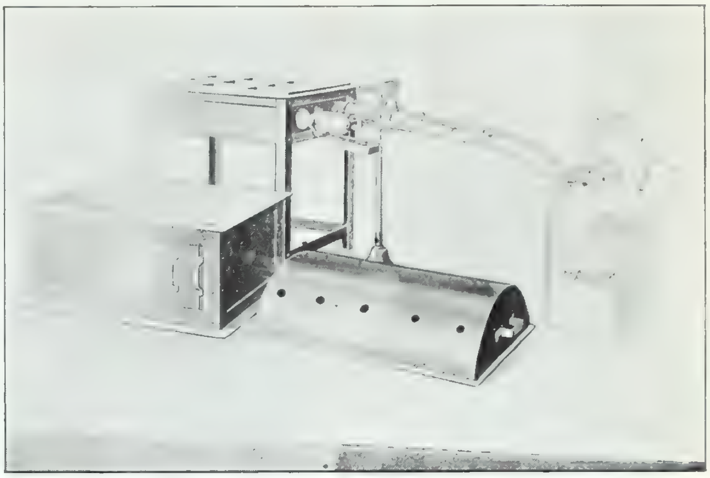
Consequently, some means of preheating had to be adopted. Charcoal fires have been most universally used. Charcoal at best is slow, undependable and costly. It is expensive not only in price, but in its effect on the welders and the work they do. The fumes make it impossible for a man to do his best work. And, the smoke is always an annoyance. Besides this, the castings are more often than not, unevenly heated causing internal strains which result in cracks or breaks, and so make the jobs worthless.

Many welders have resorted to all sorts of makeshift arrangements which seem suitable for small work, yet in all cases the risk of uneven heating is present.

Proper preheating is one of the principal factors in reducing welding costs. It is claimed that the consumption of welding gases can be reduced from 50 to 75 per cent where a good preheating medium is used.

A remarkably practical and satisfactory furnace for preheating is the one shown in the accompanying illustration. It consists of a deep box or oven, with detachable cover, mounted on a preheating table. The box is large enough to accommodate a block of six cylinders and other small parts at the same time. It is equipped with three sliding doors, enabling the operator to watch the work and see that it is not overheated.

The inside of the box is lined with asbestos, which retains the heat, and the oven can be used for reheating after welding. The burners can then be turned off and the castings allowed to cool gradually.



Hauck Preheating Furnace

By removing the box and cover, the furnace is converted into a preheating table. The combustion chambers through which the flames of the kerosene preheating burners travel, are lined with a patented type of refractory brick, which breaks the flame up into a number of small, soft, radiating flames. This is an important item in evenly and thoroughly transmitting the heat to the castings or broken machine parts to be heated.

This furnace has been found invaluable for such work as welding gears, crank cases and other parts with comparatively large areas and of intricate formation. The even heating prevents cracking, and avoids any possibility of unequal expansion.

The burners shown are the so-called hand pump type vaporizing kerosene oil as fuel. The manufacturer, the Hauck Manufacturing Company of Brooklyn, state that this furnace as used in their welding department has proven to be an economical, and indispensable piece of equipment.

HUGE TOOL FOR SHIPYARD

A very large plate bending brake was recently furnished the Newport News Shipbuilding and Dry Dock Company, Newport News, Va., by the Dreis & Krump Mfg. Co., of Chicago. The brake weighed 30 tons and has a capacity of bending plates 12 feet long up to ¾″ thick cold and is driven by a 40 horsepower motor directly connected to the brake.

The brake is built of steel throughout, the main body being constructed of large steel plates braced with truss rods, and the housings are steel castings. The links which connect the upper and lower jaws are huge forgings. Counter weights balance the bending leaf.

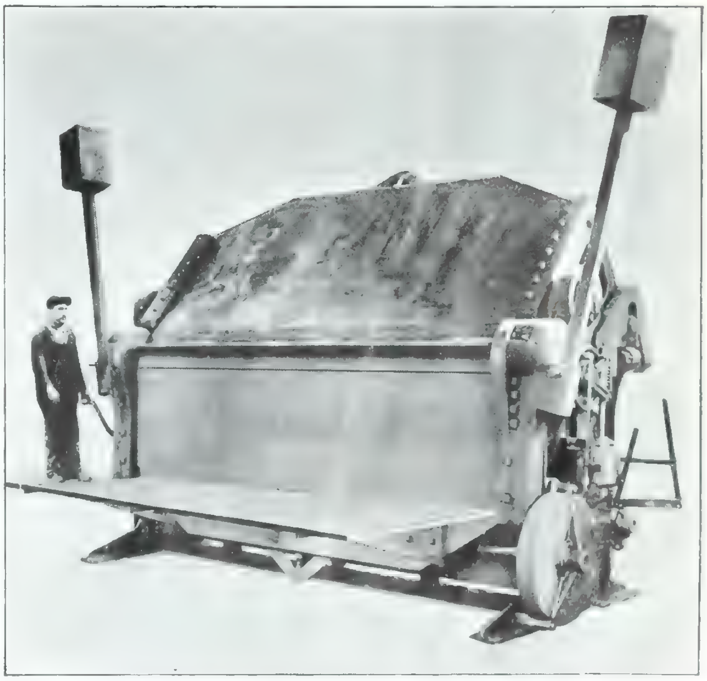
The motor is mounted within the machine, driving the friction clutch shaft, which has direct and reverse friction clutches. The reverse motion for lowering the bending leaf is obtained through an idle gear.

The upper jaw is raised and lowered by means of a power clamp consisting of a manganese bronze gear mounted on an eccentric which is controlled by a lever on each end. Friction clutches trip out when sufficient pressure is exerted on the plate, this pressure flattens buckled plates and clamps them securely and requires no adjustment for the various thicknesses of plates.

A draw bolt on each end provides adjustment for sharp and rounding corners. As sharp as 1½″ inside radius can be bent on ¾″ plates full length, and as large a radius as is desired. The nose of the upper jaw is faced with a tool steel edge. The opening between jaws is sufficient so that four sides of a plate can be flanged by inserting blocks between the two side flanges after they have been bent. After the plate has been clamped a positive friction clutch on the drive shaft is engaged, this actuates the bending leaf which is driven by three steel arched racks. An adjustable dog is provided which automatically stops the bending leaf at any desired angle. While the racks drive the bending leaf considerably over a right angle; when the bending leaf is lowered the racks drop below the bed so that plate is free to pass through between the housings which permits bends to be made at any distance from front or rear end of the plate.

An important feature of this machine is the rapidity of operation. The time consumed in making a right angle bend is less than one minute. Another feature is that no dies are required for different thickness of metal, radius of bends or degree of angle to which plates are bent.

Dreis & Krump Mfg. Co. have within the past year opened an office in San Francisco located at 508-510 Mission St.



Large Plate Bending Brake Built by the Dreis & Krump Manufacturing Company of Chicago for the Newport News Shipbuilding and Dry Dock Company

TOOL DISPLAY

Display of the Products of the Chicago Pneumatic Tool Company at its Seattle Branch Office

A SPLENDID show room arrangement of pneumatic and electric tools, air compressors, fuel oil engines and other devices manufactured by the Chicago Pneumatic Tool Company is being displayed in the Seattle branch of this company, located at 119 Jackson street, and in charge of Mr. Max Maximilian, district manager.

In the accompanying photograph will be noted a neatly printed card, reading:

A Boyer hammer
A Little Giant air drill
A Little Giant electric drill
A Little Giant grinder
For every purpose.

This display includes hammers, from a tiny stone hammer, weighing one pound, to a large riveting hammer for driving one and one-half inch rivets, air drills, from a small drill having a capacity of one-sixteenth of an inch to a large reversible compound drill for tapping and drilling up to three-inch holes, electric drills, from a tiny drill having a capacity of one-sixteenth of an inch to a large drill having a capacity of one and one-half inch, also air and electric grinders, holders-on, staybolt riveters, rivet busters, driftbolt drivers, rivet sets, chisel blanks, hose couplings, and hose, drilling stands, used in connection with electric and air drills.

A large stock of repair parts of all tools and machines manufactured by the Chicago Pneumatic Tool Company is carried in Seattle in connection with their service station, assuring the customers prompt service and quick delivery.

Each tool is tagged, showing dimensions, weight and the work for which each tool is particularly adapted. This gives the prospective purchaser a very comprehensive idea of every tool and enables him, in most cases, to select the tools best adapted for his work.

Each air compressor, from a small compressor having a capacity of 69 cubic feet per minute up to a large two-stage compressor having a capacity of 1000 cubic feet per minute, and each engine and other device, is tagged, showing all necessary data, such as dimension, capacity, weight, etc.

In addition to this, Mr. Maximilian has a compressor set up and operated by electric motor to demonstrate to the prospective purchaser just how the compressor is operated, and in this connection he has also a practical working model of an air lift pumping system, in operation, using air lift pump manufactured by the Weber Subterranean Pump Company of New York.

Mr. Maximilian, who during the recent war was pneumatic tool efficiency expert for the U. S. S. B. and is a recognized atuhority on pneumatic tools, is thoroughly conversant with all tools and machines manufactured by his company, as well as with pneumatic tools made by other manufacturers. Engineers and others interested in the use of air and electric tools, air compressors, fuel oil engines, etc., have been making this branch their headquarters while in Seattle, for the reason that Mr. Maximilian has such a comprehensive display.

In order that their customers may be given prompt personal service, the Seattle district office maintains a branch in Portland, room 304 Railway Exchange building.

LUDLUM WATER TUBE MARINE BOILER

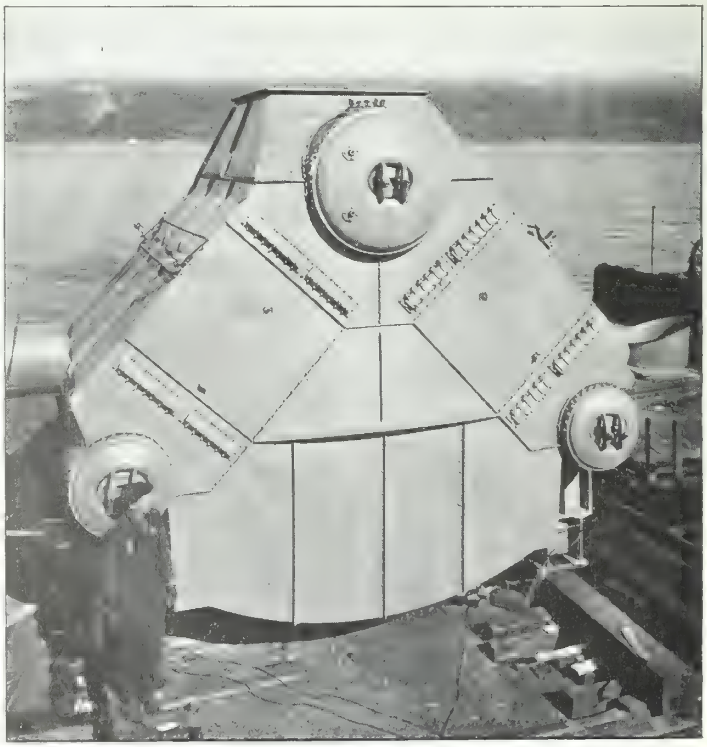
THE boiler here illustrated is of special interest because of its large size and high pressure. It is 15 feet high, 17½ feet wide and 12 feet deep, with a furnace of approximately 500 cu. feet volume. Its weight is 85,000 lbs. complete. It was built for a working steam pressure of 350 lbs. and tested to 550 lbs., hydrostatic pressure. The steam drum is 48 inches by 12 feet, with a tube sheet 1-13/16 inches thick. The water drums are 30 inches by 12 feet, with tube sheets 1-13/16 inches thick. All drums have double butt strap and double riveted joints.

The tubes are of cold drawn seamless steel, No. 10 gauge, 1⅝" outside diameter. Casing is of No. 10 gauge steel plate backed with asbestos mill board and 2 inches of high tempered special insulating material. The combustion chamber has a 9-inch fire brick lining backed up with the same insulating material mentioned above. The bottom of the furnace is shaped on the arc of a circle to allow for the proper expansion of the brick lining.

The unit is equipped with cleaning openings for each bank of tubes and also with Ludlum automatic soot blowers, the latter being operated by a chain pull. They automatically dispose of water of condensation in the piping and also shut off the steam automatically after cleaning is completed.

This boiler was too large to be shipped by rail and it was therefore transported on a barge, completely assembled, as here illustrated. On arrival at the Naval Station it was necessary only to set it on its foundation and connect up piping and smoke stack. No mason work or boiler setting was required.

This equipment was built in the shops of the New York Engineering Company at Yonkers-on-the-Hudson, New York. This company is now at work on a battery of boilers of this same type for the United States Navy, each unit of which will be much larger than the one here described. When completed they will be installed in one of the new battleships now under construction.



Ludlum Watertube Marine Boiler built by the New York Engineering Company for the Naval Station at Annapolis

Phenomenal Records
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RIVET SETS

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AN IMPORTANT CONSOLIDATION

ANNOUNCEMENT is made of the consolidation of two well known non-competing foundry equipment manufacturing companies, the Whiting Foundry Equipment Company of Harvey, Illinois, and the American Foundry Equipment Company of New York City.

The new organization will be known as Whiting Corporation and will be capitalized at $5,000,000. Mr. J. H. Whiting, president of the Whiting Foundry Equipment Company, becomes chairman of the board and V. E. Minich, president of the American Foundry Equipment Company (Sand Mixing Machine Company) and of the Foundry Equipment Manufacturers' Association, will be president.

As the lines of manufacture of the component companies do not overlap it is the intention to maintain all present manufacturing facilities. The Whiting plant at Harvey will retain the manufacture of cranes, cupolas, hoists, tumbling mills, core ovens and all other items of the established Whiting line, together with sand blast equipment and dust arresters. Sand cutting machines, charging trucks, core machines and steel flasks will comprise the bulk of work at the new "American" plant at 2935 West Forty-seventh street, Chicago, under the direction of E. A. Rich, Jr. Molding machines, jolts, flask specialties and pattern mounting materials will continue to be manufactured at the York, Pa., plant of the American Company, in charge of R. S. Buch.

The plans include maintaining and enlarging the present offices of the American Foundry Equipment Company, 366 Madison avenue, New York, as the eastern sales and export office of the combined lines.

Though production is heavy in all of the respectiv companies' lines, much development work is in progress. It is believed that important economies in manufacture and distribution will result from this combination of experienced manufacturing and selling organizations.

REMOVAL ANNOUNCEMENT

CHAS. CORY & SON, Inc., announce the removal on October 15, 1920, of their main office and factories from 290 Hudson street, 186 Spring street and 487-489 Greenwich street, to 183-187 Varick street, New York.

The new Cory building, which is located on the corner of King and Varick streets, is a modern reinforced concrete and glass building containing more than 100,000 square feet of manufacturing floor space. The increased facilities will permit of a larger and more complete stock of marine electrical materials being maintained from which immediate deliveries can be made.

The Cory corporation, pioneer manufacturers of American standard marine equipments, which is 75 years old this year, proposes to establish, in a section especially constructed for the purpose, a permanent marine exposition where there will be displayed all types of ships' electrical and mechanical telegraph systems, complete lighting equipments, instantaneous reading shaft revolution indicators, engine direction indicators and revolution counters, watertight marine loud speaking anti-noise telephones, the famous "Ramsay" anticipating and emergency marine governors, control systems for floating dry docks, fire alarm systems, and all other signaling and communicating systems required for naval or merchant ships.

The apparatus will be connected ready for operating, and a demonstrator will be present each week day from Monday until Friday to explain the technical features of the many products manufactured by this corporation.

It is expected that the Cory permanent marine exposition will be ready in the near future, and a press announcement of the formal opening will be made at a later date, when the public will be cordially invited to inspect the improved safety devices which are now available for marine use.

EFFICIENT RUST REMOVER

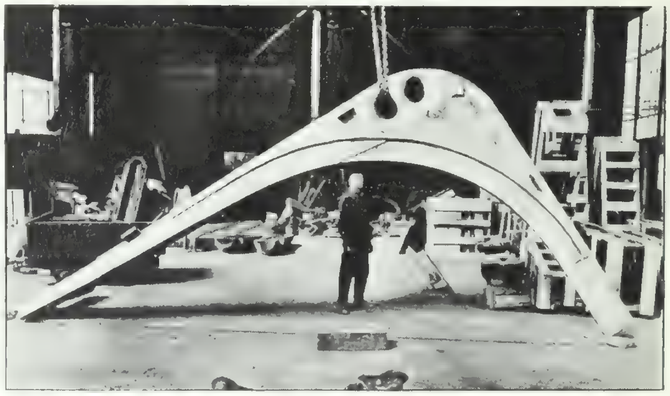
A NEW preparation known as "Meno" Rust Remover and Cleanser has recently made its appearance on the market, and it is one that bids fair to be a boon of considerable importance to all concerns and individuals engaged in or allied to any metal products industry, inasmuch as it appears to be one of the most important labor saving inventions of the age. The inventor of the preparation is a chemist of wide experience, who realized that the methods employed to remove rust, corrosion, etc., from all metal surfaces, required considerable time and involved high labor costs and set before himself the task of devising a much better and more economical cleansing method. He devoted many years to unceasing research and experimentation with the result that "Meno" Rust Remover and Cleanser was invented. That this preparation is remarkably efficient is proven by the enthusiastic endorsements received from those who have used it. The name "Meno" is a word derived from the Latin and means "less work." The material to which this name is given is a scientific combination and blending of certain chemical ingredients, which produces an electro-chemical action that rapidly loosens and dissolves rust, corrosion, grease, oil, dirt, carbon, paint or any other foreign substance irrespective of its age or hardness.

The action automatically ceases when contact between the cleanser and the metal is established. So that it will positively not injure or mar the surface of the metal in any way. There are two methods of using the preparation: First, apply it to the machine or part with a brush and allow it to remain for a short time, then brush or rub off and the metal is left bright and clean. Second, mix the preparation in a vat or container with water, then attach the machine or parts to wire or chain so that they will hang in the solution. No further attention is required since the process of cleaning goes on whilst the parts are immersed.

It is stated that the preparation is absolutely safe in every way and that it will not burn or explode. Another important point in its favor is that it will not cause corrosion or rust to form, for in fact, it protects the metal and makes it exempt from corrosive or disintegrating action for a long period after treatment and there need be no fear of injury to the most delicate part no matter what metal it is composed of.

The preparation is economical as the same solution may be used many times over without deterioration or loss of its cleansing power. Peter A. Frasse & Co. of 417 Canal street, New York, are the sole distributors, and are now establishing agencies in various parts of the country for the sale of this preparation.

A STEEL FOUNDRY RECORD



The illustration above shows the cast steel stem for the United States torpedo boat destroyer Dobbins. This casting weighs finished 7450 pounds. It was poured in the foundry of the United States Navy Yard at Philadelphia on March 19, 1920. The unusual feature which makes this a casting record was that this casting was poured from one heat in a 3-ton Greaves-Etchells electric furnace.